



USAID/PAKISTAN POWER SECTOR IMPROVEMENT ACTIVITY (PSIA) PROGRESS REPORT, Q3 FY 2022 APRIL – JUNE 2022

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POWER SECTOR IMPROVEMENT ACTIVITY (PSIA)

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ACRONYMS

AEDB	Alternative Energy Development Board
AIDEP	Automotive Industry Development and Export Plan
AMR	Advanced Meter Reading
APTMA	All Pakistan Textile Mills Association
ATM	Authorization to Mobilize
B2B	Business 2 Business
BOD	Board of Directors
BOI	Board of Investment
BPC	Bulk Power Consumer
C&I	Commercial & Industrial
CDPX	Central Data Exchange Portal
CE	Clean Energy
CLASP	Collaborative Labeling and Appliance Standards Program
CMOD	Competitive Market Operation Date
COD	Commercial Operations Date
COP	Chief of Party
COR	Contracting Officer Representative
CPPA-G	Central Power Purchasing Agency Guarantee
CTBCM	Competitive Trading Bilateral Contract Market
DISCO	Distribution Utility Company
EDF	Environment Documentation Form
EFTN	Energy Food and Transportation Nexus
EMMP	Environmental Mitigation and Monitoring Plan
EMP	Electricity Market Professional
EPA	Energy Purchase Agreement
EPRC	Energy Planning and Resource Center
ESG	Energy and Security Group, LLC
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FC	Financial Closure
FY	First Year
GOP	Government of Pakistan
HBP	Hagler Bailly Pakistan
HVDC	High Voltage Direct Current
IA	Implementing Agency
IAA	Independent Auction Administrator
IEE	Initial Environmental Examination
IEP	Integrated Energy Plans
IGCEP	Indicative Generation Capacity Expansion Plan
IPP	International Power Producer

K-ELECTRIC	Karachi Electric
KESC	Karachi Electric Supply Corporation
KII	Key Informant Interviews
KV	Kilovolt
LEI	LUMS Energy Institute
LOP	Life-of-Project
LSEV	Low-Speed Electric Vehicle
MCC	Market Commercial Code
MEPCO	Multan Electric Power Company
MIRAD	Market Implementation and Regulatory Affairs Department
MMS	Market Management System
MO	Market Operator
MOE	Ministry of Energy
MW	Megawatt
NE	National Energy
NEDP	National Energy Database and Portal
NEECA	National Energy Efficiency & Conservation Authority
NEP	National Electricity Policy
NEPn	National Electricity Plan
NEPRA	National Electric Power Regulatory Authority
NEVP	National Electric Vehicle Policy
NGC	National Grid Company
NPCC	National Power Construction Corporation
NREL	National Renewable Energy Laboratory
NTDC	National Transmission and Despatch Company
NUMARK	NUMARK Associates, Inc.
O&M	Operations & Maintenance
PD	Power Division
PDP	(USAID's) Power Distribution Program assistance
PGC	Provincial Grid Company
PITC	Power Information Technology Company
PNNL	Pacific Northwest National Laboratory
PPA	Power Purchase Agreement
PPIB	Private Power & Infrastructure Board
PPP	Public-Private Participation
PSIA	Power Sector Improvement Activity
PSQCA	Pakistan Standards & Quality Control Authority
PV	Photovoltaic
RE	Renewable Energy
RFP	Request for Proposal
ROI	Return on Investment

SO	System Operator
SOP	Standard Operating Procedure
SPT	Special Purpose Trader
T&D	Transmission and Distribution
TAMU-Q	Texas A&M University - Qatar
TOR	Terms of Reference
TSEP	Transmission System Expansion Plan
TSP	Task Sustainability Plan
US DOE	United States Department of Energy
USAID	United States Agency for International Development
USD	United States Dollar
USG	United States Government
VRE	Variable Renewable Energy
WAPDA	Water and Power Development Authority
WPP	Wind Power Plant

I. ACTIVITY OVERVIEW

This quarterly report details key activities carried out by the Power Sector Improvement Activity (PSIA) from April through June 2022, the third quarter of the 2022 fiscal year.

PSIA supports the Government of Pakistan's (GoP's) efforts to increase the financial viability, reliability, and affordability of the power system in Pakistan. PSIA has three overarching objectives: 1) increasing competition by supporting the development of Pakistan's wholesale electricity market, 2) improving the management and operation of the transmission and distribution system, and 3) optimizing grid load. PSIA, through its various activities and sub-activities across all three objectives will help Pakistan:

- Develop fully functioning capabilities and necessary capacities before, during, and after the Competitive Trading Bilateral Contract Market's (CTBCM's) Commercial Operations Date (COD) for the operator to seamlessly perform its vital functions.
- Institute market-mandated competitive procurement frameworks and reduced prices through competitive auctions for renewable energy (RE), which will be the principal driver for steering Pakistan away from its currently increasing use of coal and towards clean energy.
- Upgrade the technical and operational capacities of Pakistan's Transmission and Distribution (T&D) sector entities to meet the demand of the expanding market and support digitization throughout the T&D sector.
- Assist newly established Energy Planning and Resource Center (EPRC) and National Transmission & Despatch Commission (NTDC) to adopt necessary modeling capabilities for regular development and updating of Integrated Energy Plans (IEPs), Indicative Generation Capacity Expansion Plans (IGCEPs) and Transmission System Expansion Plans (TSEPs).
- Support management and operational improvements at select Distribution Utility Companies (DISCOs) to reduce commercial losses, improve revenues, and enhance customer service, power sector data security, and cyber resilience.
- Reduce seasonal generation surpluses to help improve system utilization and increase the usage of electricity supplied by the grid; both for new applications such as accelerated Electric Vehicle (EV) adoption.
- Improve and optimize the system utilization and economics by leveling demand-supply imbalances, reducing redundant generation capacity and associated costs, and improving the RE dispatch.

This report format meets the requirements of Section F.4 (Reporting and Deliverables), sub-section 5.a. (Quarterly Progress Reports) of the Power Sector Improvement Activity Contract, 7200AA19D00027 and Task Order 72039121F00005.

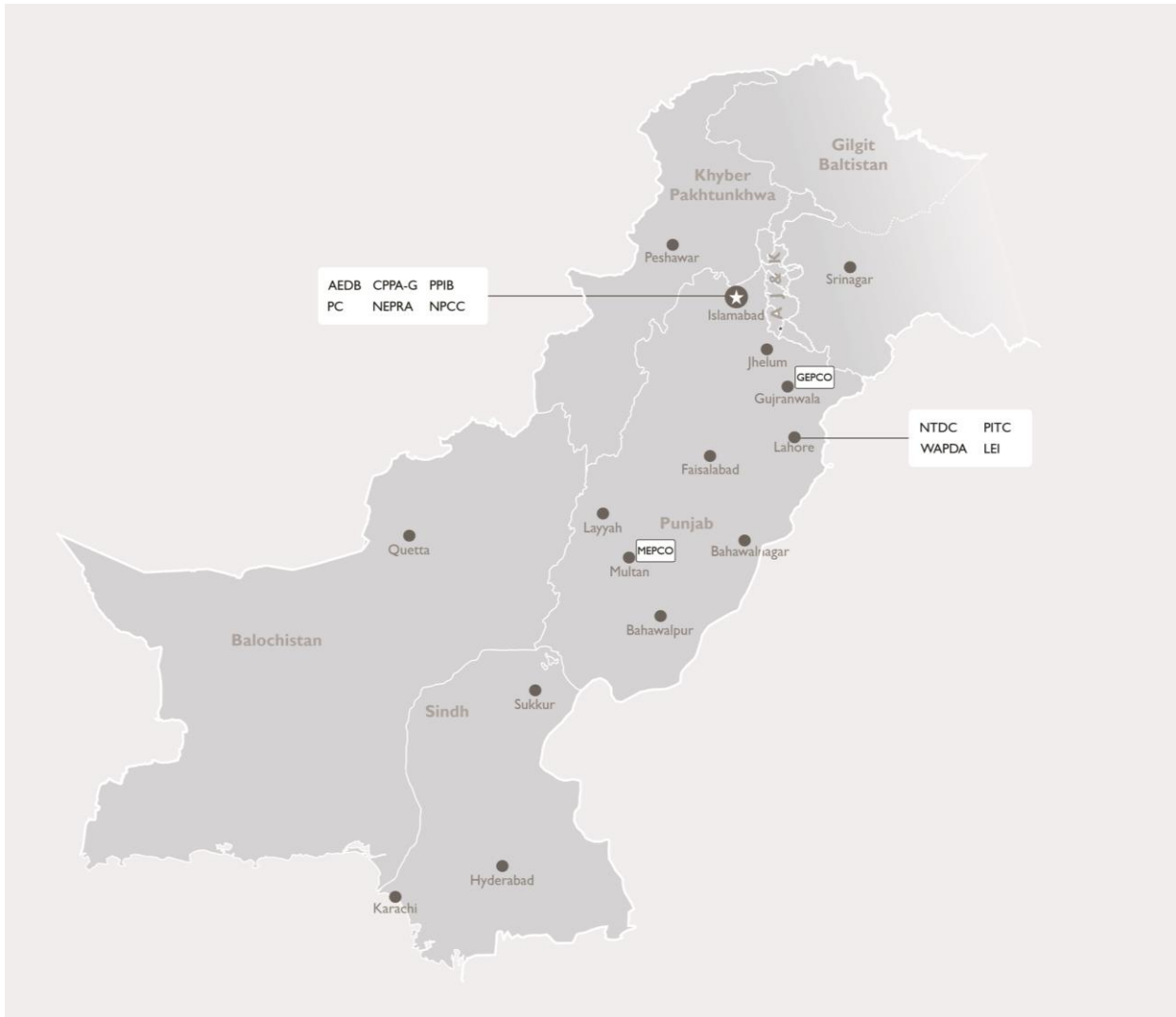
2. EXECUTIVE SUMMARY

Upon USAID approval of PSIA Year 1 (FY 22) Work Plan end of March, PSIA initiated the implementation of Year 1 activities across all three objectives in Q3.

PSIA major accomplishments during the third quarter included:

- Holding the PSIA launch ceremony in coordination with USAID Pakistan.
- Developing and implementing the Task Sustainability Plan (TSP) to support PPIB/AEDB for review and revisions of various policies and regulatory documents.
- Supporting CTBCM award the Market Operator license to the Central Power Purchasing Agency Guarantee (CPPA-G) on May 30 and approving the Commercial Code by NEPRA.
- Conducting Modules 1 and 2 Electricity Market Professional (EMP) training programs for CPPA-G.
- Developing an implementation roadmap for the Public-Private Participation (PPP) transmission framework.
- Coordinating, planning, and implementing the Future of Women in Energy Scholar program with USAID Pakistan and the US-Pak Women's Council.
- Formalizing the PSIA and Multan Electric Power Company's (MEPCO) partnership. Through this partnership, PSIA will improve MEPCO's management, operation, and financial viability for the selected model division (Musa Pak Division).
- Developing the technical architecture and functional specifications of end consumer mobile application (beta version) supporting customer service improvements activities at MEPCO's selected model division.
- Developing and publishing a Request for Proposal (RFP) for cyber security hardware and software.

3. DISTRICT MAP OF ACTIVITY IMPLEMENTATION FOR THE QUARTER



4. PROGRESS ACHIEVED DURING THE QUARTER

4.1 PSIA LAUNCH CEREMONY

The launch ceremony of USAID's PSIA successfully was held at the Serena Hotel, Islamabad on April 21, 2022. The ceremony highlighted the project's objectives and its expected impact on Pakistan's energy sector in the following key areas:

- Supporting and facilitating Pakistan's transition to a competitive power market
- Improving operations of its transmission and distribution systems
- Optimizing the use of grid electricity through increased electrification and better infrastructure utilization

Approximately 80-90 people from various government agencies, USG/USAID, the private sector, and PSIA attended the event.



Photo 1: Group photo of all PSIA Launch Ceremony attendees.



Photo 2: USAID Mission Director, Julie Koenen, delivering remarks at USAID's PSIA Launch Ceremony.



Photo 3: Managing Director PPIB/Chief Executive Officer AEDB, Shah Jahan Mirza, commends USAID's past and on-going support in Pakistan's energy sector.

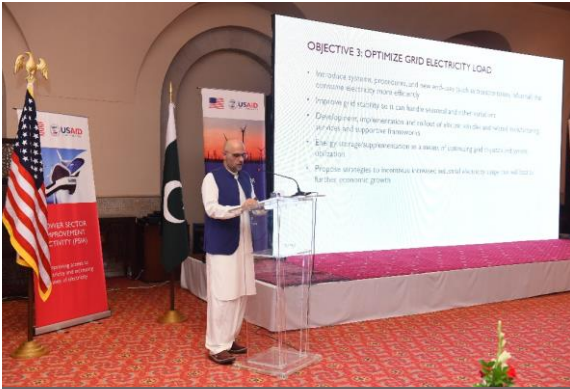


Photo 4: PSIA's Chief of Party, Kashan Saeed, introduces PSIA to all stakeholders at the event.



Photo 5: PSIA Launch ceremony participants.

4.2 OPERATIONS AND ADMINISTRATION

During this reporting quarter, the following activities were completed:

- Recruited and onboarded PSIA administrative and technical personnel in Islamabad, Lahore, and Multan.
- Established PSIA's Lahore office at NTDC's PIA Building.
- Issued an RFP for the procurement, installation, and commissioning of a cyber security system at PITC headquarters in Lahore.
- Supported and implemented logistical and administrative arrangements for the following events:
 - PSIA project launch ceremony
 - Modules I and II of the Electricity Market Professional Program (EMP-2022)
 - Future of Women in Energy Scholars Program
- Trained all PSIA employees on ethics, operations, project management, and communications.

4.3 OBJECTIVE I: INCREASE POWER SECTOR COMPETITION THROUGH SUPPORT TO DEVELOP PAKISTAN'S WHOLESALE ELECTRICITY MARKET

4.3.1 OVERVIEW

PSIA activities during the reporting period focused on providing support to CPPA-G and PPIB/AEDB as presented in the table below.

Table I: Objective I – Increase Power Sector Competition Through Support to Develop Pakistan’s Wholesale Electricity Market Progress

Activities/ Sub-activities	Outputs/Milestones	Target Dates	Progress
I. Preparatory activities, transition, and implementation support for wholesale power market			
I.1. Assistance to Ministry of Energy on policies, rules, and institutional reforms required for CTBCM	<ul style="list-style-type: none"> Marked-up version of draft generation policy framework with recommendations. 	May 30	<ul style="list-style-type: none"> Reviewed the draft generation policy framework and recommended changes to align with the NEPn and NEP. This activity was completed in Q3 FY22 and submitted to PPIB for further inputs from stakeholders.
	<ul style="list-style-type: none"> Marked-up version of draft NEPRA procurement regulations with recommendations. 	May 30	<ul style="list-style-type: none"> Reviewed the procurement regulations and recommended changes to PPIB considering new market design and NEPRA act. This activity was completed in Q3 FY22 and submitted to CPPA-G for further sharing with NEPRA.
	<ul style="list-style-type: none"> Review of draft eligibility criteria rules. 	June 30	<ul style="list-style-type: none"> Conducted meetings with CPPA-G followed by a technical review of the draft eligibility criteria rules (Market Operator, System Operator, Electric Power Supplier License, Distribution Service License, Electric Power Trader, Transmission License, and a registered entity) to ensure the relevant parameters included in the NEPRA act are complied with. This activity was completed in Q3 FY22 and submitted to CPPA-G for further processing.
I.2. Support for the transformation of CPPA-G under the CTBCM roadmap	<ul style="list-style-type: none"> Electricity Market Professional (EMP) Training Program, Modules 1 and 2 	Module 1: May 31- June 4 Module 2: June 27- July 1	<ul style="list-style-type: none"> Sponsored and implemented Modules 1 and 2 of the EMP training program, which included conducting technical sessions to relevant public sector entities including MoE, NTDC, NPCC, PPIB/AEDB, CPPA-G, NEPRA, DISCO’s and K-Electric. EMP Module 1 was attended by approximately 128 participants (119 males; 9 females). EMP Module 2 was attended by 131 participants (120 males; 11 females).
	<ul style="list-style-type: none"> Award of Market Operator license to CPPA-G and approval of the Commercial Code by NEPRA 	May 30	<ul style="list-style-type: none"> Provided technical, commercial, and financial support in completing NEPRA's determination of the Market Operator license and approval of the Commercial Code (May 31). This was done through the review and revision of the commercial code in light of the stakeholders’ comments, advocacy with relevant GoP stakeholders in resolving issues during the approval process,

Activities/ Sub-activities	Outputs/Milestones	Target Dates	Progress
			<p>NEPRA public hearing and the final NEPRA determination.</p> <ul style="list-style-type: none"> Completed in Q3 FY22 and the new wholesale market will run parallel to the previous regime as a “soft-run” for the next six months. During the time CPPA-G (in its role as the MO) will test and implement (without any financial implications for any players in the market) the MCC and the processes, IT systems, and methodologies developed under the new regime.
	<ul style="list-style-type: none"> MMS Phase II implementation report 	September 30	<ul style="list-style-type: none"> Began outlining requirements for MMS Phase II implementation after a series of discussions with CPPA-G. This is an ongoing activity to be completed in Q4 FY22.
	<ul style="list-style-type: none"> Tracked-changed version of concession package (including the EPA, IA, Connection Agreement and Buyer Participation Agreement) for customers as a last resort supplier under CTBCM 	September 30	<ul style="list-style-type: none"> Technical and legal review is ongoing for the concession package received from PPIB. This is an ongoing activity to be completed Q4 FY22.
I.3. Institutional strengthening of AEDB and PPIB and reconstitution of IAA	<ul style="list-style-type: none"> Competitive auctions training for AEDB/PPIB in preparation for its role as an IAA 	September 30	<ul style="list-style-type: none"> Conceptualized, developed, and finalized in-house mandatory competitive auction training program, to be held in the first half of August 2022, for PPIB/AEDB/IAA.
I.4. Support to NTDC/NPCC in transitioning to CTBCM	<ul style="list-style-type: none"> Operationalization of CDPX portal at NPCC 	June 30	<ul style="list-style-type: none"> Assisting in the implementation and operationalization of the CDPX portal at NPCC based on earlier support provided by CPPA-G and including support in strengthening related IT resources and capabilities. This is an on-going activity to be completed Q4 FY22. This activity is contingent upon the availability of technical resources from MRC Consultants as already identified.

Activities/ Sub-activities	Outputs/Milestones	Target Dates	Progress
2. DISCO interfacing with wholesale market and related capacity building			
2.1. Cross-functional and targeted support to DISCOs for transitioning to CTBCM and related capacity building	<ul style="list-style-type: none"> Standard Operating Procedures (SoPs) for Market Implementation and Regulatory Affairs Department (MIRAD) 	September 30	<ul style="list-style-type: none"> Developed the SoPs for various MIRAD functions as envisaged under CTBCM. Developed flow diagrams for the 11 MIRAD functions. Drafting the SoPs is underway. This is an ongoing activity to be completed Q4 FY22.
	<ul style="list-style-type: none"> Review of Distribution Code 	September 30	<ul style="list-style-type: none"> Provided a technical and commercial review of the Distribution Code to align it with the amended Grid Code. This is an ongoing activity to be completed Q4 FY22.
3. Development of competitive procurement frameworks and private CE investment support			
3.1. Design and implementation of competitive auctions for RE-based generation capacity	<ul style="list-style-type: none"> Revised concession package (including the RFP, EPA, and IA) for competitive auction amongst category-3 projects and support for the auction process. 	June 1	<ul style="list-style-type: none"> Provided technical, commercial, legal, and financial review of the concession package for category 3 renewable energy generation projects (which includes the RFP and security documents) considering NEPRA's determination of February 2021, which will serve as the foundation for renewable energy auctions. Completed in Q3 FY22 and the reviewed concession package was submitted to AEDB. Next steps are the approval of the concession package from AEDB's board and subsequently, NEPRA.
3.2. Development of standalone bidding packages and RE-integrated auction modes for private transmission lines	<ul style="list-style-type: none"> Report on an implementation roadmap for the PPP transmission framework (Phase I) 	August 1	<ul style="list-style-type: none"> Developed implementation roadmap for the PPP transmission framework based on national and international experience and a summary of best practice models suitable for Pakistan. Report submitted to PPIB for comments.
4. Development of flexible, open market contractual arrangements			
4.1. Support on bilateral B2B PPAs, wheeling contracts, and tariffs	<ul style="list-style-type: none"> B2B contract template 	September 30	<ul style="list-style-type: none"> This activity is contingent on the approval of the security package documents for procurement of capacity under CTBCM for the regulated customer.
4.2. Novation of existing single-buyer PPAs to bilateral contracts with DISCOs/BPCs	<ul style="list-style-type: none"> Revised methodology for commercial allocation of existing electricity power pool to DISCOs and KE 	September 30	<ul style="list-style-type: none"> Initial allocation has been approved as part of the accepted commercial code and will be finalized after the parallel run in Q4. This is an ongoing activity to be completed in Q4 FY22.

Activities/ Sub-activities	Outputs/Milestones	Target Dates	Progress
5. Facilitating private CE investment and market opportunities in Pakistan			
5.1. Support to AEDB/IAA for achieving financial close of Category I and II RE project pipeline	<ul style="list-style-type: none"> Financial Closing of as many categories I and 2 projects (wind, solar, and bagasse) as possible 	August 1	<ul style="list-style-type: none"> Began identifying impediments preventing the achievement of FC for category I and 2 wind, solar, and bagasse projects and devising strategies to overcome these issues. This is an ongoing activity throughout the life of the project.



Photo 6: PSIA's Director, Power Market Operations, Abid Lodhi, conducting a session during the Electricity Market Professional (EMP) training program held at LUMS, Lahore.



Photo 7: Representatives from Pakistan's power sector are engaged in a break-out room session during the Electricity Market Professional (EMP) training program.

4.4 OBJECTIVE 2: IMPROVE THE MANAGEMENT AND OPERATION OF T&D SYSTEM

4.4.1 OVERVIEW

PSIA activities focused on providing support to NTDC, PITC, and MEPCO as presented in **table 2**.

Table 2: Objective 2 – Improve the Management and Operation Of T&D System Progress

Activities/Sub-activities	Outputs/Milestones	Target Dates	Progress
6. Institutional capacity development for integrated system and energy plans			
6.1. Support to EPRC in undertaking development of least-cost, long-term IEP	<ul style="list-style-type: none"> Report outlining energy data sourcing, collection, and standardization requirements as well as key institutional collaboration requirements for the development of the NEDP during FY 2023. 	September 30	<ul style="list-style-type: none"> Reviewing current energy and IEP-related data sources and their quality. PSIA participated in the Turnaround Conference on June 28, which was hosted by the Ministry of Planning, Development and Special Initiatives.
6.2. Support to NTDC in the development of Indicative Generation Capacity Expansion Plan (IGCEP) 2022-2031	<ul style="list-style-type: none"> Institutionalized process for development of IGCEP and integration with overall IEP. 	September 30	<ul style="list-style-type: none"> Preliminary meetings were held between the PSIA and NTDC teams to discuss the existing processes for development of IGCEP.
6.3. Capacity building for transmission system planning/studies and dispatch at NTDC/NPCC	<ul style="list-style-type: none"> Task Sustainability Plan for TSEP activity. Phase I: System studies to develop transmission system alternatives for bulk transmission reinforcement/ expansion plans and simulations for draft TSEP. Phase II: System studies to identify transmission reinforcement alternatives, cost estimates, and additional simulations for final TSEP. <p>Note: The TSEP deliverable has been combined (Phase I and 2). As communicated by NTDC, the TSEP will be revised within three months of IGCEP approval by Ministry of Energy (pending).</p>	July 30	<ul style="list-style-type: none"> TSEP Report (Phase I and II): <ul style="list-style-type: none"> Defined model inputs for the 2027-2028 base cases. Developed cost basis and per-unit costs. Testing and finalization of the 2025-2026 load flow base cases for a variety of operating conditions completed. Sub-system studies have completed and the results are pending final review with NTDC. These studies encompass and address critical areas of concern such as: <ol style="list-style-type: none"> Deficient reactive power support in the Balochistan region

Activities/Sub-activities	Outputs/Milestones	Target Dates	Progress
			<ul style="list-style-type: none"> 2. Issues with power supply security to the Peshawar and Lahore load centers 3. Increased short circuit levels in the Lahore and Islamabad areas. <ul style="list-style-type: none"> – The geographical mapping of forecasted hydro-generation plants and their potential inter-connection with the national grid has been completed.
7. Improved management, operations, and financial viability of distribution utilities			
<p>7.1. Commercial service orientation and revenue optimization at DISCOs</p> <p>7.1.1. End-consumer mobile application and pilot program</p> <p>7.1.2. Feasibility study for targeted division within a selected DISCO</p>	<ul style="list-style-type: none"> • End consumer mobile application beta version • End consumer pilot program • Diagnostics and assessment of a targeted division in selected DISCO- MEPCO 	<p>Q4 FY22 Q1 FY23</p> <p>Q4 FY22</p>	<ul style="list-style-type: none"> • Developed end consumer application blueprint in consultation with PITC and MEPCO customer service department. Initial draft of solution architecture finalized and under review by MEPCO. • Selected MEPCO Musa Pak Division as a target Model Division in consultation with all stakeholders. • Began collection of baseline data for target division.
8. IT interventions for strengthening DISCO planning and performance			
<p>8.1. Enhancing power sector data security, risk assessment, and cyber resilience</p>	<ul style="list-style-type: none"> • PITC cyber security vulnerability study and systems procurement report 	<p>Q3 FY22 Q4 FY22</p>	<ul style="list-style-type: none"> • Commenced development of cyber security study report. • Developed and published RFP for cyber security hardware and software.



Photo 8: Meeting at MEPCO headquarters to officialize the partnership between PSIA and MEPCO.



Photo 9: PSIA's Chief of Party, Kashan Saeed, and MEPCO's General Manager, Chief Executive and other MEPCO officials visiting the facilities.

4.5 OBJECTIVE 3: OPTIMIZE GRID ELECTRICITY LOAD

4.5.1 OVERVIEW

PSIA activities focused under objective 3 are presented in **table 3**.

Table 3: Objective 3 – Optimize Grid Electricity Load Progress

Activities/Sub-activities	Outputs/Milestones	Target Dates	Progress
9. Measures to mitigate seasonal demand imbalances and idle capacity costs			
9.1. Financial and technical evaluation of shifting captive gas-fired generation to the grid	<ul style="list-style-type: none"> Report outlining key stakeholder issues with switchover from captive gas-fired to grid-based alternative supplies, key risks and mitigation options, and feasible solutions 	Q4 FY22	<ul style="list-style-type: none"> Identified scope of study focus on the textile industry to determine who has the largest deployment of gas-fired captive generation for optimal impact. Conducted initial screening and selection of representative textile units (spinning, weaving, finishing, and integrated) through survey and database of the 400-member All Pakistan Textile Mills Association (APTMA). Conducted site visits in Lahore, Karachi, Multan, and Faisalabad to meet owners and managers at selected industrial plants for discussions and agreement on their inclusion in the study. Initiated plant-level energy, cost, and operational information gathering. Initiated preparation of spreadsheet model for comparative financial analysis of various gas and electricity pricing regimes and electricity supply alternatives.

Activities/Sub-activities	Outputs/Milestones	Target Dates	Progress
10. Increased electrification and end-use efficiency			
10.1. Improvement of electric vehicle (EV) policy and incentives frameworks	<ul style="list-style-type: none"> Report on EV policy and regulatory actions needed to accelerate NEVP implementation and achievement of EV penetration targets 	Q4 FY22	<ul style="list-style-type: none"> Conducted review of National Electric Vehicle Policy (NEVP) 2019 and Automotive Industry Development and Export Plan (AIDEP) 2021-2026. Initiated policy gap analysis and recommendations.
10.2. Support to private sector for pilot deployment of electric 3-wheelers	<ul style="list-style-type: none"> Report on expanded low speed electric vehicle (LSEV) pilot project with respect to technical, functional, and financial feasibility of swappable battery platform in different market segments 	Q4 FY22	<ul style="list-style-type: none"> Identified potential low speed electric vehicle use-cases for field evaluation and pilot phase shortlisting. Initiated identification of and consultations with potential end-users and pilot program partners. Initiated evaluation of pilot implementation of on-going LUMS three-wheeler EV pilot at four commercial cargo/courier companies (Daewoo, TCS, M&P, and Metro). Collected three-wheeler EV sales data on second-tier cities, towns, and rural markets from manufacturers (Sazgar). Initiated drafting of LSEV pilot design report.
10.3. Measures for incentivizing increased industrial, commercial, and residential electricity use	<ul style="list-style-type: none"> Preliminary assessment and recommendations for increased residential and C&I electrification measures for design of targeted PSIA implementation support 	Q4 FY22	<ul style="list-style-type: none"> Developed study ToRs based on stakeholder consultations (NEECA, PSQCA, CLASP) and available end-use data. Conducted preliminary assessment to focus on switchover of gas-fired domestic water and space heating appliances to electrical alternatives. Initiated market assessment (manufacture, sales, usage) data collection for relevant appliance categories. Initiated preparation of end-use simulation and financial evaluation model.

Activities/Sub-activities	Outputs/Milestones	Target Dates	Progress
11. Energy storage/supplementation as a means of optimizing grid dispatch and system utilization			
11.1. Preliminary evaluation of cluster-level hybrid wind/solar farms	<ul style="list-style-type: none"> Preliminary assessment report on cluster-based solar and wind hybridization model and analysis results 	Q4 FY22	<ul style="list-style-type: none"> Completed WPP interconnection mapping on GIS for Jhimpir-Gharo wind corridor, Sindh province. Completed TL-based wind IPP subcluster selection. Conducted meetings with selected IPP owners and collaboration requirements agreed upon. Collected plant-wise hybrid studies for three out of four subcluster WPPs; fourth to be prepared in-house. Initiated historical WPP generation data request to NTDC/NPCC. Held consultations with NTDC/NPCC on cluster selection and data access. Initiated financial evaluation model for hybrid configuration.
11.2. RE augmentation at substations to reduce peak transformer loads	<ul style="list-style-type: none"> Preliminary findings summary and identification of candidate substation(s) for RE offset to be evaluated for detailed pilot-scale implementation assessment in FY 2023 	Q4 FY22	<ul style="list-style-type: none"> Held discussions with US Department of Energy (DOE) (PNNL and NREL) on requirements and methodology for undertaking study jointly. Developed study approach outline and data requirements.
11.3. RE storage and EFTN-based solutions for weak grid communities	<ul style="list-style-type: none"> Report on grid infrastructure challenges, mitigation strategies, and pilot EFTN design. The goal is utilization of RE, battery storage, and optimized loads to enhance power supplies in weak grid rural and agricultural areas 	Q4 FY22	<ul style="list-style-type: none"> Conducted field visits to Bhakkar, Hafizabad, Multan, Pakpattan, and Lar to assess potential EFTN applications, markets, and local electricity access issues. Initiated identification of EFTN use-cases and locations for pilot design underway. Identified and consulted with potential partner agencies for pilot implementation (e.g., MNS-University of Agriculture, Multan). Initiated preparation of draft report.

5. ENVIRONMENTAL INTERVENTIONS

An initial environmental examination (IEE) of PSIA was carried out by USAID (reference number OAPA-20-JUL-PAK-0031). This review identified preliminary environmental impacts of proposed project tasks and activities in accordance with US Regulation 22 CFR 216 and ADS 204. According to the threshold determination carried out in the IEE, all PSIA project activities were categorized as either Categorical Exclusions or Negative Determination with Conditions.

PSIA developed an environmental mitigation and management plan (EMMP) which identifies all potential environmental and social impacts as a result of project activities and proposes appropriate mitigation and management measures accordingly.

Table 4: Environmental Interventions Progress

Activities	Outputs/Milestones	Target Dates	Progress
Development of Project EMMP	EMMP	June 30	Completed and approved by USAID.
Development of Objective-wise EDFs	Draft EDF for Objective 1	July 1	Drafted (shared for internal review).
	Draft EDF for Objective 2		In progress.
	Draft EDF for Objective 3		Drafted (shared for internal review).
Development of Objective-wise EDFs	Final EDF for Objective 1	July 15	Will be finalized after review and addressal of comments received from USAID, if any.
	Final EDF for Objective 2		
	Final EDF for Objective 3		

6. IMPLEMENTATION CHALLENGES

Under PSIA's Objective 1, due to change in the government in Q3 FY 2022, any further potential delays in the approval of the rules and waiver of moratorium (clauses 23A and B on MO license and 23G and H on SO license) by GoP, the commercial market operation date (CMOD), (i.e., December 2022) may be pushed back to April 2023 with the intervening period treated as an extension of the shadow/trial-run market.

Similarly, under Objective 1, the auctions process for category 3 is still awaiting AEDB board's approval and subsequent determination by NEPRA. The auction process was originally envisaged to be initiated in Q3 FY 2022, but due to the delays in the requisite GOP approvals, it is now expected in Q4 FY 2022, with the actual auction process to launch in FY 2023.

Under PSIA's Objective 3, the access to and availability of detailed line and transformer data for selected substations was not obtained from the relevant agencies during Q3 FY 2022 and is now expected in Q4 FY 2022. This places a constraint on the subsequent time available for conducting the corresponding analysis, which is expected to continue into FY 2023.

Similarly, for Sub-activity 3.1 (Preliminary evaluation of cluster-level hybrid wind and solar farms) detailed plant and grid-level line and transformer loading, energy dispatch, and corresponding wind speed data required for selected WPPs connected to the New Jhimpir I substation has been promised but not yet provided by NPCC and the plant operators. PSIA expects most of the required data to be available by August 2022, so the preliminary assessment planned for FY 2022 can be completed.

7. GENDER INTERVENTIONS

During this reporting quarter, in collaboration with USAID’s PSIA, the U.S.-Pakistan Women’s Council implemented a pilot of the Future of Women in Energy Scholars Program. The program seeks to increase the number of women in Pakistan’s energy sector by promoting education in energy studies, fostering young women’s participation and leadership on energy issues, and provide an overview of energy infrastructure and how it underpins the global economy. The U.S.-Pakistan Women’s Council selected 17 qualified Pakistani women undergraduate students currently pursuing their bachelor’s degrees in science or engineering to participate in a two-week certificate program hosted by Texas A&M University at Doha, Qatar in June 2022. In addition to participating in lectures on the full spectrum of the energy economy and developing an independent research project, Future of Women in Energy Scholars had the opportunity to interact with industry and business leaders, engage in cultural immersion in Qatar, and experience student life in Education City—a vibrant educational community with satellite campuses for major international universities. The students received a certificate of participation from Texas A&M at Qatar upon completion of the Qatar program.

Following the two-week course, USAID’s PSIA assisted the U.S.-Pakistan Women’s Council by planning, facilitating, and supporting the Future of Women in Energy Scholars through a two-week program in Pakistan where they visited key public and private energy sector contributors, such as General Electric, Pakistan’s National Transmission & Despatch Commission, the Lahore Electric Supply Company, the Private Power & Infrastructure Board, and the Alternative Energy Development Board. The goal of the program was to inspire the next generation of female talent to thrive in careers in the energy sector and encourage the pursuit of advanced degrees in energy-related disciplines that focus on renewable resources.

The table below represents the progress on PSIA’s gender intervention activities during Q3FY22.

Table 5: Gender Interventions Progress

Activities	Outputs/Milestones	Target Dates	Progress
1. Contextual analysis and needs Assessments			
Obtain list of PSIA stakeholder focal persons	<ul style="list-style-type: none"> Gender Assessment Report on the inclusion of women in the energy sector 	July 30	<ul style="list-style-type: none"> Completed obtaining list of PSIA stakeholder focal persons.
Design HR Survey for gender needs assessments			<ul style="list-style-type: none"> Completed designing HR survey for gender needs assessments.
Design Key Informant Interviews for female employees in stakeholder organizations			<ul style="list-style-type: none"> Completed designing Key Informant Interviews (KIIs) for female employees in stakeholder organizations.
Share survey and interview questions with stakeholder organizations			<ul style="list-style-type: none"> Completed sharing survey and interview questions with stakeholder organizations.
Analyze compiled data and Key Informant Interviews			<ul style="list-style-type: none"> Awaiting data from completed from stakeholder organizations.
2. Review Policies of PSIA Stakeholder Organizations			
Collect HR policies from stakeholder orgs (including hiring, promotion, sexual harassment at the workplace and other relevant policies)	<ul style="list-style-type: none"> Review of policies of PSIA stakeholder organizations report 	July 30	<ul style="list-style-type: none"> Awaiting responses from stakeholder organizations to share their policies.
3. Gender Sensitization Workshops			
Gender Sensitization Workshops	<ul style="list-style-type: none"> Gender sensitization Training Manual 	May-August	<ul style="list-style-type: none"> Completed preparing Gender Sensitization Training materials.
Prepare Gender Sensitization Training materials: presentation slides, handouts, assignments, case studies, pre and post evaluations	<ul style="list-style-type: none"> Training Summary Report 	May-August	<ul style="list-style-type: none"> The first training module was held on June 2 during the EMP training program. A total of 94 participants (88 males; 6 females) participated. . The second training module was held on June 28 A total of 124 participants (113 males; 11 females) were educated. The third training module will be held in August.

Activities	Outputs/Milestones	Target Dates	Progress
4. U.S. Pakistan Women's Council: Future of Women in Energy Scholars Program			
Qatar, Pakistan and Close-out ceremony	<ul style="list-style-type: none"> Future of Women in Energy Scholar Program and Close-out Ceremony Report 	July 14	<ul style="list-style-type: none"> An intensive two-week academic enrichment program led by experts. Lectures focused on the energy economy, energy security, and resources such as solar, wind, hydro, geothermal, and biomass. PSIA assisted the US State Department by supporting a two-week familiarization program focused on advancing women's participation in Pakistan's energy economy. The close-out ceremony was held on July 1 at the US embassy. 17 women successfully participated in the Future of Women in Energy Scholar and Program.



Photo 10: USAID Mission Director speaking with the Future of Women in Energy scholars after the close-out ceremony at the US Embassy in Islamabad.



Photo 11: PSIA's Gender sensitization training session being conducted at PSIA's EMP training program – LUMS, Lahore.

8. PROGRESS IN NUMBERS

Below is a list of indicators and targets from the Monitoring and Evaluation Plan approved on June 20, along with the results of this quarter, i.e., Q3 FY 2022.

Table 6: Indicators and Targets -Q3FY22

Indicator Number, Name, Disaggregates	Unit	LOP Target	Achieved in FY 2022 Q3	Total Achieved as of FY 2022 Q3	% LOP Achieved as of FY 2022 Q3
3.3.1a Amount of investment mobilized (in U.S. dollars million) for energy projects as supported by USG assistance [EG.7.2-1] <i>Disaggregates: domestic/international/U.S., public/private sector, clean/non-clean</i>	# of million dollars (USD)	USD 1,042	0	0	-
3.3.1b Clean energy generation capacity (MW) supported by USG assistance that has achieved financial closure (EG.12-5) <i>Disaggregates: Type of clean energy source (solar, wind, hydro, geothermal, biomass and biofuels, other)</i>	# of MW	1,715	0	0	-
3.3.2a Number of laws, policies, regulations, or standards to enhance governance of energy sector formally proposed, adopted, or implemented as supported by USG assistance <i>Disaggregates: policy stages process/step (adopted, analysis, formally proposed, full and effective implementation, public debate, stakeholder consultation) and clean/non-clean</i> <i>Note: USAID guidance given to count for the continuation of the policies in different developmental stages.</i>	# of laws, policies, regulations, or standards	40	14 ¹	14	35%

¹ 3 = Standard-formally proposed stage: Revised RFP, Energy Purchase Agreement (EPA), Implementation Agreement (IA) for category-3 projects (wind)

3 = Standard-formally proposed stage: Revised RFP, Energy Purchase Agreement (EPA), Implementation Agreement (IA) for category-3 projects (solar)

1 = Regulation-formally proposed stage: Revised the draft Generation Policy Framework; submitted to AEDB/PPIB on April 20, 2022 and approved on May 11, 2022. AEDB/PPIB have forwarded the draft to NEPRA for approval.

1 = Regulation-implemented stage: CPPA-G received approval on NEPRA's determination of the Market Operator License and Commercial Code on May 31.

5 = Law-formally proposed stage: Reviewed the draft Eligibility Criteria Rules for Market Operator and System Operator; submitted to CPPA-G and approved on June 13. CPPA-G have forwarded the draft to NEPRA for approval. A total of four licenses and a rule were reviewed:

1. Power Supply License
2. Power Trader License
3. Distribution License
4. Transmission License
5. Registration Rules

1 = Regulation-formally proposed stage: Reviewed and provided comments/recommendations on the draft NEPRA Procurement Regulations to PPIB; submitted to PPIB on April 17 and approved on April 18. PPIB has forwarded the draft to NEPRA for approval.

Indicator Number, Name, Disaggregates	Unit	LOP Target	Achieved in FY 2022 Q3	Total Achieved as of FY 2022 Q3	% LOP Achieved as of FY 2022 Q3
C1 Relative percent of commercial & technical losses reduced in targeted DISCO subdivision(s) <i>Disaggregates: DISCO and Losses Type, Technical and Non-Technical</i>	Relative percent of commercial & technical losses	20%	0	0	-
C2 Number of people trained in technical energy fields supported by USG assistance <i>Disaggregates: Sex</i>	# of people	1,070	276 ²	276	26%
C3 Number of interventions for improved institutional capacity to address clean energy issues as supported by USG assistance <i>Disaggregates: None</i>	# of interventions for improved institutional capacity	72	0	0	-
C4 Number of public-private and private-private partnerships supported <i>Disaggregates: Type of partnership: Public-Private/Private-Private</i>	# of partnerships supported	58	0	0	-
C5 Number of models, systems, policies, methodologies, tools, software, regulations, or institutional processes procured, assessed, revised, drafted, or developed with USG assistance to facilitate the delivery of sustainable energy (custom/activity level) <i>Disaggregates: Entity; procured, assessed, drafted, revised, developed</i>	# of models, systems, policies, methodologies, tools, regulations, or institutional processes	51	13 ³	13	25%

² - 128 Individuals (119 males; 9 females) received training during the Electricity Market Professionals (EMP) Training Program (Module 1) held at LUMS, Lahore from May 31 – June 4.

- 131 Individuals (120 males; 11 females) received training during the Electricity Market Professionals (EMP) Training Program (Module 2) held at LUMS, Lahore from June 27 – July 1.

- 17 females participated in the U.S. State Department Future of Women in Energy Scholars Program. Qatar segment (June 3–16), Pakistan segment (June 17–30). PSIA provided assistance to the State Department in the program's successful implementation.

³ 3 = PSIA revised the Request for Proposals (RFP), EPA, IA for Category-3 solar projects - submitted to AEDB on April 27 and confirmation received on May 11. AEDB has submitted the RFP package to NEPRA for approval and redetermination of benchmark tariffs.

3 = PSIA revised the Request for Proposals (RFP), EPA, IA for Category-3 wind projects - submitted to AEDB on April 27 and confirmation received on May 11. AEDB has submitted the RFP package to NEPRA for approval and redetermination of benchmark tariffs.

1 = Reviewed the draft Generation Policy Framework and submitted to AEDB/PPIB for review and approval.

1 = Reviewed the 2015 Transmission Policy and submitted to CPPA-G for review and approval.

5 = Reviewed the draft Eligibility Criteria Rules for Market Operator and System Operator. A total of four licenses and a rule were reviewed:

6. Power Supply License
7. Power Trader License
8. Distribution License
9. Transmission License
10. Registration Rules

Indicator Number, Name, Disaggregates	Unit	LOP Target	Achieved in FY 2022 Q3	Total Achieved as of FY 2022 Q3	% LOP Achieved as of FY 2022 Q3
C6 Number of Task Sustainability Plans (TSPs) developed with USG assistance (custom/activity level) <i>Disaggregates: By Entity</i>	# of Task Sustainability Plans (TSPs) developed	17	2 ⁴	2	12%
C7 Number of activities to promote gender equity in the power sector developed by the counterpart with USG assistance that are planned, approved/supported, and implemented (custom/activity level) <i>Disaggregates: activity type, work unit and implementation status (planned, approved/supported, implemented)</i>	# of activities	14	0	0	-
C8 Power purchase/wheeling capacity transactions or open access through bilateral/novated contracts developed/enabled (custom/activity level) <i>Disaggregates: None</i>	# of contracts developed	6	0	0	-
C9 Percent improvement in generation/transmission capacity utilization (MWh dispatched/MWh available) made possible through selected USG-facilitated interventions (custom/activity level) <i>Disaggregates: None</i>	% improvement in generation/transmission capacity utilization	13%	0	0	-
C10 Percentage improvement in revenue collection efficiency (collection/billing) in targeted DISCO subdivision(s) (custom/activity level) <i>Disaggregates: None</i>	% improvement in revenue collection efficiency	10%	0	0	-
C11 Number of public liaison, awareness, and outreach programs/events organized or supported for improved utility-customer services and relationship management (custom/activity level) <i>Disaggregates: Sex</i>	# of events	12	0	0	-
C12 Number of men and women within work units participating in interactive gender training/awareness workshops supported by USG assistance (custom/activity level) <i>Disaggregates: Sex</i>	# of men and women	165	218 ⁵	218	132%

⁴ I = Task Sustainability Plan developed for TSEP activity acknowledged by NTDC

I = Task Sustainability Plan developed for PSIA's scope of work on IAA activity acknowledged by PPIB/AEDB

⁵ - Gender Sensitization Workshop session held on June 2 at LUMS Lahore during the EMP Training Program (Module 1). A total of 94 participants (88 males; 6 females) were trained.

- Gender Sensitization Workshop session held on June 28 at LUMS Lahore during the EMP Training Program (Module 2). A total of 124 participants (113 males, 11 females) were trained.

9. FINANCIAL REPORTING

A summary of costs compared to the funding is provided below:

Summary of Program Costs to Funding		
Power Sector Improvement Activity (PSIA)		
Contract:	7200AA19D00027/72039121F00005	
COR/AOR:	Nadeem Habib/Kashif Hasnain	
Start Date (Authorization to Mobilize):	January 26	
End Date:	September 22, 2025	
Contract Ceiling Price:	\$23,493,150.86	
Total Obligated toward ceiling:	\$8,100,000.00	
Contract ceiling remaining:	\$15,393,150.86	Ceiling minus obligated
Total disbursed (invoiced):	\$2,149,932.12	Invoiced as of June 30
Accruals (cumulative):	\$450,000.00	Accruals as of June 30

The table below lists PSIA's costs incurred by CLINs for Q3 FY 2022 (does not include accruals).

	CLIN1	CLIN2	CLIN3
Total Estimated:	\$402,500.00	\$402,500.00	\$345,000.00
Total Actual:	\$504,495.14	\$515,798.38	\$330,366.40
Deviation Cumulative:	(\$101,995.14)	(\$113,298.38)	\$14,633.60

10. PLANNED INTERVENTIONS FOR NEXT QUARTER

The following are PSIA’s plans for Q4 FY2022 under each Objective as well as at the administrative and operational level.

10.1 OBJECTIVE I: INCREASE POWER SECTOR COMPETITION THROUGH SUPPORT TO DEVELOP PAKISTAN’S WHOLESALE ELECTRICITY MARKET

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
I. Preparatory activities, transition, and implementation support for wholesale power market			
I.1. Assistance to Ministry of Energy on policies, rules, and institutional reforms required for CTBCM	<ul style="list-style-type: none"> Review and provide inputs to the MoE on the National Energy (NE) Plan 	August 20	<ul style="list-style-type: none"> Review of the comments received from stakeholders along with CPPA-G team
	<ul style="list-style-type: none"> Revised transmission policy framework in line with the NE Plan 	September 30	<ul style="list-style-type: none"> Coordinate with the GoP on revising the transmission policy framework.
	<ul style="list-style-type: none"> Support approval of rules, such as NGC, PGC, and MO Eligibility Criteria Rules 	September 30	
I.2. Support for the transformation of CPPA-G under the CTBCM roadmap	<ul style="list-style-type: none"> Electricity Market Professional (EMP) Training Program, Module 3 	Q4 FY22	<ul style="list-style-type: none"> Conduct EMP training program Module 3 and technical sessions for relevant public sector entities
	<ul style="list-style-type: none"> MMS Phase II implementation report 	September 30	<ul style="list-style-type: none"> Continue work on the report to outline requirements for MMS Phase II implementation after a series of discussions with CPPA-G.
	<ul style="list-style-type: none"> Support the ‘shadow market’ for six months and post-CMOD 	September 30	<ul style="list-style-type: none"> Provide support to MO and SPT in a shadow market environment for six months and post-CMOD.
I.3. Institutional strengthening of AEDB and PPIB and reconstitution of IAA	<ul style="list-style-type: none"> Competitive auctions training for AEDB/PPIB in preparation for its role as an IAA 	September 30	<ul style="list-style-type: none"> Finalize in-house mandatory training program for PPIB/AEDB/IAA for capacity-building on topics related to competitive auctions. The training is scheduled for the first half of August 2022.
	<ul style="list-style-type: none"> Reviewed concession package for customers as a last resort supplier under CTBCM 	September 30	
	<ul style="list-style-type: none"> Registration of IAA by NEPRA 	September 30	<ul style="list-style-type: none"> Continue to work with relevant agencies to expedite the registration of IAA by NEPRA.

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
1.4. Support to NTDC/NPCC in transitioning to CTBCM	<ul style="list-style-type: none"> Operationalization of CDPX portal at NPCC 	June 30	<ul style="list-style-type: none"> Assist with the implementation and operationalization of the CDPX portal at NPCC based on earlier support provided by CPPA-G, including support in strengthening related IT resources and capabilities.
2. DISCO interfacing with wholesale market and related capacity building			
2.1. Cross-functional and targeted support to DISCOs for transitioning to CTBCM and related capacity building	<ul style="list-style-type: none"> SoPs for MIRAD 	September 30	<ul style="list-style-type: none"> Continue developing SoPs for various MIRAD functions as envisaged under CTBCM. This is an ongoing activity with a due date at the end of Q4 FY22
	<ul style="list-style-type: none"> Review of Distribution Code 	September 30	<ul style="list-style-type: none"> Provide technical and commercial review of the Distribution Code to align with the amended Grid Code.
3. Development of competitive procurement frameworks and private CE investment support			
3.1. Design and implementation of competitive auctions for RE-based generation capacity	<ul style="list-style-type: none"> Revised concession package (including the RFP, EPA, and IA) for competitive auction amongst category-3 projects and support for the auction process. 	September 30	<ul style="list-style-type: none"> Support approval process of the concession package from AEDB's board and subsequently, NEPRA. Following that, the auction process will be launched by AEDB. Continue support to AEDB, as and when required throughout the review, approval, and implementation of the auction process.
3.2. Development of standalone bidding packages and RE-integrated auction modes for private transmission lines	<ul style="list-style-type: none"> Revised transmission policy framework in line with the NE Plan 	Sep 30	<ul style="list-style-type: none"> Coordinate with PPIB in revising the transmission policy framework, as envisaged in the NE Plan
4. Development of flexible, open market contractual arrangements			
4.1. Support on bilateral B2B PPAs, wheeling contracts, and tariffs	<ul style="list-style-type: none"> B2B contract template. 	September 30	<ul style="list-style-type: none"> The initiation of this activity is contingent on the approval of requisite security package documents for procurement of capacity under CTBCM for the regulated customer.
4.2. Novation of existing single-buyer PPAs to bilateral contracts with DISCOs/BPCs	<ul style="list-style-type: none"> Revised methodology for commercial allocation of existing electricity power pool to DISCOs and KE 	September 30	<ul style="list-style-type: none"> Initial allocation has been approved as part of the approved commercial code and accordingly will be finalized after the parallel run in Q4. FY22.

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
5. Facilitating private CE investment and market opportunities in Pakistan			
5.1. Support to AEDB/IAA for achieving financial close of Category I & II RE project pipeline	<ul style="list-style-type: none"> Financial Closing of as many categories 1 and 2 projects (wind, solar, bagasse) as possible. 	August 1	<ul style="list-style-type: none"> Identify impediments that prevent the achievement of FC for category-I and 2 wind, solar, and bagasse projects and devise strategies to overcome these issues. This is an ongoing activity till LOP.

10.2 OBJECTIVE 2: IMPROVE THE MANAGEMENT AND OPERATION OF T&D SYSTEM

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
6. Institutional capacity development for integrated system and energy plans			
6.1. Support to EPRC in undertaking development of least-cost, long-term IEP	<ul style="list-style-type: none"> A complete review of current energy and IEP related data sources. 	September 30	<ul style="list-style-type: none"> Continue and complete a review of available data sources and determine their quality and reliability. Work with the EPRC team in initiating and developing an IEP.
6.2. Support to NTDC in the development of Indicative Generation Capacity Expansion Plan (IGCEP) 2022-2031	<ul style="list-style-type: none"> Development of a framework for stakeholders' engagement in developing IGCEP 2032, which is to be completed in the second quarter of FY2023. 	September 30 – Q2 FY2023	<ul style="list-style-type: none"> Hold consultations with stakeholders and support the NTDC/NPCC team in the development of an IGCEP 2032, which will continue in FY2023.
6.3. Capacity building for transmission system planning/studies and dispatch at NTDC/NPCC	<ul style="list-style-type: none"> Consolidation of repeat sub-system studies and conducting additional sub-studies for the development of transmission system reinforcement alternatives in TSEP, which will simultaneously strengthen NTDC's own capabilities Upon finalization of further iterations of the IGCEP and the corresponding TSEP, develop robust cost estimates for recommended transmission facilities 	September 30	<ul style="list-style-type: none"> Rework and rerun of sub-system studies to reverify recommended remedial measures. This will extend to any other rework required post revisions made to the load flow base cases for 2025-2026 and 2027-2028. Identify, analyze, and consolidate recommendations for the prevailing transmission network issues and identification of network expansion requirements to aid in further developing sustainable skills and expertise of NTDC's team in this field.
7. Improved management, operations, and financial viability of distribution utilities			
7.1. Commercial service orientation and revenue optimization at DISCOs	<ul style="list-style-type: none"> PSIA support in the development of mobile application and development of pilot program will provide a revenue stream for DISCOs, transition mechanism to smart meters for improving commercial operations (meter-to-cash), reduce commercial losses, improve customer service, 	Q4 FY22	<ul style="list-style-type: none"> Draft RFP for smart meters review by Home Office and securing USAID approval Draft RFP (for smart meters) publishing Draft RFP for (smart meters) Q/A session and its submission Draft RFP for APMS

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
7.1.1. End-consumer mobile application and pilot program	<p>and support digitization efforts.</p> <ul style="list-style-type: none"> PSIA support in the revenue improvement feasibility study will assist DISCOs identify initiatives to improve the financial performance and reduce technical and commercial losses of the DISCO. Future implementation of proposed initiatives will attract private sector investment in targeted DISCO functions. End consumer mobile application beta version End consumer pilot program 	<p>Q4 FY22 Q1 FY23</p>	<ul style="list-style-type: none"> Draft RFP for APMS review by Home Office and USAID approval Draft RFP for APMS publishing Project realization: develop a consumer-facing mobile application prototype Integrate and configure end-consumer mobile application with MEPCO and PITC systems Conduct field operation training Initiate go-live phase and post-implementation support To deliver end-consumer mobile application (beta version) To launch end-consumer mobile application (pilot program) in MEPCO
7.1.2. Feasibility study for targeted division within a selected DISCO	<ul style="list-style-type: none"> Diagnostics and assessment of a targeted division in selected DISCO- MEPCO 	<p>Q4 FY22</p>	<ul style="list-style-type: none"> Conduct Model Division-MEPCO network studies Conduct functional area study Develop diagnostic framework Coordinate with MEPCO management on draft financings and actions Deliverable: Diagnostics and assessment report of a targeted division in MEPCO

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
8. IT interventions for strengthening DISCO planning and performance			
8.1. Enhancing power sector data security, risk assessment and cyber resilience	<ul style="list-style-type: none"> PITC cyber security vulnerability study and systems procurement report 	Q4 FY22	<ul style="list-style-type: none"> Conduct analysis of critical infrastructure vulnerabilities Conduct study of application security requirements Conduct study of security issues in cloud migration and report development Conduct PITC cyber security vulnerability study and systems procurement report Draft RFP Q/A session and bid submission Conduct bid evaluations, technical clarifications and negotiations, consent memo, and contract award

10.3 OBJECTIVE 3: OPTIMIZE GRID ELECTRICITY LOAD

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
9. Measures to mitigate seasonal demand imbalances and idle capacity costs			
9.1. Financial and technical evaluation of shifting captive gas-fired generation to the grid	<ul style="list-style-type: none"> Report outlining key stakeholder issues with switchover from captive gas-fired to grid-based alternative supplies, key risks and mitigation options and feasible solutions 	Q4 FY22	<ul style="list-style-type: none"> Conduct financial analysis of various captive-to-grid switchover scenarios under different gas and electricity pricing regimes and power procurement alternatives. Hold industry stakeholder consultations on analysis results, feasible options, and implementation requirements. Develop final report containing analysis outcomes, recommendations, and next-stage PSIA support/action areas.
10. Increased electrification and end-use efficiency			
10.1. Improvement of electric vehicle (EV) policy and incentives frameworks	<ul style="list-style-type: none"> Report on EV policy and regulatory actions needed to accelerate NEVP implementation and achievement of EV penetration targets 	Q4 FY22	<ul style="list-style-type: none"> Prepare draft report on EV policy and regulatory recommendations for rollout and EVSE deployment. Hold stakeholder consultations on report findings and prepare final report for submission to GoP.
10.2. Support to private sector for pilot deployment of electric 3-wheelers	<ul style="list-style-type: none"> Report on expanded low speed electric vehicle (LSEV) pilot project with respect to technical, functional, and financial feasibility of swappable battery platform in different market segments 	Q4 FY22	<ul style="list-style-type: none"> Draft report on selected LSEV and swappable battery use-case pilot schemes. Hold stakeholder/partnership consultations for pilot implementation and targeted markets/locations. Prepare final LSEV pilot program report for implementation under PSIA starting in FY23.
10.3. Measures for incentivizing increased industrial, commercial, and residential electricity use	<ul style="list-style-type: none"> Preliminary assessment and recommendations for increased residential and C&I electrification measures for design of targeted PSIA implementation support 	Q4 FY22	<ul style="list-style-type: none"> Conduct market data collection on gas and electric water and space heating appliances and end-uses. Develop comparative financial and energy use modeling of gas vs. electric domestic water heating and market switchover options (same model to be adapted for space heating applications subsequently). Hold stakeholder consultations on study outcome and prepare final report and recommendations for next-stage PSIA interventions.

Activities/Sub-activities	Outputs/Milestones	Target Dates	Planned
11. Energy storage/supplementation as a means of optimizing grid dispatch and system utilization			
11.1. Preliminary evaluation of cluster-level hybrid wind/solar farms	<ul style="list-style-type: none"> Preliminary assessment report on cluster-based solar wind hybridization model and analysis results 	Q4 FY22	<ul style="list-style-type: none"> Conduct financial analysis of selected solar PV wind hybrid subcluster operation and grid utilization and compare with updated plant-wise hybrid model. Hold stakeholder consultations on study outcome and implementation modalities. Prepare final study report with recommended strategies for hybrid cluster implementation and next steps.
11.2. RE augmentation at substations to reduce peak transformer loads	<ul style="list-style-type: none"> Preliminary findings summary and identification of candidate substation(s) for RE offset to be evaluated for detailed pilot-scale implementation assessment in FY 2023 	Q4 FY22	<ul style="list-style-type: none"> Subject to access to substation and transformer-level operational data from MoE/DISCO, PNNL modeling of peak load offsetting with supplemental RE supply at selected substations. Prepare preliminary report with financial and technical benefits of selected transformer load offset for potential pilot implementation and dissemination among stakeholders.
11.3. RE storage and EFTN-based solutions for weak grid communities	<ul style="list-style-type: none"> Report on grid infrastructure challenges, mitigation strategies and pilot EFTN design for utilization of RE, battery storage, and optimized loads to enhance power supplies in weak grid rural and agricultural areas 	Q4 FY22	<ul style="list-style-type: none"> Select and design initial EFTN pilot use-cases and implementation arrangements in different agricultural weak grid settings. Prepare of EFTN pilot design report, including partnership arrangements, financing requirements, geographical locations, and implementation requirements.

10.4 GENDER INTERVENTIONS

Activities	Outputs/Milestones	Target Dates	Planned
1. Contextual analysis and needs Assessments			
Analyze compiled data and Key Informant Interviews	<ul style="list-style-type: none"> Gender Assessment Report on the inclusion of women in the energy sector 	July 30	<ul style="list-style-type: none"> Conduct analysis of the compiled data and the key informant interviews. Prepare a Gender Assessment Report on the inclusion of women in the energy sector.
2. Review Policies of PSIA Stakeholder Organizations			
Conduct review of policies of PSIA stakeholder organizations progress report	<ul style="list-style-type: none"> Review of policies of PSIA stakeholder organizations report 	July 30	<ul style="list-style-type: none"> Conduct review and analysis of the collected policies of PSIA stakeholder organizations. Prepare a progress report for stakeholders.
3. Gender Sensitization Workshops			
Train employees in PSIA stakeholder organizations, including DISCOs.	<ul style="list-style-type: none"> Gender sensitization Training Manual Training Summary Report 	August 30	<ul style="list-style-type: none"> Continue providing trainings to the employees in PSIA stakeholder organizations, including DISCOs. Prepare and submit Gender sensitization Training Manual. Prepare and submit Training Summary report.

ANNEX A: LIST OF KEY MEETINGS

Key Meetings in Q3 FY 2022

Meeting with	Date	Location	Purpose
Objective I meetings:			
AEDB	April 13	AEDB office	To discuss work on competition auction by reviewing the concession package (RFP, EPA, and IA).
AEDB	April 15	AEDB office	To discuss work on competition auction by reviewing the concession package (RFP, EPA, and IA).
AEDB	April 16	AEDB office	To discuss work on competition auction by reviewing the concession package (RFP, EPA, and IA).
MOE PD	April 18	MOE PD office	To discuss the importance of issuance of a letter to NEPRA from MOE PD in support of CPPA-G point of view for grant of MO license and approval of commercial code in absence of approval of moratorium of section 23.
NREL	April 19	ZOOM	To discuss potential support areas of support through PSIA.
CPPA-G	April 19-20	NEPRA office	To facilitate the issuance of a letter of undertaking that CPPA-G will comply with all the requirements stipulated in eligibility criteria rules for issuance of MO license.
NEPRA	April 20	NEPRA Headquarters	Participate in the public hearing on the award of MO license to CPPA-G.
CPPA-G	April 21	CPPA-G office	To facilitate the issuance of a letter of undertaking that CPPA-G will comply with all the requirements stipulated in eligibility criteria rules for issuance of MO license.
CLDP	May 13	ZOOM	To discuss potential capacity-building programs for PPIB/AEDB through CLDP.
PPIB	May 18	PPIB Office	To discuss work on the transmission framework.
PPIB	May 26	ZOOM	To discuss capacity-building training pertaining to auctions for PPIB once IAA is operationalized.
PPIB	June 3	ZOOM	To discuss the detail of the priority areas for potential capacity-building programs for PPIB/AEDB through CLDP.

Meeting with	Date	Location	Purpose
CLDP-USAID Pakistan office	June 3	ZOOM	To discuss the detail of the priority areas for potential capacity-building programs for PPIB/AEDB through CLDP.
PPIB	June 3	PPIB office	To discuss implementation roadmap for PPP transmission framework.
PPIB	June 7	PPIB office	To discuss the detailed training plan pertaining to auctions for PPIB once IAA is operationalized.
Objective 3 and Bridge Factor	June 16	ZOOM	To discuss the CTBCM framework for Captive generation study under objective 3.
CPPA-G	June 17	PACRA office Lahore	To attend a meeting organized by CPPA-G with PACRA for possible assistance for next year's work plan regarding the credit rating of all DISCOs.
NPCC	June 21	NPCC office	To discuss USAID's PSIA project team's assistance to NPCC.
Objective 2 meetings:			
CEO/CTO, PITC	May 9	PITC, Lahore	Introduction meeting with PITC Staff and Management – PSIA SOW.
LUMS IT	May 13	LUMS, Lahore	Diagnostic study of PITC IT Infrastructure with respect to vulnerability of cyber security.
ITRON Technologies	May 18	PITC, Lahore	To attend the presentation on tools used for load forecasting.
CEO PITC	May 24	PITC	Customer services mobile application development.
CEO MEPCO	May 27	MEPCO, Multan	COP meeting with CEO MEPCO-Project Kick off.
MD and GM, PSP, NTDC	April 7	PIA Tower, Lahore	Status update and better understand of the roles of the PSIA and NTDC teams.
GM, PSP, NTDC	April 8	PIA Tower, Lahore	Discussion on the current IGCEP and its delay implication on TSEP.
GM, PSP, NTDC	April 11	PIA Tower, Lahore	Continued discussion on IGCEP scenarios and sensitivities.
PSIA Management	April 12	PSIA office, Islamabad	Elaborated discussion on various TSEP activities.
GM, PSP, NTDC	April 18	PIA Tower, Lahore	Scope of work for Khuzdar Area study.
GM, PSP, NTDC	April 19	PIA Tower, Lahore	765 kV line shunt compensation from Dasu to ISB.
PSIA Management	April 21	PSIA office, Islamabad	Internal meetings to get a status update and understanding of deliverables.

Meeting with	Date	Location	Purpose
GM, PSP, NTDC	May 6	PIA Tower, Lahore	Connectivity of Hydro power plants.
GM, PSP, NTDC	May 12	PIA Tower, Lahore	Study Scope for avoidance of out of merit generation.
GM, PSP, NTDC	May 13	PIA Tower, Lahore	Sensitivity study for delay in ISB West substation.
GM, PSP, NTDC	May 20	PIA Tower, Lahore	Scope for QESCO area compensation study.
Provost, LUMS	May 26	PIA Tower, Lahore	Cost of service discussion for Training Courses.
GM, PSP, NTDC	June 2	PIA Tower, Lahore	Discussion on finalization of 2025 and 2026 base cases.
G.M. (CS), MEPCO	June 6	MEPCO, Multan	Follow up meeting with MEPCO Management for reviewing the project deliverables.
GM, PSP, NTDC	June 8	PIA Tower, Lahore	Review of Geographical mapping.
CTO, PITC	June 14	PITC, Lahore	Mobile Application Blueprint.
GM, PSP, NTDC	June 15	PIA Tower, Lahore	Review of Mohmand Dam connections.
DG Admin, MEPCO	June 16	MEPCO, Multan	Establishing PSIA Field Office MEPCO.
GM, PSP, NTDC	June 17	PIA Tower, Lahore	Review of consolidated reactive power study for QESCO area.
PITC/LUMS	June 21	PITC, Lahore	Reviewing the progress on cyber security vulnerability study of PITC network.
GM, PSP, NTDC	June 22	PIA Tower, Lahore	Review of winter cases.
GM, PSP, NTDC	June 27	PIA Tower, Lahore	Review of Suki-NJ-Gujranwala OHL switching study.
GM, PSP, NTDC	June 30	PIA Tower, Lahore	Discussion on QESCO area study and switching study.
Objective 3 meetings:			
EV industry and market stakeholders	April 5	LUMS, Lahore	Annual meetup of EV manufacturers, vendors and stakeholders arranged by LUMS Energy Institute.
Secretary, Addl. Secy. & Jt. Secy., Ministry of Energy	April 18	Power Division, Ministry of Energy, Islamabad	Introduction to USAID/PSIA technical assistance program.
Commercial Law Development Program, US Dept. of Commerce	April 18	Video conference	Discussion of respective PSIA and CLDP scope of assistance and potential areas of collaboration.
Secretary, Punjab Provincial Transport Authority	April 18	Punjab Transport Department, Lahore	Three-wheeler registration issues.

Meeting with	Date	Location	Purpose
Secretary, Punjab Provincial Transport Authority	April 25	Punjab Transport Department, Lahore	Presentation on commercial electric transportation.
Secretary, Punjab Provincial Transport Authority	April 27	Punjab Transport Department, Lahore	Three-wheeler registration issues.
PNNL, NREL and ANL, US Department of Energy	April 28	Video conference	Discussion of respective PSIA and DOE scope of assistance and potential areas of collaboration.
Secretary, Punjab Provincial Transport Authority	May 10	Punjab Transport Department, Lahore	PTA meeting on electric three-wheeler specifications.
MD, NEECA	May 12	NEECA Office, Islamabad	Identification of technical support required by NEECA and collaboration on PSIA activities on captive generation switchover and end-use electrification
World Bank	May 13	WB Resident Mission, Islamabad	Discussion of respective PSIA and WB scope of assistance and potential areas of collaboration.
RInco Ariya	May 17	Karachi	Small electric four-wheeler company.
M&P	May 17	Karachi	Electric vehicle needs of courier companies.
TCS	May 18	Karachi	Electric vehicle needs of courier companies.
Korean Consul General	May 18	Karachi	Electric vehicle supply chain from Korea.
APTMA	May 20	APTMA Office, Islamabad	Discussion on captive generation study, strategy for consultation with the private sector/textile industries, and arranging conference calls with Ayesha Spinning Mills, Ghazi Fabrics, Sarena Textile Industries and North Star.
APTMA	May 30	APTMA Office, Islamabad	Discussion on meeting schedule and questionnaire for consultation with the private sector and textile industries.
Future Energy Asia Summit	June 1	Video conference	Discussion on possibility of holding Pakistan-specific session at the Bangkok event on July 20 to target potential international clean energy investors.
PNNL and NREL, US Department of Energy	June 2	Video conference	Scope and approach for PSIA and DOE collaboration on conducting the RE transformer offset modeling and study.

Meeting with	Date	Location	Purpose
Sarena Textile Industries (Pvt) Ltd	June 2	Company Head Office, Lahore	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Ghazi Fabrics International	June 2	Company Head Office, Lahore	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
North Star Textile Limited	June 2	Company Head Office, Lahore	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire.)
Ayesha Spinning Mills Limited	June 3	Company Head Office, Lahore	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Ghazi Fabrics International	June 3	Company Head Office, Lahore	Follow-up meeting to discuss data collection questionnaire shared in the earlier meeting and obtain feedback from company sponsors who could not attend the June 2 meeting.
Kohinoor Mills Limited	June 3	Company Head Office, Lahore	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Secretary, Punjab Provincial Transport Authority	June 3	Punjab Transport Department, Lahore	Meeting of Technical Committee to review and formulate standards and specifications for three-wheelers, including EVs.
Rural weak-grid communities	June 3-5	Bhakkar, Hafizabad	Evaluation of specific weak-grid and rural settings, locations and needs for inclusion as potential EFTN pilot schemes.
Textile units with captive gas-fired generators	June 3-6	Lahore	Plant operational and energy needs, electricity supply options, costs, grid interconnection issues and data requirements for the captive generation switchover study.
NTDC	June 6	NTDC Office, Islamabad	Meeting with DMD NTDC to introduce hybrid RE cluster study and request data required.
Kohinoor Textile Mills Limited	June 6	Video conference	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Textile units with captive gas-fired generators	June 7-9	Faisalabad, Multan	Plant operational and energy needs, electricity supply options, costs, grid interconnection issues and data requirements for the captive generation switchover study.

Meeting with	Date	Location	Purpose
Fazal Cloth Mills and Ahmed Fine Textile (Fatima Group)	June 8	Company Head Office, Multan	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Mahmood Group (2x textile units)	June 8	Company Head Office, Multan	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Maqbool Group (2x textile units)	June 9	Company Head Office, Multan	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Akhtar Group	June 9	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Nizam Group	June 9	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Secretary and DG, Board of Investment (BOI)	June 9	BOI Office, Islamabad	BOI participation in the Future Energy Asia Summit in Bangkok on July 20-22.
Textile units with captive gas-fired generators	June 9-12	Karachi	Plant operational and energy needs, electricity supply options, costs, grid interconnection issues and data requirements for the captive generation switchover study.
Selected wind IPP owners/management	June 10	Video conference	Wind IPP participation and data requirements for hybrid solar/wind cluster evaluation and collaboration arrangements.
Artistic Milliners (Pvt) Limited	June 10	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
NP Group	June 10	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Indus Group	June 10	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Premium Textile Mills Limited	June 10	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).

Meeting with	Date	Location	Purpose
Zaman Textile Mills (Pvt) Limited	June 11	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire).
Saya Weaving Mills (Pvt) Limited	June 13	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire.)
Sana Industries Limited	June 13	Company Head Office, Karachi	Private sector stakeholder consultations for primary research and data collection (through a detailed questionnaire.)
Future Energy Asia Summit	June 13	Video conference	Invitations, logistics and setup arrangements for Pakistan spotlight session on July 20 at the Future Energy Asia Summit in Bangkok.
MD and senior management, PPIB	June 15	PPIB Office, Islamabad	Review of transmission policy framework and implementation plan sub-activity and PPIB participation in the Future Energy Asia Summit in Bangkok on July 20-22.
GM PSP, NTDC	June 17	Lahore	Configuration, plant selection and data requirements for hybrid solar and wind cluster evaluation and collaboration arrangements.
GM MEPCO	June 17	Multan	Net metering and AMR for EFTN feasibility.
Vice Chancellor, MNS Agriculture University	June 17	Multan	Areas of collaboration and potential partnering in EFTN pilot program.
Mumtaz Khan Manais, progressive farmer	June 18	Tibba Sultanpur	EFTN use-cases and site survey.
Nauman Jamil, cold store owner	June 18	Multan	Cold storage use-cases and opportunities.
Jamshed Qureshi, progressive farmer	June 18	Lar	EFTN use-cases and site survey.
DMD (SO) and senior management	June 21	NPCC, Islamabad	Introduction to USAID/PSIA technical assistance program and areas of collaboration.
Future of Women in Energy Scholars	June 22	PSIA Office, Islamabad	Presentation on career options in energy consulting and professional services provided by Hagler Bailly Pakistan.
DG, Board of Investment (BOI)	June 24	BOI Office, Islamabad	Follow up discussion on BOI presentation, ministerial protocol, and logistical arrangements at the Future Energy Asia Summit in Bangkok on July 20-22.

Meeting with	Date	Location	Purpose
Future of Women in Energy Scholars	June 28	PSIA Office, Islamabad	Presentation on career options in energy consulting and professional services provided by Hagler Bailly Pakistan.
DMD (SO) and senior management	June 29	NPCC, Islamabad	Collaboration and data requirements for hybrid RE cluster and RE transformer offset studies.
Future Energy Asia Summit	June 30	Video conference	Review of final arrangements for Pakistan spotlight session on July 20 at the Future Energy Asia Summit in Bangkok.

ANNEX B: SUCCESS STORIES



USAID | PAKISTAN

FROM THE AMERICAN PEOPLE

SUCCESS STORY

Transforming Pakistani Women's' Lives Through Energy Education



Future of Women in Energy Scholars excited to reach Doha, Qatar.

Women play a key role in decision making around energy use, (especially at the household and local levels) yet are not well represented in making energy decisions at managerial and regional/national policy levels. Despite making up 48 percent of the global labor force, women only account for 22 percent of the traditional energy sector workforce. According to the International Energy Agency, this number is even lower in management-level positions. In Pakistan, the lack of women in the energy sector is starker—women make up only 10 percent of the employed workforce in engineering and technology fields (USAID, 2015). Women's involvement as leaders and policy makers is key to ensure an inclusive and functioning energy sector.

Through a collaboration between the U.S. Pakistan Women's Council and USAID's Power Sector Improvement Activity (PSIA), a pilot of the *Future of Women in Energy Scholars Program* was implemented in June 2022. This program seeks to not only increase the number of women in Pakistan's energy sector by promoting education in energy studies, but also to inspire young women to participate in and lead on imperative energy issues in Pakistan.



Herman Nasir, 21 – Future of Women in Energy Scholar.

As part of this program, 17 qualified Pakistani female undergraduate students pursuing their bachelor's degrees in science or engineering participated in a two-week certificate program hosted by Texas A&M University in Doha, Qatar. They attended lectures on the full spectrum of the energy economy, developed an independent research project, had the opportunity to interact with Qatar's energy industry and business leaders, and participated in Qatari student life in Education City.

Herman Nasir, a student at Pakistan's National University of Sciences (NUST), and a climate change activist, was selected as one of the 17 participants. She not only studies environmental engineering, but also actively leads a Pakistani-based environmental education initiative called *Ductus Exemplø* (Latin for: *Lead by Example*). The organization incorporates

environmentalism at the grassroots level for Pakistan’s youth by organizing seminars, environmental awareness sessions, and workshops in local schools and colleges across Islamabad/Rawalpindi.

Herman noted, *“When I came across the post for the Future of Women in Energy Scholars Program, I knew that it would be a great opportunity for me to gain more knowledge and exposure in the technical aspects of not just Pakistan’s energy sector but also Qatar’s—one of the leaders in the petroleum industry. As a young woman with climate action close to my heart, I felt inspired by the female presenters from the energy sector who made me realize that all women have similar struggles regardless of their age, opportunities, or geography.”*



Aqsa Amir, 21, Future of Women in Energy Scholar.

Another program participant, Aqsa Amir, is studying chemical engineering at NUST. Aqsa always had an interest in computers and pursued undergraduate studies in pre-engineering where she discovered her love for chemical engineering. Hoping to pursue a career in the field after obtaining the required higher-education qualifications from a reputable university in Pakistan, Aqsa aspires to work as a leading chemical engineer in Pakistan’s energy sectors. She stated, *“Growing up with continuous load-shedding hampering our daily lives made me wonder—if more women were working in Pakistan’s energy sector, then perhaps the planning and provisions of our basic needs, such as electricity, would have been better managed as we, as women, suffer the most when we do not have it.”*

In this regard, USAID’s PSIA is supporting the Government of Pakistan’s efforts to increase the financial viability, reliability, and affordability of the power system by making it more reliant on clean and renewable energy. USAID’s PSIA initiatives over the next four years will help Pakistan increase its revenue and improve the financial and operational performance of distribution companies while modernizing its transmission and distribution grids for improved access to electricity and mobilizing private sector investments in clean energy projects.



Future of Women in Energy Scholars at Pakistan’s Central Power Purchasing Agency – Guarantee (CPPA-G).

Upon completion of the Qatar trainings, USAID’s PSIA planned and coordinated the 17 Future of Women in Energy scholars’ participation in a two-week program in Pakistan where they visited key public and private energy sector institutions. These sessions served as a networking platform for the program participants and provided them the opportunity to see themselves engaged in one of these institutions.

To further promote Pakistani women’s significant role in this transition, USAID’s support under PSIA in the Future of Women in Energy Scholar Program, helped program scholars like Aqsa Amir, Herman Nasir, and the other promising Pakistani energy leaders to gain in-depth understanding of the energy sector’s economic and professional landscape while also enhancing their awareness and knowledge on the importance of embracing renewable energy in addition to the current majority mix of fossil-based and nuclear energy.



SUCCESS STORY

Transitioning Pakistan into a Competitive, Open, and Affordable Wholesale Electricity Market

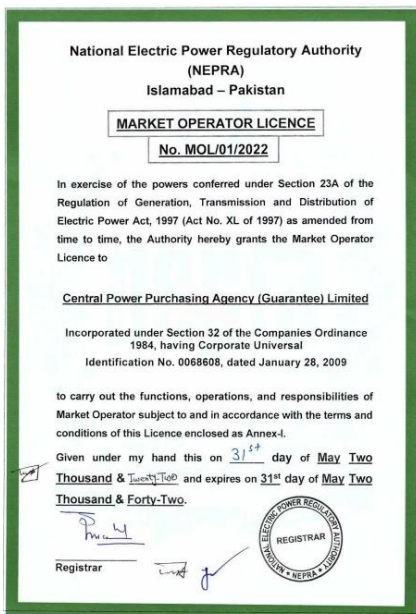
Despite a comprehensive reform program initiated over two decades ago, Pakistan's power sector continues to face significant challenges. The centralized control and regulation of state-owned utilities and a single-buyer market model has often led to decision-making that is disconnected from ground realities, created unnecessary roadblocks, and resulted in poor performance monitoring and accountability of service providers. For electrical utilities, transmission and distribution losses remain high and bill collection falls below regulator-set targets. These factors continue to inhibit private investment and participation in Pakistan's power sector unless investors are provided attractive tariffs and state-backed guaranteed rates of return. Such concessions make electricity supplies costly and impose a significant payment liability on the government.

The long-standing government policy of providing electricity to consumers across the country at uniform rates—that are lower than the actual cost of supply—requires paying unaffordable levels of subsidies to compensate for the higher cost of purchased power. In addition to this, long-term fuel supply contract obligations and spot price volatility, system losses, infrastructure and management constraints have also resulted in a rapidly increasing 'circular debt' that significantly undermines the sector's financial sustainability, stymies further investments and private participation, and impedes necessary reforms.

According to the Central Power Purchasing Authority (CPPA), Pakistan's circular debt stood at Rs. 2467 billion by March 2022; this is equivalent to 3.8 percent of Pakistan's gross domestic product and represents 5.6 percent of Pakistan's government debt. At this rate of growth, the circular debt will reach an estimated Rs. 4 trillion by 2025 – this requires urgent power sector reforms (Pakistan Economic Survey 2021 – 2022).



Picture of CPPA – G announcing its acquiring of its market operator license from NEPRA, the market regulator.



Picture of the CPPA-G (Market Operator) license.

As a solution to Pakistan’s current power sector challenges, the Government of Pakistan has implemented a wholesale power sector market, the Competitive Trading Bilateral Contracts market (CTBCM). The idea behind CTBCM is to create opportunities for greater private sector engagement in the power markets to make them more transparent and competitive. Additionally, the CTBCM would incentivize increased use of energy efficiency and renewable energy for cleaner, more reliable, and more affordable power in the country.

Since 2010, USAID has actively supported the Government of Pakistan in its planned transition towards the open market and the adoption of competitive procurement policies to liberalize and modernize Pakistan’s power sector. Through its assistance under past projects such as the Power Distribution Program (PDP), Sustainable Energy for Pakistan (SEP), and most recently, the Power Sector Improvement Activity (PSIA), USAID has provided necessary resources across multiple domains—human, management, processes, and systems—to the timely opening of the wholesale market.

As a result of USAID’s past and current technical support under PSIA, on May 31, 2022, the Central Power Purchasing Agency - Guarantee (CPPA-G), Pakistan’s market operator, was granted its market operator license and the commercial code, which is the guiding document that lays out the principles and steps to operationalize CTBCM, by the National Electric Power Regulatory Authority (NEPRA). This legally marks the opening of the wholesale market after 24 years, unbundling it with the Water and Power Development Authority (WAPDA).

CPPA-G’s Head of Market Operations and Development, Mr. Omar Haroon Malik, stated *“through an integrated approach, CTBCM will combine the whole power sector supply chain in the delivery of reliable, affordable and sustainable electricity to the consumer.”*

This landmark approval of the commercial code and granting of the operator license effectively opens the wholesale market for the first time in Pakistan. The next step after this significant development entails enabling CPPA-G’s ability to operate the new wholesale market in parallel to the previous regime as a soft launch for the next six months. During this trial period the CPPA-G in its role as the market operator will test and implement (without any financial implications for any players in the market) the market commercial code and the processes, IT systems, and methodologies developed under the new regime. USAID’s PSIA will support CPPA-G during this soft launch through the provision of technical, commercial, and legal advice on various market aspects and requisite approvals.

Through these vital interventions, USAID brings Pakistan another step closer to an energy-secure future.