

Proceedings Report of the Seminar



Energy Security and Sustainable Industrial Growth

Impact of Prosumer Regulations, Tariff Structure and Geopolitical Shocks

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Energy Security and Sustainable Industrial Growth: Impact of Prosumer Regulations, Tariff structure and Geopolitical Shocks (Launch of ADS Research Study & Energy Security Codex for Pakistan – 2026)

About ADS

Based in Islamabad, Alternate Development Services (ADS) is a research and capacity development organization working on climate action, energy transition, environmental sustainability, and just transition pathways. Through its energy and climate work, ADS supports evidence-based policy dialogue on renewable energy, industrial decarbonization, and equitable development in Pakistan. ADS also actively contributes to policy advocacy by translating research into practical recommendations for regulators, industry, and development partners. Its work bridges technical analysis with stakeholder engagement, helping build informed discussions around energy security, market reform, and cleaner industrial growth.

Background, Rationale and Event Purpose

Pakistan's textile sector lies at the center of the economy, exports, and industrial employment, but it is also among the most energy-intensive and cost-sensitive sectors. Rising electricity tariffs, grid unreliability, and compliance pressure have pushed many mills toward rooftop solar as a way to manage costs, improve energy security, and reduce emissions. However, NEPRA's shift from net-metering to net-billing under the Prosumer Regulations 2026 has changed the investment environment for industrial prosumers, especially textile firms that had started treating rooftop solar as part of their decarbonization strategy.

To examine these changes, ADS completed a focused study titled “**Impact of NEPRA Prosumer Regulations 2026: A Case Study for Textile Sector.**” The study assesses how the new settlement rules affect project viability, payback, electricity bills, and investment decisions across mills of different sizes. It also considers the wider implications for industrial decarbonization, rooftop solar adoption, and the future role of storage, aggregation, and grid integration.

The dialogue further examined the proposed **Optional Time-of-Use (ToU)** tariff system for industrial consumers. While the reform aims to shift load patterns, improve productivity, and ease pressure on the grid, industry concerns remain around high fixed charges, sanctioned-load definitions, quarterly recovery mechanisms, and the uneven impact on different industrial operating models. The session also explored renewable mix optimization, including solar, wind, hydropower, and waste-to-energy, as well as the broader energy-security implications of geopolitical shocks and fuel-supply disruptions.

The event was designed to present the study findings, create a practical policy dialogue for NEPRA, DISCOs, industry stakeholders, and researchers, and open space for discussion on realistic solutions that support both grid stability and private investment in clean energy.

Outcomes of the Event

The event successfully created a timely and informed platform for discussing prosumer regulations, tariff restructuring, industrial decarbonization, and energy security in Pakistan. Participants developed a stronger understanding of how the transition from net-metering to net-billing under the Prosumer Regulations 2026 is affecting rooftop solar economics, especially for textile mills and other industrial prosumers. The discussion also clarified that settlement design, export-credit structure, and tariff stability are now central to the investment case for industrial solar.



The dialogue generated practical reflections on the Optional Time-of-Use tariff system, including its implications for fixed charges, sanctioned load, production flexibility, and industrial operating patterns. It also highlighted the growing importance of battery storage, renewable mix optimization, waste-to-energy, and emission factors in shaping Pakistan’s industrial energy future. Speakers and participants further underscored that energy security is now closely linked to external shocks, fuel dependence, and geopolitical risk, strengthening the case for domestic clean energy, flexibility, and resilience.

A particularly valuable outcome was the constructive role of the policy regulator, as **Mr. Imtiaz Hussain Baloch** listened carefully to the concerns raised by civil society, industry, and technical experts, and also shared his own judgments and regulatory perspective. His remarks added coherence to the discussion by stressing the need for a 360-degree assessment of policy choices, gradual transition rather than abrupt shifts, scientific evaluation of cost-benefit issues, and realistic recognition of grid limitations. He also emphasized that consumer policies should be shaped by evidence and practical system realities, not by pressure alone.

The discussion also helped identify key policy and implementation challenges, including the need for more gradual regulatory transitions, better grid planning, stronger evidence-based policy design, and closer alignment between energy reform and industrial competitiveness. Overall, the event deepened stakeholder awareness of the study findings and reinforced the importance of predictable, investment-friendly, and technically sound policy options for Pakistan’s energy transition.

Proceedings

The consultation began with the recitation of verses from the Holy Quran.

Mr. Amjad Nazeer (CEO, ADS)

Mr. Amjad Nazeer opened the dialogue by welcoming the distinguished guests, speakers, participants, and colleagues, and by thanking **USPCAS-E, NUST** for supporting the event. He framed the session as a timely policy dialogue and study launch on the changing relationship between prosumer regulations, tariff design, and energy security in Pakistan. He emphasized that the event was meant to move the discussion from concern to solution by bringing together regulators, researchers, industry representatives, and policy experts around one common question: how Pakistan can design an energy framework that is more balanced, more predictable, and more supportive of clean energy investment and industrial sustainability. Mr. Nazeer further explained that the textile sector is central to Pakistan's economy, exports, and industrial employment, while also being one of the most energy-intensive sectors. He pointed to the sector's large export contribution and stressed that its energy choices are therefore national economic choices. He emphasized that the textile sector is not a marginal part of the economy, contributing *54.70% of total exports in Jul-Sep 2024 and 53.46% in Jul-Jun 2025*, while the World Bank notes that industry accounted for *37% of Pakistan's total energy consumption and 73% of coal consumption in 2020*.



He highlighted that Pakistan's rooftop solar and industrial tariff landscape is now being shaped more by regulatory design than by panel prices, and that the choices made at this stage will determine whether distributed energy becomes a tool for industrial resilience or a missed opportunity for competitiveness, emissions reduction, and energy security. Drawing from ADS's study on the textile sector, he noted that settlement design has become the decisive factor in determining whether rooftop solar remains financially viable for industrial prosumers of different sizes. He cautioned that smaller firms may face particular difficulty under the NEPRA prosumer regime unless supportive measures such as storage, aggregation, and flexible market arrangements are introduced. He then discussed the implications of *NEPRA's Prosumer Regulations 2026*, explaining that the transition from net-metering to net-billing has changed the settlement basis for distributed generation connected to the grid. In his view, this directly affects project economics, payback periods, bill savings, and future expansion decisions for industrial consumers that had already integrated rooftop solar into their decarbonization strategies.

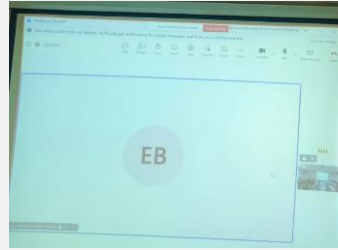
He also discussed the *Optional Time-of-Use tariff framework*, noting that while it may help some industrial users, its design must be aligned with real industrial operating patterns, especially for continuous and shift-based production systems. He emphasized that tariff incentives cannot succeed if they are built on the assumption that all industries can easily shift load.

Finally, he highlighted the importance of *emission factors and smarter renewable integration*, stating that as rooftop solar and other clean sources expand, attention must shift from installed capacity alone to the way renewable power is integrated into the grid. He noted that Pakistan's broader energy mix remains heavily fossil-based and that grid integration, flexible demand, storage, and smart dispatch are essential if renewable growth is to deliver genuine emissions reduction and system reliability. He concluded by linking energy security to geopolitical risk, stating that conflict-driven shocks strengthen the case for domestic clean energy, storage, and flexible demand as practical resilience tools for Pakistan's industrial future.

Guest Sessions - Electricity Market Design, Procurement Reforms, and Energy Security for Sustainable Industrial Growth

Mr. Imtiaz Hussain Baloch (Director General (Licensing), NEPRA)

A major highlight of the event was the valuable regulatory and market-focused contribution of **Mr. Imtiaz Hussain Baloch (DG (Licensing), NEPRA)**, who emphasized the importance of the conventional grid as the backbone of energy supply, the need for smoother and more gradual transitions, and the importance of informed policymaking grounded in sector realities. Mr. Imtiaz Hussain Baloch offered a strong regulatory perspective on Pakistan's energy transition, emphasizing that the discussion must be approached in a 360-degree manner and in line with established industry standards. He noted that planning criteria are not created arbitrarily by regulators but are grounded in technical and institutional realities. He stressed that energy policy should not be driven by pressure campaigns or extreme positions, but by balanced assessment, scientific analysis, and practical feasibility. He highlighted that the conventional grid cannot be ignored, as it remains the backbone of energy supply. In his view, the transition toward higher renewable penetration must be managed gradually and smoothly, rather than through abrupt shifts that could create instability in the power system. He said that NEPRA is working to ensure smoother transitions while recognizing that every policy reform must account for operational realities, contractual obligations, and system limitations.



Mr. Baloch also stressed that policy decisions should be informed by scientific studies and research rather than assumptions. He pointed out that there is a lack of strong cost-benefit analysis in some areas of the ongoing energy debate and encouraged academic and research institutions to deepen their work on these issues. He specifically suggested that researchers and development bodies should study at least one DISCO as a case study, so that policy analysis reflects real distribution-company conditions, consumer behavior, and operational constraints. He further noted that consumers sometimes misuse the non-strictness of policies, which creates implementation challenges for regulators and utilities alike. According to him, this is one of the reasons why regulatory design must be clear, enforceable, and realistic. He explained that net metering and related reforms should be studied through proper historical evidence, with attention to how they have evolved over time and what their actual system impacts have been.

He also discussed the importance of the grid as a cost-bearing structure that must be compensated appropriately, even as distributed solar grows. In his view, if net-metering consumers deliver value, they should be compensated fairly, but that value must be assessed scientifically and within the limitations of the wider system. He stressed that there is no infinite capacity in any grid and that every system has limits. If more renewable energy is to be injected, then grid modernization, IT infrastructure, and capital investment will be necessary. He concluded by urging a moderate and evidence-based approach. He said that Pakistan has already made progress in behind-the-meter and distributed solar adoption, but future growth must be guided by research, institutional realism, and careful planning. He encouraged participants to follow the IGCEP process to better understand Pakistan's future energy portfolio and the challenges ahead.

Mr. Muhammad Umar Khan (Joint Director, PPIB)

Equally important was the perspective shared by **Mr. Muhammad Umar Khan (Joint Director, PPIB, MoE – Power Division)**, who spoke on Pakistan’s evolving electricity market design and CTBCM reforms, underlining how procurement reform, market structure, and planning must support a more reliable and competitive power sector. Mr. Muhammad Umar Khan delivered a detailed presentation on Pakistan’s electricity market design, tracing his professional journey from USPCAS-E, NUST, to the power sector institutions where he has worked on planning, procurement, and market reform. He explained that his exposure across PPIB, ISMO, and CPPA-G gave him practical insight into the evolution of Pakistan’s electricity market and the implementation challenges that continue to shape reform efforts. He noted that the current market structure is still rooted in a single-buyer framework, with CPPA-G serving as the main buyer and DISCOs acting within a regulated supply arrangement, even as the country moves gradually toward a more competitive wholesale market.



He then explained the concept and evolution of **CTBCM** in Pakistan, distinguishing between the wholesale and retail dimensions of the market. He noted that the wholesale market under CTBCM is intended to allow generators, traders, competitive suppliers, and eligible consumers above 1 MW to trade electricity more efficiently, while the retail market will eventually give smaller consumers more supplier choice. He outlined the institutional architecture of the market, including the roles of the *System Operator*, *Market Operator*, *TNO/DNO*, *IAA*, *MSP*, generators, traders, competitive suppliers, DISCOs as regulated or supplier-of-last-resort entities, and bulk power consumers. His explanation emphasized that CTBCM is not only a policy concept but a complete structural transformation in how electricity is traded, settled, and supplied.

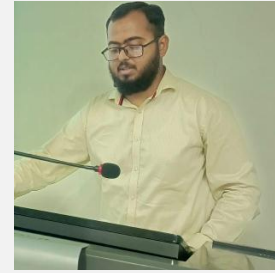
Mr. Umar also highlighted the scale of the existing market. He noted that Pakistan has around *26.6 million consumers*, representing roughly **84%** of electricity sales under the regulated structure, while only around *2,000+ eligible consumers* account for the remaining **16%** share that is relevant for the first stage of market opening. He explained that the transformation from a single-buyer model to a wholesale competitive market is therefore gradual and must be carefully phased so that procurement, settlement, and system reliability are not compromised. He also referred to the upcoming procurement planning framework, including medium- and long-term procurement by DISCOs, demand forecasting through IGCEP, auction-based procurement, and approval and monitoring by NEPRA.

He further explained the procurement pathway, noting that the proposed structure includes defined quantity and timing rules for procurement, with procurement plans approved and monitored by the regulator. He pointed out that the planned electronic trading platform will further strengthen market transparency and competition, but only if the institutional framework is properly implemented and supported by the relevant operators. In his concluding remarks, he emphasized that procurement reform, market design, and the transition toward CTBCM are central to Pakistan’s future electricity security, and that a competitive yet regulated market structure is necessary to support sustainable industrial growth, cost discipline, and long-term sector efficiency.

Session I: Impact of Prosumer Regulations 2026 on industrial sector – Study Findings

Mr. Muhammad Usman Bin Ahmed (ETO, ADS)

Mr. Muhammad Usman Bin Ahmed presented the key findings of ADS's study on the impact of NEPRA's Prosumer Regulations 2026, explaining that Pakistan's rooftop solar sector has entered a critical policy transition where the main issue is no longer panel prices but the design of settlement rules and market incentives. He noted that the move from net-metering to net-billing has reduced the value of exported electricity and changed the economics of industrial rooftop solar. In his remarks, he stressed that the textile sector remains central to exports and industrial employment, while also being highly energy intensive and therefore highly sensitive to electricity cost changes, grid unreliability, and international pressure for low-carbon production. He also highlighted that the textile industry remains central to Pakistan's exports and industrial employment, contributing around *8.5% of GDP, nearly 60% of exports, and 30–40% of industrial employment*, while also being highly energy intensive, consuming around *7–8 TWh per year* and generating roughly *1.45 MtCO_{2e} annually*.



He explained that the earlier success of rooftop solar was driven by falling module prices, high electricity tariffs, weak grid reliability, and favorable net-metering rules, all of which helped many firms recover their investments quickly. He pointed out that rooftop net-metered consumers grew from *under 1 GW around 2020 to nearly 8 GW by 2025*, reflecting how strongly the old policy framework had supported adoption. Under the new framework, however, exported units are no longer offset on a one-to-one retail basis, which sharply lowers the settlement value. He noted that this shift directly affects annual bills, net present value, internal rate of return, return on investment, and simple payback, especially for industrial consumers that had planned rooftop solar as a long-term decarbonization measure. According to him, these factors make energy policy directly relevant to trade competitiveness, especially when global buyers are increasingly demanding cleaner and lower-carbon supply chains.

Turning to the case study, Mr. Usman shared that ADS modeled large, medium, and small textile mills under twelve scenarios to assess the impact of the policy shift on annual bills, levelized cost of electricity, NPV, IRR, ROI, and simple payback. He said the results clearly show that net-metering remains the strongest option for project financeability across all mill classes. In the actual demand case, net-metering produced lower LCOE, higher NPV, stronger IRR, and shorter payback periods than net-billing for all three mill sizes. He noted that for large mills, NM reduced LCOE to about *6.692 PKR/kWh*, compared with *16.548 PKR/kWh* under NB nominal, while annual bills shifted from a net export value of around *PKR 20.66 million* under NM to a positive bill of about *PKR 13.31 million* under NB. For medium mills, the same pattern held, with NM LCOE at *7.448 PKR/kWh* against *18.284 PKR/kWh* under NB nominal. For small mills, NB also raised LCOE sharply and reduced the economic buffer that had previously supported investment.

He further emphasized that the financial shock is not uniform across scales. In the actual demand case, large mills saw NPV fall from *5.31 million-\$ under NM to 3.05 million-\$ under NB*, while IRR dropped from *54.45% to 30.54%*, and payback increased from *2.84 years to 4.26 years*. Medium mills showed a similar but slightly more balanced pattern, while small mills remained the most exposed to policy change. Mr. Usman noted that in the low-demand and export-heavy scenarios, NB caused very large revenue losses because exported electricity was being valued far below retail import prices. He stressed that this is why the design of settlement rules matters more than panel cost alone: the same system can be highly viable under net-metering and materially weaker under net-billing.



He also explained that demand profile matters greatly. Moving from low to actual to high demand generally improved IRR and shortened payback for all mill categories, but the benefits varied by settlement type. High self-consumption and lower on-peak exposure significantly improved the viability of rooftop solar under both regimes, while low self-consumption combined with high TOU exposure produced the weakest results under net-billing. He noted that ADS's model showed *large mills reaching IRR levels of about 32.21% under high self-consumption NB*, while small mills could rise from 28.10% to 37.49% if self-consumption improved. He added that battery storage can improve performance by shifting solar use into more valuable hours, but storage alone cannot fully restore the value lost under net-billing unless it is supported by compensation for dispatch or time-differentiated export credits. In his view, the most effective mitigation measures are higher self-consumption through scheduling, pooled or park-level storage, aggregation and virtual power plants, and better load-management tools for industrial users.

Mr. Usman then discussed the study's modelling results for large, medium, and small textile mills across multiple demand scenarios. He highlighted that net-metering remains the strongest option for project financeability across all mill categories. In the actual demand case, net-metering delivered higher NPV, stronger IRR, and shorter payback than net-billing for large, medium, and small mills. He explained that the largest absolute financial loss under net-billing is borne by large mills, while small mills face the greatest percentage swing and are therefore the most vulnerable. Medium mills, especially aggregated SME pools, were identified as the most resilient because they combine scale with operational flexibility.

He emphasized that the main policy issue is not panel cost, but settlement design and export-credit structure. He pointed out that the levelized cost of electricity rises sharply under net-billing relative to net-metering, and that the gap is particularly significant where self-consumption is low or export dependence is high. He explained that this is why the same rooftop solar system may remain highly viable under one regime and materially weaker under another. He also observed that better self-consumption, battery storage, and load management improve performance, but storage alone cannot fully recover the value lost under net-billing unless it is supported by time-differentiated export credits or other market mechanisms.

Mr. Usman also summarized the policy concerns raised during the public hearing, including the need for grandfathering of existing contracts, clearer hosting-capacity analysis, simple metering rules, and the development of aggregation and virtual power plant options. He noted that DISCOs and industry stakeholders often differ in their views, with utilities prioritizing grid recovery and technical control, while industry stresses predictability, investment certainty, and a transition path that does not undermine ongoing industrial solarization.

Concluding his presentation, Mr. Usman said that the policy challenge is to balance DISCO revenue recovery with investment certainty, industrial competitiveness, and the country's clean-energy goals. He recommended time-differentiated export credits, a transparent Value-of-Solar study, stronger rules for aggregation and VPPs, concessional finance for SME battery storage, and a more data-driven approach to hosting-capacity management instead of blunt caps. He stressed that the transition from net-metering to net-billing will be sustainable only if it is accompanied by credible mitigation measures that preserve rooftop solar's role in industrial decarbonization, energy security, and export competitiveness.

Dr. Syed Ali Abbas Kazmi (HOD Electrical Engineering – Power (EEP), USPCAS-E, NUST)

Current Tariff structure and Industrial Energy Security; Optional ToU Tariff System for Industrial Prosumers: Design, Incentives & Industry Response

Dr. Syed Ali Abbas Kazmi opened his remarks by noting that much of the ground had already been covered by Mr. Usman, but emphasized that the issue should be understood through five linked dimensions: the current landscape, the structural crisis, the fast-moving paradigm shift, the industrial dilemma in the context of global competitiveness, and the best policy proposition available within the existing structure. He stressed that Pakistan's power-sector challenge is not a single technical issue but a deeper systems problem involving generation, capacity payments, tariffs, grid limitations, and industrial competitiveness. He explained that the core challenge lies in the legacy of IPPs and sovereign guarantees, where Pakistan is now paying more in **capacity charges** than in actual energy price. He compared capacity payments to booking a hotel room regardless of whether it is fully used, arguing that this structure creates a heavy financial burden for the system. He pointed out that generation costs have risen sharply, that final consumer bills have crossed *PKR 50 per unit* in many cases once fuel adjustment and other surcharges are included, and that this is one of the main reasons industries are shifting toward solar simply to cut their electricity bills.



Dr. Kazmi further explained that Pakistan's generation and consumption structure has become increasingly distorted. He noted that residential consumption now accounts for roughly **52–53%** of total demand, while industrial load has declined, even though a healthy power system is generally more viable when industrial demand is closer to **40%**. He observed that this imbalance has contributed to a rising surplus debt burden and has made the sector structurally more fragile. He also highlighted that peak demand in Pakistan is concentrated in only a small number of hours, while the system still has to carry the full weight of merit order, thermal ramping, and capacity obligations for much of the year.

He then discussed the rooftop solar and net-metering transition in detail. Referring to the current policy shift, he noted that the earlier *1:1 unit offset* system has effectively moved toward a much less favorable settlement structure, in some cases resembling a *1:5 ratio* in practical terms. He explained that under the current arrangement, consumers sell surplus electricity at a much lower value than the price at which they buy electricity, which is why many consumers now see solar and storage as the only practical way to manage bills. He added that if the transition from net metering to net billing had been introduced gradually, existing consumers could have adapted and new consumers could have adjusted to the new rules more easily. In his view, the abruptness of the change created resistance and uncertainty.

A major part of his remarks focused on the emerging issue of *battery storage*. Dr. Kazmi said that the next phase of the debate will not be solar alone, but storage. He warned that if consumers across sectors begin moving off-grid or heavily reducing their dependence on the utility grid, the financial implications for capacity payments and the power sector could become even more serious. He noted that batteries can create a useful economic differential by storing electricity when prices are low and discharging it when prices are high, but only if the market is designed properly. Otherwise, a battery rush could create a new set of distortions similar to the solar rush.

He also raised concerns about the broader implications of poorly coordinated policy expansion, including EV uptake, grid harmonics, and digitalization. He noted that if Pakistan aggressively expands EV adoption and other electric loads without preparing the grid, the system could face serious technical stress, including harmonics and stability issues. He stressed that grid modernization, IT infrastructure, and digital market



tools will be required if Pakistan is to absorb more distributed generation, storage, and electric demand without creating new bottlenecks.

Dr. Kazmi also discussed transmission and wheeling constraints. He said that Pakistan has strong industrial concentration in the south, but the system does not yet have the flexibility to move electricity efficiently from south to north at the required scale. He noted that interzonal wheeling and market reform will only work if the rules are clear and if the grid can handle the physical and commercial complexity of cross-zone power movement. In his view, the future market design must be able to support optimized system use rather than simply shifting problems from one part of the grid to another.

He then moved to the industrial competitiveness question. He explained that Pakistan's industrial electricity cost is already around *16 US cents per unit*, while China is below *5 cents*, and regional competitors such as Bangladesh, Vietnam, and India are much lower as well, around the mid-7-cent range. He argued that this cost gap is a major reason Pakistan is losing competitiveness in export markets. He also pointed to the burden of cross-subsidy and the fact that the IMF is pressuring Pakistan to reduce subsidy distortions, which makes tariff reform even more difficult. In his view, rising power costs, currency depreciation, and thermal dependence are together making Pakistani industry less viable in global markets.

As a way forward, Dr. Kazmi recommended flattening the load curve and making more intelligent use of time-of-use pricing. He said the best way to benefit from the current structure is not to resist it blindly, but to make it work through storage, optimized time-of-use planning, and better industry-side demand management. He explained that industries operate across three shifts and often run for nearly *300 days a year*, so the tariff system must be designed to reflect actual industrial operation rather than assume a simple morning-evening pattern. He suggested that off-peak electricity should be stored and used strategically so that industries can reduce their effective cost and improve competitiveness.

He also emphasized that the Optional ToU structure can only work if it is paired with properly localized battery manufacturing, quality control, and market packages that encourage value addition rather than simply import dependence. He warned that battery policy should not rely on second-hand or weakly regulated supply chains, but should build a domestic industrial ecosystem around cells, fabrication, and approved manufacturing. He also pointed to the need for packages that help industries use time-of-use pricing effectively while preserving competitiveness.

Toward the end of his remarks, Dr. Kazmi broadened the discussion beyond textiles alone. He said the goal should not be to overfocus on one industrial zone, but to build suitable market zones across sectors so that the broader industrial base can benefit from lower-cost and more reliable power. He also suggested that Pakistan should think beyond conventional energy solutions and begin exploring future options such as hydrogen and ammonia-based pathways, especially where nuclear or other low-carbon energy sources may support long-term industrial transformation.

Overall, Dr. Kazmi's intervention presented a wide-ranging and data-backed assessment of Pakistan's power-sector crisis, tariff reform, and industrial energy future. His central message was that Pakistan needs a realistic, gradual, and technologically informed transition that protects industrial competitiveness, supports storage and flexibility, modernizes the grid, and avoids abrupt policy shifts that could undermine both investor confidence and system stability.

Dr. Muhammad Haasan (Associate Professor, USPCAS-E, NUST)

Renewable Energy Mix and Waste-to-Energy for Sustainable Industrial Growth

Dr. Muhammad Hassan spoke on Pakistan's current energy mix and the role that waste-to-energy can play in strengthening industrial sustainability and energy security. He explained that Pakistan's energy mix is still dominated by fossil fuels, which account for more than half of total supply, while hydropower contributes around 15 percent and solar, wind, and other renewable sources remain relatively small. He noted that although Pakistan has an installed power generation capacity of about 42,000 MW, actual production is much lower, and the country still has substantial room to expand the renewable share in its overall energy portfolio. He stressed that Pakistan possesses significant renewable potential, yet the country continues to face transmission bottlenecks and weak integration of clean energy into the grid. In his view, Pakistan must move more decisively toward renewables if it wants to improve energy security and reduce dependence on imported fuels. He also noted that Pakistan's policy target for renewable expansion remains ambitious, but actual progress is still behind the desired trajectory, especially when hydro is excluded from the renewable growth calculation.



A major part of his remarks focused on waste-to-energy as an underutilized but highly practical solution. Dr. Hassan explained that Pakistan generates a very large volume of municipal solid waste every year, much of which is dumped in landfills without being treated as a resource. He argued that this waste stream could be converted into useful energy through technologies such as pyrolysis, gasification, and incineration. He described these technologies as commercially proven in several countries and emphasized that Pakistan should adopt them more seriously, especially in major cities where waste volumes are high.

He further explained that waste-to-energy offers multiple benefits beyond electricity generation. It can reduce landfill pressure, lower methane emissions, improve sanitation, and contribute to resource recovery. He noted that such systems can also help reduce the carbon footprint of Pakistan's industrial sectors, including textiles, by enabling local low-carbon energy generation. In his presentation, he described this as a circular-economy approach in which waste is treated not as a burden but as a usable input for energy production.

Dr. Hassan also pointed to the industrial value of waste-to-energy. He said that decentralized power generation from waste could support continuous power supply for industry, reduce reliance on the national grid, lower exposure to fossil-fuel price volatility, and create local employment. He added that industrial clusters, including textile zones, can particularly benefit from such technologies by achieving greater energy independence and stronger control over their energy costs.

He concluded by highlighting the policy gap around waste-to-energy in Pakistan. According to him, existing institutions have not yet provided tariff support or incentives strong enough to attract investors and small or medium enterprises into this sector. He urged stronger policy coordination among the Ministry of Planning, Ministry of Energy, Ministry of Climate Change, and NEPRA so that waste-to-energy can become a practical part of Pakistan's renewable energy mix rather than remaining an overlooked opportunity.

Mr. Subayyal Najeeb (Program Director, Green Growth Alliance, Baghbaan Environmental Services Ltd.)

Emission Factors and Smart Usage of Renewable Mix on the Grid

Mr. Subayyal Najeeb focused his remarks on emission factors, industrial carbon accounting, and the strategic value of a smarter renewable mix on the grid. He framed the issue not as a narrow environmental compliance matter, but as a competitiveness question for Pakistan’s industrial sector, particularly textiles. He noted that export markets are increasingly demanding verified emissions performance, and warned that if Pakistan continues to rely on default global factors and fragmented reporting, the textile industry could face serious trade and carbon-cost exposure in the years ahead.



He highlighted that Pakistan’s textile exporters are already being pushed toward compliance regimes such as **CBAM** and *California SB 253*, and said that without a reliable sector-specific emissions framework, the country risks turning compliance into a cost burden rather than a market advantage. He cited a projected *US\$1.2 billion carbon-tax liability by 2028* if the sector does not prepare for these requirements. His core argument was that Pakistan should move from a reactive position to a strategic one, where emissions accounting is built around national and sector-specific data rather than imported assumptions.

A major point in his presentation was the need for a *Pakistan-specific emission factors database*. He explained that while individual Tier-2 studies can cost each mill between *US\$80,000 and US\$150,000*, a shared pre-competitive database could reduce verification costs by about **70%** while creating a more credible and buyer-accepted emissions baseline. He also noted that a common database would reduce duplication, strengthen investor confidence, and improve the consistency of carbon reporting across mills and industrial clusters. Mr. Subayyal further explained that Pakistan’s electricity system should not be evaluated only at the national average level. He pointed out that the **grid average emission factor** is around *0.51 kg CO₂/kWh*, while industrial baseload electricity can be much cleaner, around *0.32 kg CO₂/kWh*, if the renewable mix is allocated and used intelligently. He argued that this difference matters because buyers, auditors, and regulators increasingly care about the actual emissions profile of electricity used by industry. In his view, the strategic use of renewable generation can turn carbon performance into a market advantage rather than a reporting burden.

He concluded by emphasizing collaboration. According to him, a shared national emission-factor system, combined with strong policy backing and industry participation, would help reduce verification costs, improve export readiness, and strengthen buyer trust in Pakistan’s industrial supply chains. He stressed that emission factors, renewable allocation, and carbon accounting must be treated as part of the country’s industrial strategy, not just as technical add-ons.

Session II: Industry insights and the #StopSunTax (SST) campaign

Mr. Hasnat Ahmed Khan (Senior Vice Chairman, Pakistan Solar Association (PSA))

Mr. Hasnat Ahmed Khan presented the industry’s broader perspective on Pakistan’s consumer policy and solar regulations, focusing on how regulatory shifts are affecting the solar sector and, more importantly, the wider industrial ecosystem that depends on it. He explained that the Pakistan Solar Association represents a broad range of stakeholders, including EPC companies, traders, and manufacturers, and therefore any change in consumer policy has consequences not only for solar businesses but also for the wider energy market and industrial users. In his view, the main concern is not whether



policy changes happen, but how abruptly they are introduced and whether they allow adequate time for adjustment.

He stressed that Pakistan's move away from the earlier net-metering framework has been far more abrupt than ideal. Referring to the 2015 policy and its eventual replacement, he argued that policy shifts must be managed through phased transitions rather than sudden reversals. According to him, abrupt change creates uncertainty for both old and new consumers and weakens trust in the policy environment. He noted that the new framework has already affected the behavior of different segments of the market: new consumers are not moving toward net-billing at the same pace, households are largely avoiding it, while only small and medium-sized companies are still exploring it to some extent. In his assessment, this reflects not only the technical design of the policy, but also the confidence gap created by inconsistent policymaking.

Mr. Hasnat also drew a comparison with Pakistan's experience on IPP agreements. He said that, just like power-sector contracts were often entered into without fully anticipating future consequences, the same problem is now appearing in consumer regulation. He emphasized that agreements and reforms should ideally be win-win, but when policy is designed in a way that benefits one side while creating long-term strain on the other, the result is eventually instability. He warned that the current consumer regulation framework, like some earlier power-sector arrangements, does not create a genuine win-win situation and therefore risks repeating the same structural mistakes.

He explained that the first policy supported net metering, while the second effectively shifts the settlement logic toward a much more demanding ratio, making it harder for consumers to offset their bills. He argued that if such reforms had been introduced gradually as part of a phased transition, old consumers could have adapted while new ones would have adjusted to the new system over time. Instead, the policy shock has created resistance and uncertainty. He used this argument to stress that solar policy should not be treated as a short-term administrative change but as a long-term market design issue.

A major point in his remarks was the growing relevance of batteries. He observed that the next major issue for the government and ministry will not simply be solar, but storage. He explained that the policy direction is already pushing consumers toward battery adoption, whether intentionally or as a market response to changing rules. He noted that the technical solution may appear simple; if the grid is under stress, consumers store power; but the financial consequences for the system are much more serious. If a large number of consumers move off-grid or toward high levels of self-sufficiency, then capacity payments and the wider financial structure of the power sector will face even greater pressure.

Mr. Hasnat said that this is why the issue is not only technical but also financial. According to him, the government's main concern is not whether batteries work, but how the financial impact on the power sector will be managed if consumers reduce dependence on the grid. He noted that in major cities, especially in daytime and evening load centers, batteries may become increasingly attractive for consumers seeking autonomy and cost control. He also pointed out that industrial electrification and the growing use of electric vehicles will increase demand for electricity, creating an opportunity to balance the grid-side concern if the policy environment encourages productive electricity use rather than penalizing it.

He concluded by saying that the industry's advice is not to oppose reform, but to support a more balanced policy direction. He noted that battery policy should be aligned with local manufacturing, investor confidence, and grid-level planning. He also emphasized that the sector's campaign is not about resisting taxation at all costs, but about ensuring that policy supports rather than undermines solar adoption, industrial

competitiveness, and energy security. His remarks set the stage for the formal launch of the #StopSunTax campaign that followed.

Ms. Izzah Khan (Assistant Manager, Policy Advocacy & Government Relations, PSA)

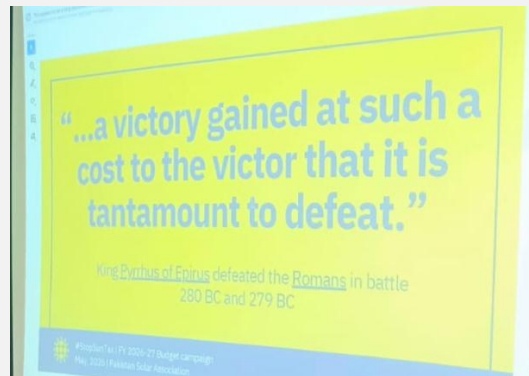
Formal Launch of the #StopSunTax Campaign

Ms. Izzah Khan formally launched the #StopSunTax campaign and presented a structured industry argument against taxation of the solar sector. She began by explaining that the campaign is not simply about resisting a tax measure, but about challenging a policy direction that, in her view, would ultimately harm the broader energy system and economy. She framed the issue through the idea of a **Pyrrhic victory**, meaning a victory that comes at such a cost that it is effectively equivalent to defeat. In her explanation, a short-term revenue gain from taxing solar imports would be outweighed by much larger long-term losses through fuel imports, foreign exchange pressure, and reduced industrial competitiveness.



She argued that taxing the solar sector may generate immediate fiscal revenue, but the real question is what the country gives up in return. According to her, the burden of fossil-fuel imports is recurring and unstable, while the tax collected from solar is one-time and narrow in impact. She stressed that fuel-import costs continue year after year and remain exposed to global volatility, geopolitical shocks, and external market conditions, while solar helps reduce that vulnerability. In this sense, she said, taxing solar does not create energy security; it weakens it.

Ms. Izzah emphasized that energy policy is economic policy and that the effects of solar taxation are not limited to the solar industry alone. The Pakistan Solar Association represents around **300 solar companies**, but the implications of solar taxation extend well beyond that sector because energy prices, import dependence, and tariff design affect every industry in Pakistan. She noted that the issue touches on the cost of energy, energy security, and import substitution, all of which are central to industrial competitiveness and macroeconomic stability.



She presented data showing that Pakistan’s recent solar expansion has already contributed significantly to economic savings. She cited estimates that the solar boom between **2022 and 2025** mobilized around *US\$18 billion* in private investment and saved roughly *US\$12 billion* in fossil-fuel import costs. She also referred to the long-term potential of imported solar PV, noting that fully deployed solar capacity could avoid *US\$100–120 billion* in fuel imports over its lifetime. In her view, these figures show that solar should be treated as a national economic asset rather than a taxable burden.

Ms. Izzah also used direct comparisons of energy costs to reinforce her argument. She noted that fossil-fuel-based electricity generation in Pakistan costs around *PKR 29–32 per kWh*, while solar power would have cost approximately *PKR 3.5–5 per kWh* in FY24 and FY25. She argued that this cost difference makes solar not just an environmental option but a crucial economic one, especially for industry. She added that if Pakistan wants more electricity demand and stronger industrial growth, the solution is to facilitate productive electricity use; for example, by encouraging electrification of industry and transport; rather than penalizing solar investment.

She pointed out that industrial electrification itself could raise demand substantially, citing estimates that electrifying selected industrial uses such as heating and cooling could increase demand by around **37%**. In her view, this is a more constructive way to expand electricity demand than discouraging private investment in clean energy. She argued that government and regulators should adopt a facilitative approach, using a real carrot-and-stick balance rather than relying mainly on punishment. She stressed that profitable industries are needed because they drive exports and keep the economy functioning.

Ms. Izzah concluded by making a clear policy appeal. She called for the removal of **GST on solar panels and inverters**, the removal of import duties on batteries and inverters except where tied to a genuine strategic local-manufacturing initiative, and a stable tax regime that aligns with Pakistan's national renewable-energy goals. She stated that if the government wants local industry to grow, it must pair taxation with tangible support and a credible implementation framework. Otherwise, she warned, the result will be policy contradiction rather than policy progress. She ended by noting that Pakistan already has many plans and policies on paper; the real gap lies in implementation and consistency.

Session III: Economic Backlashes due to Geopolitical Crisis and Fuel Dependence: Launch of Energy Security Codex for Pakistan – 2026

Mr. Mashhood Urfi presented the **Energy Security Codex for Pakistan – 2026**, framing the document as a response to Pakistan's structural energy vulnerabilities in the context of war, disruption, and transition. He explained that Pakistan stands at an energy crossroads where the challenges are both structural and institutional. He noted that circular debt has risen to more than *Rs. 2.6 trillion*, transmission losses continue to drain a significant share of generated electricity, tariff structures make the industrial sector uncompetitive, and dependence on imported fossil fuels can push the national current account into crisis within a single commodity cycle.



He argued that despite these weaknesses, Pakistan also possesses extraordinary renewable potential. He pointed to the country's abundant solar irradiance, strong wind corridors, and untapped hydropower resources, and said that the real problem is not resource scarcity but governance failure, policy instability, and a lack of coherent institutional planning. In his view, the gap between energy abundance and energy poverty is a consequence of bad governance rather than an absence of options.

Mr. Urfi explained that the *Energy Security Codex for Pakistan – 2026* is intended as an operational framework rather than a catalogue of aspirations. He said the codex is based on sustained analytical engagement with Pakistan's energy system across technical, fiscal, diplomatic, and civil-society dimensions. According to him, the codex is grounded in evidence and sequenced in a way that can help policymakers make practical decisions over the coming decade. He stressed that Pakistan's energy future should be guided by strategy, not only by reactive crisis management.

He presented three interlocking arguments at the core of the codex. First, he argued that diversification of the energy mix; anchored by utility-scale renewables, supported by gas-fired peaking capacity, and gradually integrated with battery storage and regional interconnection; is both technically feasible and fiscally preferable to the current trajectory. Second, he stated that institutional reform, including the restructuring of DISCOs, de-politicized tariff-setting, and constitutionally grounded decentralized planning, is essential for sustainable investment. Third, he emphasized that energy diplomacy, pursued coherently

across the CPEC, Gulf, Central Asian, and multilateral dimensions, can unlock concessional financing and technology transfer that Pakistan cannot self-finance on its own.

He further noted that civil society, investigative journalism, and community-based organizations are not peripheral actors in this process but part of the governance architecture itself. In his view, energy transition must be socially informed and institutionally supported if it is to succeed. He cited the solar boom from 2022 to 2025, which mobilized approximately *USD 18 billion* in private investment and saved an estimated *USD 12 billion* in foreign exchange, as evidence that market-driven energy transformation is already happening, often despite policy inconsistency rather than because of it. He argued that policymakers should recognize and support this public initiative instead of undermining it.

He concluded by urging policymakers, regulators, development partners, and civil society organizations to treat the codex as a shared reference for evidence-based energy reform. He emphasized that the challenges are serious, but the conditions for decisive progress are better now than at any previous moment, provided that institutions act with strategic coherence and commitment.

Ms. Arhama Siddiq (Research Fellow, Institute of Strategic Studies Islamabad (ISSI))

Middle-East Geo-political Crisis, Post-Accords Scenario and Pakistan's Energy Future

Ms. Arhama Siddiq spoke on the implications of the Middle East crisis for Pakistan's broader national interests, framing the issue not only as a security concern but also as an energy, food, remittance, investment, and connectivity challenge. She emphasized that regional instability in the Middle East has direct spillover effects on countries like Pakistan, particularly through oil price volatility, supply insecurity, trade disruptions, and pressure on foreign exchange reserves. In her view, energy security cannot be separated from wider geopolitical realities, because external shocks quickly influence domestic prices, industrial costs, and economic planning.

She explained that the ongoing Middle East tensions, including the Iran-Israel war context and the broader uncertainty surrounding the region, have significant implications for Pakistan's energy future. She noted that conflict in the region can disrupt imported fuel flows, increase transportation and insurance costs, and weaken the predictability required for industrial planning. She stressed that for an import-dependent economy like Pakistan, geopolitical shocks are not distant events; they shape the energy environment in which local industry must operate.



Ms. Arhama also discussed the significance of the Abraham Accords and the idea that normalization alone cannot create lasting peace without a just settlement of Palestine. She argued that trade, technology, and economic normalization cannot be treated as substitutes for justice and stability. In her view, the post-accords scenario remains uncertain, and Pakistan must assume that the regional environment may remain fragile for some time. This makes energy diversification and domestic resilience all the more important.

She outlined five priorities for Pakistan's energy future. First, she called for *diversifying supply* so that the country is less exposed to imported-fuel shocks. Second, she emphasized the need to *accelerate renewables* so that domestic clean-energy generation can reduce dependence on volatile international markets. Third, she highlighted *energy efficiency* as a major source of resilience, since reducing waste is often as important as adding new capacity. Fourth, she argued that Pakistan must *protect critical sectors*, especially industry

and exports, from the economic effects of energy shocks. Fifth, she stressed the importance of *linking energy policy with regional diplomacy*, because energy security will remain incomplete without a coherent foreign-policy dimension.

She concluded by stating that war in the Middle East benefits no one and only deepens energy stress, economic strain, and food-system vulnerability for developing countries. Her central message was that Pakistan must build an energy strategy that is not only technically sound, but also geopolitically aware and resilient to external shocks. In this sense, she positioned energy security as a core element of Pakistan's national resilience and economic survival.

Dr. Adeel Waqas (Principal, USPCAS-E, NUST) – Vote of Thanks and Closing Remarks

Dr. Adeel Waqas delivered the concluding remarks by appreciating Alternate Development Services (ADS), Green Corporate Alliance (GCA), and all collaborating partners for organizing a timely and important dialogue on Pakistan's evolving energy landscape. He welcomed the participation of representatives from government, regulatory bodies, academia, industry, and civil society, noting that meaningful energy-sector reforms require precisely this kind of multi-stakeholder engagement. Reflecting on the discussions, Dr. Waqas observed that Pakistan's energy future is increasingly shaped by the interaction between regulatory reforms, industrial competitiveness, technological innovation, and energy security considerations. He noted that the event had successfully connected several important themes, including prosumer regulations, industrial tariff structures, renewable energy integration, waste-to-energy opportunities, electricity market reforms, and the implications of regional geopolitical developments for Pakistan's energy planning.



He particularly acknowledged the efforts of *Mr. Muhammad Usman Bin Ahmed* for leading the research study on the impact of the Prosumer Regulations 2026 on the textile sector and for presenting a comprehensive evidence-based assessment of the policy's implications, and also for organizing the multi-stakeholder policy dialogue. He noted that the study provided valuable insights into how regulatory design can influence industrial investment decisions, rooftop solar deployment, and long-term decarbonization pathways. He appreciated the analytical rigor demonstrated in the study and commended ADS for bringing this important research into the public policy discourse.

Dr. Waqas also appreciated the contributions of all speakers, whose perspectives enriched the discussion from regulatory, industrial, technical, environmental, and strategic viewpoints. He remarked that the diversity of expertise represented during the dialogue demonstrated the complexity of Pakistan's energy challenges and the importance of collaborative solutions.

He emphasized that universities and research institutions have a crucial role to play in generating the evidence needed for informed policymaking and expressed hope that the discussions and recommendations emerging from the event would contribute to future policy development in support of energy security, industrial growth, and sustainable development. Concluding his remarks, he thanked all participants for their active engagement and constructive contributions, expressing confidence that continued dialogue between academia, industry, regulators, and policymakers would help advance a more resilient and sustainable energy future for Pakistan.

Moderator

The dialogue was moderated by **Alishba Maqsood** (ESE, USPCAS-E, NUST).



Participants

The launch and consultation was attended by over *30 participants*, bringing together senior academics, ADS & USPCASE researchers, policymakers and development advisors, civil society representatives and students.

Key Observations / Challenges

1. Settlement Design Is Now the Central Policy Issue

Participants repeatedly noted that the main question is no longer solar panel cost, but how export credits, billing rules, and settlement design affect project economics under the new prosumer regime.

2. Abrupt Policy Shifts Create Investment Uncertainty

Industry representatives stressed that sudden regulatory change reduces confidence, especially for mills that planned rooftop solar under a different policy environment.

3. Industrial Load Patterns Differ Significantly

The ToU tariff may work for some users, but continuous, three-shift, and fixed-hour industries may not benefit equally without further design refinement.

4. Grid Stability and Financial Recovery Must Both Be Addressed

NEPRA and market stakeholders highlighted the challenge of balancing grid recovery, capacity payments, and fair compensation for distributed generation.

5. Battery Storage Is Emerging as the Next Major Policy Question

Speakers noted that the move toward storage will create new opportunities, but also new risks unless the battery market, local manufacturing, and grid-level integration are carefully planned.

6. Energy Security Is Now Linked to Geopolitical Risk

The discussion confirmed that regional tensions and fuel-supply disruption risks strengthen the case for domestic renewable energy, storage, and flexible demand.

7. Emission Factors Need More Serious Policy Attention

Participants agreed that better emissions accounting and smarter renewable-mix allocation are necessary to support industrial decarbonization and export competitiveness.

8. There Is Strong Demand for Evidence-Based Policy and Case Studies

A recurring point was the need for more scientific studies, DISCO-level case evidence, and practical policy testing rather than assumption-driven reform.

Conclusion and Next Steps

The event successfully created a timely and informed platform for discussing prosumer regulations, tariff restructuring, industrial decarbonization, and energy security in Pakistan. It demonstrated that the country's energy transition is not only a technical matter, but also a question of regulatory design, industrial competitiveness, financial sustainability, and resilience against external shocks.

The discussion showed that rooftop solar, storage, waste-to-energy, market reform, and industrial electrification can all support Pakistan's energy future, but only if policy is predictable, realistic, and aligned with industrial operating conditions. It also reinforced that the textile sector remains a critical test case for how regulatory and tariff reforms will affect investment, exports, and decarbonization.



Next Steps

1. Share the study findings and proceedings with NEPRA, PPIB, DISCOs, and relevant ministries for policy follow-up.
2. Prepare a short policy brief on the implications of net-billing and Optional ToU for industrial prosumers.
3. Explore follow-up technical sessions on storage, aggregation, emission factors, and waste-to-energy.
4. Engage industry stakeholders on practical adaptation pathways, especially for textile mills and SME clusters.
5. Use the event's observations to support ADS's broader policy advocacy on industrial decarbonization, grid reform, and energy security.

Coverage Links

1. https://www.linkedin.com/posts/alternate-development-services-ads_stopsuntax-energysecurity-prosumerregulations-activity-7464574568708366337-t20z?utm_source=share&utm_medium=member_desktop&rcm=ACoAACXX-AsBTiy3R2v0WOc5jrPoer2h1FS35g0
2. https://www.linkedin.com/posts/pakistansolarassociation_stopsuntax-nosuntax-nosuntax-activity-7463225439495524352-qpf0?utm_source=share&utm_medium=member_desktop&rcm=ACoAACXX-AsBTiy3R2v0WOc5jrPoer2h1FS35g0

Annex I: Event Visuals













Annex II: Shields Distribution



Agenda

“Deliberating on the Impact of Prosumer Regulations, Tariff Structure, and Geopolitical Shocks on Energy Security and Sustainable Industrial Growth in Pakistan”

**Alternate Development Services (ADS)
Green Corporate Alliance (GCA)**

Venue: USPCAS-E, NUST

Date: 19-05-2026

Time: 2:00 PM – 5:00 PM

Time	Session	Speaker
1:30 – 2:00 PM	Registration & Agenda Setting	Participants arrival and networking
2.00 – 2.05 PM	Recitation of Holy Quran	–
2:05 – 2:20 PM	Introductory Session and Contextual Development	Mr. Amjad Nazeer (CEO, ADS)
2:20 – 2:50 PM	Session I: Impact of Prosumer Regulations 2026 on industrial sector – Study Findings	Mr. Muhammad Usman Bin Ahmed (ETO, ADS)
2:50 – 3:05 PM	Expert Talk on Current Tariff structure and Industrial Energy Security; Optional ToU Tariff System for Industrial Prosumers: Design, Incentives & Industry Response	Dr. Syed Ali Abbas Kazmi (HOD, EEP & Associate Professor, USPCAS-E, NUST)
3:05 – 3:20 PM	Renewable Energy Mix and Waste-to-Energy for Sustainable Industrial Growth	Dr. Muhammad Hassan (Associate Professor, USPCAS-E, NUST)
3:20 – 3:30 PM	Emission Factors and Smart usage of Renewable mix on the grid	Mr. Subayyal Najeeb (Program Director, Green Growth Alliance, Baghbaan Environmental Services Ltd.)
3:30 – 3:50 PM	Session II: Industry insights and the #StopSunTax (SST) campaign	Mr. Hasnat Ahmed Khan (Sr. Vice Chairman, Pakistan Solar Association (PSA)) Ms. Izzah Khan (Assistant Manager, Policy Advocacy & Government Relations, PSA)
3:50 – 4:00 PM	Session III: Economic Backlashes due to Geopolitical Crisis and Fuel Dependence: Launch of Energy Security Codex for Pakistan – 2026	Mr. Mashhood Urfi (ETO, ADS)
4:00 – 4:15	Middle-East Geo-political crisis, Post Accords scenario and Pakistan’s Energy future	Ms. Arhama Siddiqi (Research Fellow, ISSI)
4:15 – 4:25 PM	Electricity Market Design, Procurement Reforms, and Energy Security for Sustainable Industrial Growth	Mr. Muhammad Umar Khan (Joint Director (PPIB) – MoE (Power Division))
4:25 – 4:35	Energy regulations, market development, and industrial energy security	Mr. Imtiaz Hussain Baloch (Director General (Licensing), NEPRA)



4:35 – 4:50 PM	Q&A Session	Open discussion with participants
4:50 – 5:00 PM	Vote of Thanks & Conclusion	Dr. Adeel Waqas (Principal, USPCAS-E, NUST)
5:00 – 5:15 PM	Shields Distribution to Speakers and Guests	Mr. Amjad Nazeer (CEO, ADS) Dr. Adeel Waqas (Principal, USPCAS-E, NUST)
5:15 PM onwards	Tea	Networking and informal discussion

Moderated by: **Alishba Maqsood** (ESE, USPCAS-E, NUST)