

SOLAR. STORAGE. FLEXIBILITY. 2026

A Post-Conference Briefing on SSF26

Key findings, ideas and priorities emerging from the conference.



#SSF2026

EXECUTIVE SUMMARY

Pakistan's solar transition is one of the most significant grassroots energy movements in the world. Farmers, shopkeepers, and households imported 57 GW of solar panels and mobilized USD 14 billion in private capital without a national policy to guide them. One in five Pakistani households now has solar. The country has already saved USD 12 billion in fossil fuel costs, strengthening its energy security and cushioning households and businesses from global fuel price volatility and geopolitical shocks.

Although the achievement is exceptional, however, it has exposed many gaps. Pakistan has solved the generation problem, but it has not built the system that manages it. This gap has resulted in a shrinking grid, leading to an exodus of affluent consumers, which is leading to evening peaks going unmet. Planning models are blind to distributed solar. The regulatory architecture is outdated. Less than 4 percent of solar was formally financed. Those who need affordable energy most - apartment dwellers, renters, low-income households, and women, have not benefited to the fullest. The country is navigating an energy system transformation without a national plan, without the data to build one, and without the market design to integrate the massive generation that people have deployed.

"Solar. Storage. Flexibility 2026 (SSF26)" conference convened over 300 international and national practitioners, policymakers, financiers, and advocates in Islamabad to address this directly. What emerged across two days of plenary sessions and parallel tracks is a coherent architecture of five interdependent pillars.

- Generation and storage integration to complete the 24-hour energy base.
- Smart grid and digital infrastructure to make the system visible, steerable, and plannable.
- Market and regulatory reform to write the rules the new system requires.
- Financial equity and access to extend the transition benefits to those who are left behind.
- Industrial localization to build rather than import the energy economy.

Across the five pillars, the work required is concrete. On regulation, the immediate priorities are time-variable electricity pricing to make battery storage economically rational, and legal recognition and piloting of virtual power plants. On digital infrastructure, real-time monitoring systems and updated planning tools, incorporating distributed solar, storage, and electric vehicle demand, need to be in place before the grid can be managed effectively at the scale the transition now demands.

Underpinning all of this, financial architecture requires the most structural attention. Standardized frameworks for banks to assess and price distributed solar and storage assets, aggregated structures that pool small installations into vehicles large enough for institutional investors, and blended finance instruments that use concessional public and multilateral capital to draw in private investment are the core building blocks. A dedicated national battery storage scale-up program, with a credible long-term demand signal, would anchor this.

The transition also needs to build in equity in terms of who benefits the most from this transition. Concessional financing linked to existing social protection programs, legal frameworks for rooftop rental and neighborhood energy sharing, and structured inclusion of women across ownership and workforce are actionable now. The Pakistan Prosumer Alliance could give the millions already generating their own electricity a formal voice in the regulatory processes that will shape what comes next.

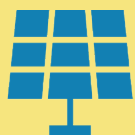
Building a domestic manufacturing base for batteries and clean energy technology is a time-sensitive opportunity. It requires a long-term demand signal, a corrected import tariff structure, and a deliberate shift from import dependency to technology transfer. The Pak-China Green Energy Connect could be a primary vehicle for this i.e., a structured pipeline that brings Chinese manufacturing expertise and investment into Pakistan's industrial base on terms that build local capability.

Pakistan's experience also carries significance well beyond its own borders. As the country that has achieved one of the fastest household-level solar deployments in the world, Pakistan is already a reference case for nations at earlier stages of a distributed energy transition. The lessons drawn from managing this transition at scale, including what the system requires next, are among the most consequential contributions Pakistan can make to the global conversation on energy access and climate action. Initiatives such as the 300 Million Solar Homes campaign formalize that role, positioning Pakistan as a country with hard-won implementation knowledge that others need.

Gap Analysis

Pakistan's solar transition is, by any standards, extraordinary. At SSF26, the Energy Minister Awaiz Ahmad Khan Leghari confirmed that 38 GW of solar PV has been deployed at the distributed level. This transition is real; it is people led, and it is politically recognized. It has become important both for energy security as well as national security, reinforced by the pressures of the Hormuz crisis, saving more than USD 12 billion in fossil fuel imports.

Distributed Solar's impact so far



57 GW+

Solar imports by FY2026



\$14B

Private capital mobilized



\$12B

Saved in fossil fuel imports



500K+

Jobs created (300K direct)



46 Mt

CO2 emissions avoided



1 in 5

Households with solar

The Battery Wave Is Arriving Next



7.6 GWh

BESS imports
(2018–2025)



3.1 GWh

Residential BESS imports
(2018–2025)



1 in 26

Solarized Households with
Battery Storage installed



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Let me be very direct about where we stand. Pakistan does not have a generation problem anymore. What we have is a flexibility problem.

Sardar Awais Ahmad Khan Leghari

Federal Minister for Energy, Ministry of Energy (Power Division), Pakistan

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The solar story of Pakistan is a blueprint for many. Now, we need to move towards building our institutions, market mechanisms and financing channels to ensure that this journey results in a lasting energy paradigm, with people at its core.

Zeeshan Ashfaq

Chief Executive Officer, Renewables First



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If we get to the intended goal, by the end of this decade, we would be actually powering 1 billion people from rooftop solar.

Sonia Dunlop

Chief Executive Officer, Global Solar Council





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The 2020s and the 2030s perhaps will be the decades where the world transitioned from the fossil fuel era to the renewable energy era. One of the key things required was renewable energy, but on top of that, the holy grail, the final solution, was storage.

Waqas Moosa

Chief Executive Officer, Hadron Solar
Former Chairman, Pakistan Solar Association

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The real story is happening in Pakistan, and the world really can learn a lot from it. What Pakistan has done in distributed solar in two years has taken other countries a decade. The question is whether the institutions can move at the same speed as the people.

Richard Harrison

Senior Director, Global Energy Transition Initiative, Climate Works Foundation



Energy Paradox

The SSF26 conversations first identified the structural weaknesses of the previous fossil-fuel-based, centralized system before laying out the foundations for a new one. The previous system was built around centralized generation and dispatch. The fossil fuel IPPs of the last decade were designed to close a generation gap, and they did at enormous and ongoing cost. Capacity payments have ballooned since then. Circular debt has compounded, leading to structural inefficiencies across the power system.

Then a new reality emerged. Distributed generation became cheaper to build, run, and own than anything the centralized power system could offer. As a result, people moved to distributed solar assets. The shift arrived at a speed which institutions could not catch up.

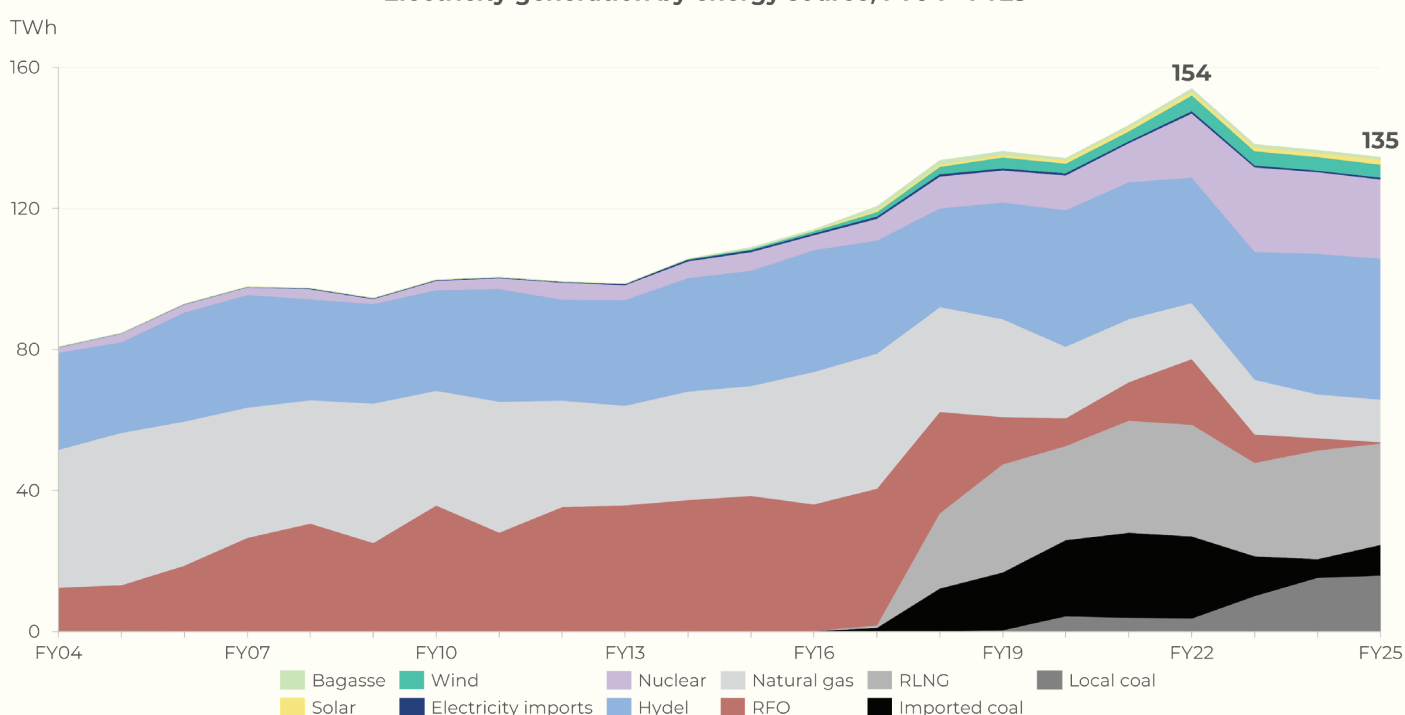
However, the operating model of the existing power system remained unchanged. Falling solar costs, the arrival of storage, and the prospect of flexible and intelligent energy systems all landed in a regulatory environment designed for a different era. The result led to a paradox, whereby, clean generation problem has been solved, but the system is lagging far behind. The gap is no longer megawatts. It is the operating system: the data, digital infrastructure, flexible grid and generators, market design, regulatory frameworks, and institutions that would allow the country to coordinate what its people have already built.

The following structural issues in the existing system were identified at the conference:

- 1. The grid is shrinking, not growing.** Grid electricity generation fell by 2% compared to last year, which is the third consecutive year of decline. Meanwhile, distributed solar generation continues to rise.

Grid revenues are falling as affluent consumers exit. Distribution companies carry high line losses and unsustainable capacity payments. The single buyer model was never designed for a world in which citizens own the supply.

Electricity generation by energy source, FY04 - FY25

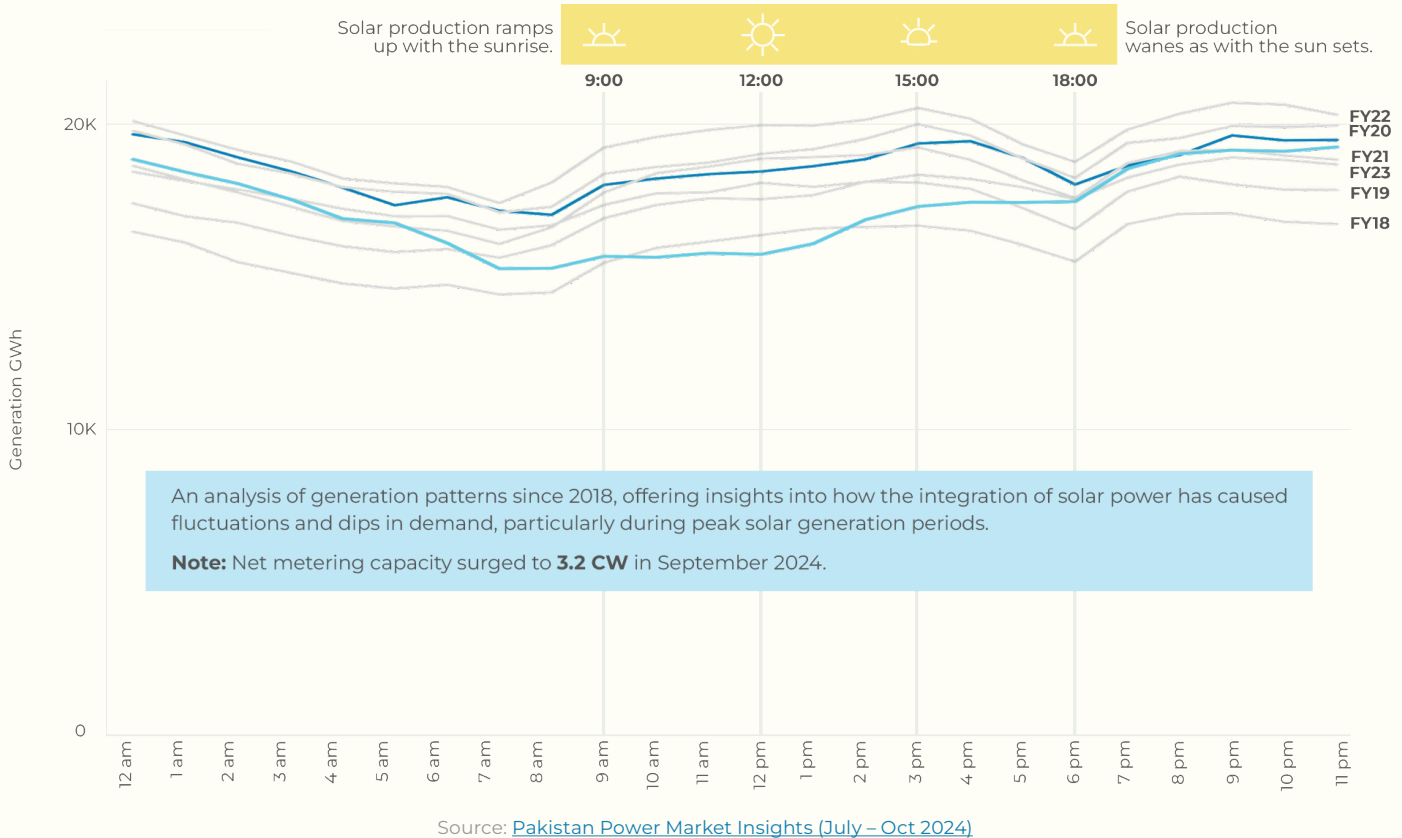


Fiscal year (FY) 2025 refers to July 2024- June 2025.

Data Source: NEPRA State of Industry Report 2025 & RF's calculations

Source: [Pakistan Electricity Review 2026](#)

- 2. The duck curve has arrived.** Midday solar surpluses now coexist with steep evening demand peaks. Pakistan's energy transition works for daytime, and battery storage remains the missing component to make it work for the remaining hours.



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Australia installed 480,000 battery storage units in under 22 months. We shifted solar dispatch for two to three hours from day to evening. Pakistan already has solar. It now needs BESS and Time-of-Use (ToU) pricing to do what Australia did, i.e. kill the duck curve. Pakistan can do this faster because the price curve has moved even further since we started.

John Grimes

Chief Executive Officer, Renewable Energy Council Asia Pacific (RECAP)

3. **Planning has not caught up.** You cannot plan what you cannot see. Pakistan has deployed 38 GW of distributed solar but has no real-time picture of where it is, how much it produces, or how it behaves under load. Grid operators at both transmission and distribution level lack the digital infrastructure to keep up with the pace of deployment. The problem runs deeper than missing data, and the planning model itself was built around centralized supply and demand, not designed to capture distributed solar assets. Something the Integrated Energy Plan (IEP) must account for,, electrification is now happening behind the meter across millions of households. The country is navigating a grid transformation without a national plan and without the data infrastructure to build one.
4. **Regulation and institutions have not adapted.** The rules governing the power sector were written for a centralized, utility-owned energy world. They were not written for prosumers, aggregators, or flexibility markets, and they have not been updated to reflect the world that now exists. The distribution grid code dates to 2005. Time-of-use tariffs that incentivize Customer Owned Renewable Electrification (CORE) assets have not yet been introduced. The market has moved while the architecture has not.

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No agreed method yet for costing fast-frequency-response or voltage-response services from BESS. Different markets have produced different formulas. We are still in the process of figuring it out.

Salman Gul

Director of System Operations,
Independent System and Market Operator



5. **The transition is inequitable.** Despite massive solar deployment throughout the country, the deployment of high quality, adequate systems still lacks penetration among apartment dwellers, renters, and low-income households. The grid, already under structural stress from years of capacity payments and circular debt, continues to become more costly. Those without access to solar and storage have no alternative but to absorb those costs. That changes only when solar and storage reach them too.
6. **Pakistan consumed the solar revolution without building it.** 80-90% of the solar value chain (wafers, cells, modules, and inverters) was imported from China. Pakistan deployed the technology at extraordinary scale but built no industrial base around it. The import bill is chronic. The supply chain is fragile. The manufacturing value stayed abroad.
7. **Finance is misaligned.** The solar rush was financed entirely by household capital. Citizens invested their own savings without waiting for banks or donors. Less than 4% of solar was formally financed. Development finance institutions missed the wave entirely. The next phase will not be so forgiving. Grids, storage, and industrial supply chains require capital that household savings cannot provide. The money exists in the system. The problem is not liquidity; it is willingness. Distributed clean energy assets fail conventional securitization tests, carry no secondary market, and lack the credit data to price risk. The financial architecture was built for large, centralized projects. It was not built for this. Development finance must now evolve to aggregate what citizens have built.

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Climate finance must reach households, SMEs, and communities directly, not concentrated on scale. Pakistan, driving the Solar Rush with household capital, should be recognized as an innovator, not just a recipient of aid.

Senator Sherry Rehman

Chair Standing Committee on Climate
Change



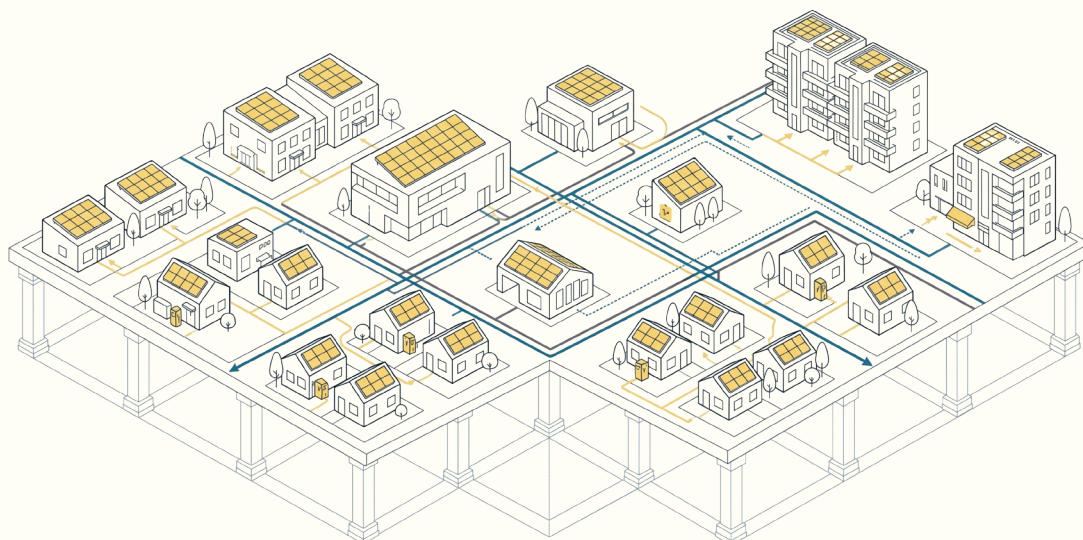


Moments from SSF26, Islamabad Serena Hotel

The Architecture of the New Energy System

The new energy system is being built by citizens which is distributed and solar-powered. The question is no longer whether it will emerge. The question is whether it will be built with the intelligence, equity, and institutional coherence it requires. That demands integrating what citizens have already created with the existing grid architecture. It demands extending the system's reach to those who are left behind. And it demands building institutions, markets, and digital infrastructure capable of sustaining it at scale.

The pillars that follow set out the architecture of that system across the technical, economic, financial, social, and political dimensions that any durable energy transition must address. SSF26 examined it through its plenaries and parallel tracks, mapping the foundational pillars, the enabling conditions each requires, and the specific action items needed to move from discussion to delivery.

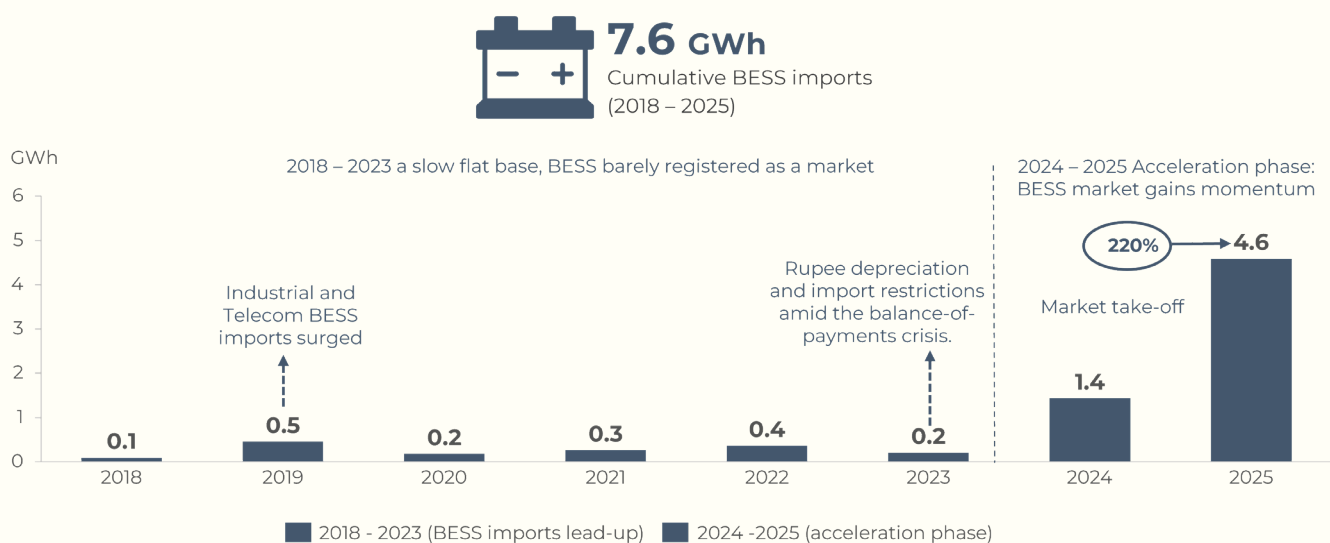


Pillar 01 - Generation and Storage Integration

The 24-Hour Energy Base

The Power System needs to turn its biggest generating asset, distributed solar, from daytime generator to round the clock. The missing instrument is battery storage, and its economics have shifted decisively in Pakistan's favor. Battery pack prices fell 45 percent in 2025 alone. Global capacity additions grew by 46 percent in the same year. Pakistan has already imported 7.6 GWh of BESS pointing towards the inception of a battery rush.

Lithium-ion battery energy storage system volume imported, 2018 - 2025



Source: [From Solar Panels to Storage: Pakistan's Battery Boom Begins](#)

The Australian precedent has useful learnings. Four hundred and eighty thousand battery units installed in under 22 months was enough to “kill the duck curve”, not by adding generation, but by storing midday solar surplus and dispatching it during the evening peak. Pakistan has the deployment volume and the price signal to replicate that at scale. What it lacks is the tariff structure that makes the economics work at household and SME level, and the planning frameworks that give storage a defined role in the national energy system.



Moments from SSF26, Islamabad Serena Hotel

The direction of travel is clear. National Grid Company (NGC) has signaled a 1,000 MW BESS procurement. A parliamentary committee on battery storage has been convened. The question now is pace. The signals are right. The institutions must move at the pace of economic demand.

Planning must evolve; IGCEP and ISP need to explicitly account for utility-scale and distributed storage, distributed solar, EVs and demand-side flexibility. As consumer-owned resources increasingly shape system demand, bottom-up, DER-aware forecasting will be necessary to complement traditional top-down planning.



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Future power plants will not be built. They will be disaggregated, existing infrastructure digitized and controlled.

Babar Hussain

Co-Founder & Director, Atmosphere, UK

Action Agenda

- **Integrate storage into national planning.**
 - Integrate distributed solar, BESS, EV demand, and demand-side flexibility into IGCEP and ISP using bottom-up, DER-aware forecasting.
 - Prioritise data collection and measurement mechanisms before heavier regulatory overhauls.
 - A coordinated procurement framework across NGC, DISCOs, and ISMO so a single battery asset can serve multiple entities simultaneously, instead of each building separate, uncoordinated fleets.
- **Build the revenue architecture for storage.**
 - Launch Time of Use tariff mechanisms to incentivize Behind-the-meter BESS at household and SME scale.
 - Design a BESS compensation mechanism based on charge and discharge arbitrage, combined with a revenue stacking model including net-metering incentives, VPP participation fees, and grid discharge compensation.
 - Test and pilot these models before scaling. ISMO has committed to the compensation mechanism within eight months. That timeline must be held.

- **Mobilize the capital.**

- Extend State Bank of Pakistan (SBP) 6 percent concessional finance scheme to cover BESS alongside solar.
- Where solar assets alone are insufficient as collateral for IFIs, develop structured finance anchored on DISCO balance sheets. Deploy blended and concessional capital to cover financing gaps while structural reform remains incomplete.

- **Execute and hold accountability.**

- Coordinate the NGC 1,000 MW BESS procurement across DISCOs and ISMO.
- Move the parliamentary committee on battery storage from convened to active, with published delivery milestones and formal accountability for each institution named in this list.



Table Discussion

Like-Minded Coalitions for distributed solar?

To navigate national budget deficits and the strict IMF tariff/contractual restrictions that lock in tariffs, Pakistan should lead an international coalition of like-minded developing nations to collectively advocate for incentivizing clean energy policy flexibility.

Politics, Partnerships & People: Driving Pakistan's Solar-Storage Transition



Pillar 02 · Smart Grid and Digital Infrastructure

Visibility and Coordination

Pakistan has deployed 38 GW of distributed solar as of June 2025. The deployment number is only increasing with time. At the same time data on where it is deployed and how much power it generates is scarce. Add the behind the meter connections which are influencing demand patterns on the grid. We are left with a power system that is operating on data that it does not have. The second pillar is making the invisible visible and building the digital infrastructure to act on what is seen.

Experts at SSF26 converged on a single operating framework:



Visibility must be translated into coordination. As distributed solar, batteries, EVs and flexible demand grow, DISCOs and ISMO need the digital infrastructure, communications, and operational capabilities to monitor and coordinate an increasingly active grid.

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You cannot plan what you cannot see. We have 38 gigawatts of distributed solar. We do not know exactly where it is. We do not know how much is generated on any given day. That is not a data problem. That is a governance problem.

Dr. Khalid Waleed

Research Fellow, Sustainable Development Policy Institute



Action Agenda

- **Build the visibility layer**
 - Market Operator delivers SCADA on its committed two-year timeline, which is the transmission-level backbone.
 - DISCOs scope and procure a national DER monitoring system combining registration data, satellite imagery, smart meter readings, and weather-based generation estimates.
 - Launch a pilot within one DISCO to track solar, BESS, and EV adoption at a localized level, designed from the outset for replication across all DISCOs.
- **Build the control and coordination layer**
 - Develop a DSO active-management architecture that can monitor and coordinate distribution-level resources, support real-time network management, and interface with aggregated consumer resources enabled by market and regulatory arrangements.
 - Establish communication and interoperability requirements for smart inverters and distributed resources.
 - Build interfaces between DISCO-level visibility/control systems and ISMO's national coordination architecture.
- **Establish digital and technical standards**
 - Gazette the updated distribution grid code requiring smart inverter communication and DSO duties.
- **Building trust through transparent data sharing**
 - Make energy data publicly accessible to regulators, researchers, think tanks, and media.
 - Develop a consumer data security and guardrail framework to address the trust deficit around demand response participation, specifically around ceding control of home appliances.



— Moments from SSF26, Islamabad Serena Hotel —

Pillar 03 · Market and Regulatory Architecture

Re-Writing Rules of the New System

The rules governing Pakistan's energy market were written for a different system. The current regulatory architecture does not accommodate distributed resources, consumers, aggregators, or flexibility markets.

The utility role must also change. The current revenue model rewards energy throughput. A system orchestrator role i.e., coordinating distributed assets, procuring flexibility, managing real-time balancing, requires a different incentive structure. Regulators and market operators must design that structure, not leave it to utilities to choose voluntarily.



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The sequencing matters enormously. You need the technical foundation before you can regulate it, and you need to regulate it before you can build a market. But you can pilot without waiting. A sandbox costs nothing compared to the cost of delay.

Dr. Kuiper

Distributed Energy Resources Expert, Australia

The international precedents point in the same direction. In the United Kingdom, Ofgem's RIIO reforms created a level playing field between capital infrastructure and distributed energy solutions, allowing flexibility from commercial, industrial, and water utilities to compete with grid investment on equal terms. Pumping loads are a natural entry point; Pakistan has the same asset.

Taiwan's Gogoro network offers a different lesson: no device is too small to support grid stability. A thousand battery-swap stations, managed as a coordinated fleet, provided meaningful grid support during a major earthquake. Aggregation turns small assets into critical infrastructure. Technical capability exists. The regulatory framework to enable it is not yet there.

The reform requirement extends beyond distributed resources. Pakistan also needs mechanisms to define, procure and compensate system-level flexibility and ancillary services, allowing storage, flexible generation, and demand-side resources to compete in providing services required by the system.

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Without these mandatory regulatory instruments, of which distribution codes are the foundational documents, or without revising them, VPPs would remain a dream.

Faizan Ali Shah

Energy Advisor - Ministry of Energy (Power Division)



Action Agenda

- **Establish the flexibility market architecture**
 - Define priority staff and flexibility services required by the system.
 - Establish mechanisms through which BESS, flexible generation and eligible demand-side resources can provide and be compensated for these services.
 - Enable revenue stacking where technically feasible, allowing flexibility resources to provide multiple services rather than relying on a single revenue stream.
- **Close the participation and legal gaps**
 - Establish transparent participation and compensation arrangements for eligible consumer-owned resources providing defined system or market services
 - Define “Aggregator” and “DER aggregation” in both the market commercial code and distribution code, to allow for VPP and consumer end BESS solutions to participate in the market
- **Establish a regulatory sandbox and initiate pilots**
 - Establish a regulatory sandbox for BESS ancillary services, demand response, and VPP aggregation so that revenue models can be tested, and the evidence base built before full regulatory design is committed.
 - Identify and resource priority pilot use cases, including BESS ancillary services, demand response and DER aggregation, based on technical readiness and scalability.
 - Begin with commercial office building AC pre-cooling and residential air-conditioning demand aggregation which is the lowest-risk, most scalable entry point.
- **Reform market price signals, based on new realities**
 - Publish CTBCM prices and issue the demand-side management regulations.
 - Finalize and enact the demand-side management regulations.
 - Develop participation and settlement arrangements for demand response and other flexible demand resources.
- **Reform the utility revenue model**
 - Design a regulatory incentive structure that rewards system efficiency, flexibility procurement, and DER integration rather than energy throughput. The regulator must build it into the tariff determination and performance framework for distribution companies.



— Moments from SSF26, Islamabad Serena Hotel —

Pillar 04 · People and Access

Embedding Equity And Inclusion

Pakistan's solar transition was people-led, but not people-inclusive. The same citizens who drove one of the fastest distributed energy deployments in the developing world are now at risk of being divided into two groups: those who benefited, and those who are left to subsidize the benefits received by others. At the same time, another group remains largely outside this dynamic: people who are either completely off-grid or grid-deprived and need additional support to access reliable energy. The equity gaps in this transition are structural, not incidental. Women are absent from ownership and from the workforce. Apartment dwellers and renters are legally excluded from the market. Those who need cheaper energy are the people who lack access to high-quality systems the most.

International experience offers two cautionary precedents. South Africa mandates community ownership in its renewable programs, but the experience shows that ownership on paper, managed by boards that decide for communities rather than with them, is token ownership. The lesson is not to mandate participation but to design for genuine agency. The Philippines case demonstrates a different trap: projects designed around donor cycles produce good pilots that do not survive. Reliance on grants is a structural flaw. Pakistan's equity interventions must be built on durable regulatory and financial models, not project-based funding.

The long tail of economic benefit is also missing. Planning focuses on construction jobs. The larger and more durable opportunity lies beyond them, i.e., maintenance, parts supply, technical services, local aggregation. These jobs sustain the transition after the panels are installed. Planning must connect those opportunities to local economies, or the economic case for inclusion remains incomplete.

The principle that must anchor this pillar is simple: equity is an engineering requirement, not an afterthought. It must be built into regulation, planning, and financing from the design stage and not added as a social objective once the market architecture is set.



MDB financing needs to reorient towards battery storage, smart grids and digital energy platforms instead of focusing primarily on new generation projects.

Table Discussion

Socio-Political, International and Consumer Momentum Session

Action Agenda

- **Build the measurement framework.**
 - Establish annual tracking of equity indicators: solarization rate by income, household electricity savings, share of deployments formally financed, and women's representation in ownership and workforce.
 - Develop an equity design framework for inclusion in all planning and regulatory documents.
- **Reform the legal architecture of access.**
 - Legally recognize DISCO rooftop rental models and neighborhood micro-grids, so communities can participate without upfront capital ownership.
 - Update property and grid regulations to include apartment buildings and renters as eligible prosumers.
 - Link concessional financing schemes for low-income households to Cash Transfer and Poverty Alleviation Programs.
- **Reform access and compensation rules.**
 - Change net billing rules so prosumers can support grid operations.
- **Make women's inclusion compulsory.**
 - Establish technical training institutes for female technicians.
 - Extend the Federal Ombudsman's jurisdiction over government-led entities to support greater women's ownership and raise awareness of redress mechanisms.

How is Solar changing lives?

The transformational power of solar can truly be understood by listening to those whose everyday lives are changed by it. Awais Abid's village in Kasur, on the Pakistan-India border, floods every year. Flooding disrupts villages in his district every year, and the electricity fails along with it. Power is never there when it is needed the most.

His family put solar panels on their roof because the electricity bill kept coming regardless. Solar changed that. The household now saves money, charges phones and stays in touch with nearby villages during floods. The sun never sends a bill. Loadshedding no longer controls their lives.

“When the grid is the first thing to fail, having power in an area like this is the difference between access and isolation.

Under current net billing, the price we get for selling electricity is much lower than the price we pay the grid. People who worked hard to install solar feel this is unfair. We installed solar because we needed it, not because it was a luxury.

Awais Abid
Community Representative

- **Design for durability.**
 - Ensure equity interventions are anchored on regulatory and financial models outlining project cycles and donor timelines.
 - Update regulations and guidelines that establish the financial and legal feasibility of micro-grids, including Micro-Grids regulations, allowing grassroots expansion that can eventually connect to the main grid. The neighborhood micro-grid model linking lower and middle-income communities to share power and build resilience, must have a legal home before it can scale.
 - Launch pilots for rooftop rental and neighborhood micro-grid models.

Pillar 05 · Industrial Ecosystem and Localization

Building, Not Just Consuming

The fifth pillar marks the shift from serving as a market for the clean energy revolution to becoming a manufacturer within it. Pakistan missed the solar manufacturing wave entirely: 80 to 90 percent of the solar value chain is imported. The battery storage manufacturing opportunity is now emerging, but capturing it requires fixing economic fundamentals, not simply adding incentives. The most significant structural barrier identified at SSF26 is the inverted tariff structure, under which raw materials are taxed at a higher rate than finished imported products. This single distortion undermines the economics of domestic manufacturing before it can begin. Pakistan must correct the tariff structure, create incentives through SEZs, and support B2B partnerships through joint ventures.

For battery storage, the demand signal is still absent. Manufacturers cannot invest in a five-year production line without a five-to-ten-year policy. Without that policy certainty, the battery rush will be imported just as the solar rush was. Standards and testing infrastructure are also essential to provide the credibility export markets require and to ensure domestic quality assurance.



Session Discussion

The opportunity for Pakistan is not just to buy batteries from China. It is to make them with China. That distinction will define whether this country becomes a consumer of the energy transition or a participant in it.

Building Industrial Ecosystems for Solar and Storage Session

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We are not asking for subsidies. We are asking for a level playing field. Right now, raw materials attract a higher tariff than the finished product. That is not a market. That is a policy that manufactures import.

Sundas Saifullah

Chief Operating Officer, Atom Power



Action Agenda

- **Establish long term policy certainty and localization incentives.**
 - Gazette the BESS manufacturing policy with a five-to-ten year demand signal.
 - Fast-track CPEC SEZ designation for clean tech manufacturing with mandatory technology transfer and engineering training conditions.
 - Set local content requirements as a defined percentage of components manufactured domestically, so that SEZ investment builds productive capacity rather than deepening import dependency in a different location.
- **Activate enterprise-to-enterprise connectivity.**
 - Operationalize platforms with an active B2B deal pipeline.
- **Establish standards and testing infrastructure.**
 - Enforce IEC 61215 and relevant international BESS safety and performance standards rigorously to block substandard imports.
 - Establish local PV and BESS testing laboratories to certify both imported and locally produced technologies.
 - Develop an industry ecosystem map to enable buyers and regulators to verify Tier-1 suppliers.
- **Build the certified workforce.**
 - Develop a pipeline of certified solar technicians and installers through TEVTA and equivalent institutions.
- **Initiate the recycling framework now.**
 - Launch a battery and solar panel recycling program before wasting volumes overwhelm informal disposal. The solar rush has already deployed on a scale that will produce a material waste crisis within the decade. Getting ahead of it is a fraction of the cost of managing it.

Global localization pathways

Every country that successfully built a clean energy manufacturing base made some moves. Long-term stable policy gave investors a horizon to plan against. A strong home market came first in some cases before attempting exports. And a complete local supply chain replaced import dependency piece by piece, not all at once. Different approaches for localization include:

China's State-Led Ecosystem

China transitioned from a technology importer to the world's largest energy manufacturer within two decades due to three key factors: **long-term stable policy** (giving investors confidence), a **strong home market** with early local projects to scale quickly, and a **complete local supply chain**.

India's Demand-Pull and PLI Model

India successfully utilised a **Production Linked Incentive (PLI)** scheme to create a strong demand pool and enable local manufacturing. Under its "Made in India" policy, a green channel and tax/duty rebates for manufacturers helped lower production costs. However, some Indian firms struggled when incentives existed without a guaranteed off-take mandate.

South Korea and Indonesia

South Korea leveraged a **stable export model driven by Chaebols** (such as LG and Samsung), while Indonesia successfully leveraged its **domestic raw material resources**.

Key Initiatives and Opportunities

Six high leverage initiatives emerged from the conference that cut across the five pillars.

Initiative 01 - Intelligent Clean Energy Platforms

The most ambitious proposal to emerge from SSF26 is for Pakistan to design and present an Intelligent Clean Energy Platform. This platform could be supported by multilateral funds, development partners, public, private, and philanthropic capital. Rather than approaching each MDB with a generation project, Pakistan should present a single, coherent program document for the intelligent layer: storage at scale, smart metering, AI powered system optimization, virtual power plant infrastructure, and the digital backbone that makes it all work together. This reframes Pakistan from a recipient of piecemeal financing to a coordinator of a system level transformation. Such a platform can also align with Pakistan Country Prosperity Plan (CPP) and Country Partnership frameworks of existing multilateral and bilateral development programs.

Initiative 02 - National BESS Scale-Up Program

Building on the Australian playbook and the government's own signals, Pakistan should launch a coordinated national BESS program. The four elements that work together are: Time of Use tariffs to make the economics viable at household scale; a concessional financing window for household and SME battery storage; a coordinated procurement framework across NGC, DISCOs, and ISMO; and a BESS manufacturing policy to develop the domestic supply chain.

Initiative 03 - VPP Pilot Program

The regulatory groundwork for the wholesale market is close to ready. Competitive Trading Bilateral Contracts Market (CTBCM) is set to go live with Use of System Charge (UoSC) approval. The window is open to launch Pakistan's first VPP pilot. Recommended starting points are commercial and industrial clusters with existing solar assets, large agricultural pump loads as flexible demand resources, and urban residential blocks where behind the meter aggregation is feasible. The sequence is: sandbox, test and iterate, then scale.

Initiative 04 - Pakistan's Leadership of the 300 million solar homes campaign

The Global campaign to power 300 million homes through rooftop solar by 2030 has identified Pakistan as its flagship case. The conference recommendation: curate and export lessons from Pakistan's playbook. Document what worked, what failed, and what the regulatory conditions were that enabled people to lead the transition at this scale. Pakistan's experience in distributed solar at mass scale is a global asset. The country should be sharing the knowledge, not only receiving it.

Initiative 05 - Pakistan Prosumer Alliance

Establish a Pakistan Prosumer Alliance modelled on global prosumer alliances like in Australia. The Alliance would unite rooftop solar users, technical experts, civil society, and community organizations around a Defend and Extend strategy: defend existing prosumer rights against rollback and extend access to those currently excluded. This is a structural counterweight to industry capture of the regulatory process.

Initiative 06 - Pak-China Industrial Partnership on Storage

China-Pakistan energy engagement is currently state to state. The transition requires enterprise to enterprise connectivity. The Pak-China Green Energy Connect platform, unveiled at SSF26, is the vehicle. The platform is mandated to facilitate business to business joint ventures for battery manufacturing and smart inverter localization; connect Pakistani engineers and manufacturers with Chinese technology transfer programs; and develop a formal track for Chinese clean energy investment to flow through CPEC Special Economic Zones into manufacturing rather than fossil fuel generation.

CONCLUSION

The story of SSF26 is not a story about what Pakistan needs to do. It is a story about what Pakistan has already done, and the institutional and systemic work required to complete what its people have started.

The solar rush was bottom-up. The next phase must be designed with communities, not for them, and enabled from the top down through regulation, data, finance, market design, and institutional reform.



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The conference might be over, but conversation will continue!

Muhammad Hassan Dajana

Industry Liaison, Renewables First



Bannu, Pakistan



Moments from SSF26, Islamabad Serena Hotel

