

Government of Pakistan
Ministry of Energy
(Power Division)

REQUEST FOR EXPRESSION OF INTEREST (CONSULTING SERVICES – FIRM SELECTION)

Country: Pakistan

Name of Project: Electricity Distribution Efficiency Improvement Project (EDEIP)

Loan No./Credit No./ Grant No.: IBRD-93180

Assignment Title: Consultancy Services for Supporting the Operation and Development of the Competitive Trading Bilateral Contract Market (CTBCM) In Pakistan's Power Sector.

Reference No. PK-MOE-566558-CS-QCBS-CTBCM

The Ministry of Energy (Power Division) has received financing from the World Bank toward the cost of the Electricity Distribution Efficiency Improvement Project (EDEIP) and intends to apply part of the proceeds for engagement of a consultancy firm for Independent System and Market Operator of Pakistan (ISMO) for supporting the operation and development of the Competitive Trading Bilateral Contract Market (CTBCM) in Pakistan's power sector.

The consulting services ("the Services") include key experts to undertake multiple tasks for supporting the operation and development of the CTBCM according to the scope provided in the detailed Terms of Reference (TOR). The TOR for the assignment can be downloaded from <https://power.gov.pk/> or www.ismo.gov.pk.

The Program Implementing Unit (PIU), Ministry of Energy (Power Division) now invites EOI from eligible consulting firms ("Consultants") to indicate their interest in providing the Services. Interested Consultants are required to provide information demonstrating their qualification and relevant experience to perform the Services described in the TOR. Key Experts will not be evaluated at the shortlisting stage.

Shortlisting criteria for the Consultants include:

- The firm must have been duly incorporated and operational for a minimum period of ten (10) years as of the date of submission in the same business (documented evidence showing years in business such as certificate of incorporation etc. must be provided).
- The firm shall provide evidence of at least two prior assignments of comparable nature, scope and complexity, demonstrating relevant experience.
- The firm shall demonstrate that its proposed team, supported by adequate back-end resources, possesses the requisite qualifications and experience to effectively deliver the assignment.

The attention of interested Consultants is drawn to paragraph 3.14, 3.16 and 3.17 of the World Bank's Procurement Regulations for IPF Borrowers February, 2025 ("the Regulations"), setting forth the World Bank's policy on conflict of interest.

Consultants may associate with other firms to enhance their qualifications, but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of a joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract, whereas each partner within the JV shall meet the qualification and experience requirement for the assigned role, if selected.

The Consultant will be selected in accordance with the “Quality and Cost Based Selection (QCBS)” method set out in the Procurement Regulations of the World Bank for IPF Borrower February, 2025.

Expressions of Interest must be submitted to the undersigned electronically by 02-Sep-2026, at 05:00 pm (PST). Further information may be obtained using the contact details provided below.

Attention: Project Director, PIU-EDEIP Project (Component-IV)

Address: Office of the Project Director (EDEIP), ISMO Building,
Pitras Bukhari Road, H-8/1, Islamabad

Email: danis6pk@gmail.com

Phone: +92-051-831-1557

TERMS OF REFERENCE (TORs)

CONSULTANCY SERVICES FOR SUPPORTING THE OPERATION AND DEVELOPMENT OF THE COMPETITIVE TRADING BILATERAL CONTRACT MARKET (CTBCM) IN PAKISTAN'S POWER SECTOR

1. Background

Pakistan's electricity market reforms are supported through World Bank financing allocated to the Ministry of Energy (Power Division), Government of Pakistan, under the Electricity Distribution Efficiency Improvement Project (EDEIP). A key component of these reforms is the implementation and operationalization of the Competitive Trading Bilateral Contract Market (CTBCM), which requires the design and implementation of a robust market model, and efficient electricity market administration arrangements aligned with international best practices. The project aims to strengthen institutional capacity, improve operational efficiency, and support the transition toward a modern, competitive, and transparent electricity market in Pakistan.

In this context, Independent System and Market Operator (ISMO) has been mandated by the Federal Government to lead the market reforms in coordination with CTBCM implementing power sector entities including Private Power and Infrastructure Board (PPIB), X-WAPDA Distribution Companies (DISCOs), National Grid Company (NGC) etc under the supervision and guidance of Ministry of Energy Power Division (MoE, PD) and National Electric Power Regulatory Authority (NEPRA). The ISMO has been established as a unified and independent institution for ensuring the reliable, and secure operation of the national power system, planning for generation and transmission system expansion and administering the wholesale electricity market.

ISMO became fully operational in April 2025, following the grant and subsequent transfer of the System Operator (SO) and Market Operator (MO) licenses by NEPRA. Previously held by NGC (SO) and CPPA-G (MO) respectively, these licenses were transferred to ISMO pursuant to the CTBCM framework and Federal Government approval.

In view of ISMO's status as a newly established institution, the recent commencement of commercial operations of the wholesale electricity market, and ongoing power sector reforms in Pakistan, ISMO requires specialized technical advisory support to effectively discharge its statutory mandate. Although ISMO has assumed responsibility for system and market operations and planning, the company's transition to a fully operational and institutionally mature entity necessitates the engagement of an experienced international consulting firm with demonstrated expertise in providing consulting support to Independent System Operators (ISOs).¹

Accordingly, the proposed consultancy under the World Bank-funded EDEIP is intended to support institutional capacity building, strengthening operational readiness, enhancing technical and market governance capabilities, and aligning operational practices with international best practices followed by mature ISOs and electricity market operators globally.

¹ ISO implies four functions — System Operations, Market Operations, Planning and Compliance — performed by a single entity.

2. Objectives

The objective of this assignment is to support ISMO in:

1. Evolve Competitive Trading Bilateral Contract Market (CTBCM) design to advanced stages, strengthen market operations, advance market simulation capabilities and institutionalize the market surveillance function.
 2. Enhance the competitive auction capabilities of relevant institutions.
 3. Develop an organizational structure tailored to ISMO's evolving business requirements and benchmarked with best practices for ISOs.
 4. Institutionalize and fully operationalize the Energy Management System (EMS) and Generation Management System (GMS) applications.
 5. Build sustainable internal capacity within ISMO and its partner entities.
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3. Scope of Services

The detailed scope of work to be performed by the consulting firm is segregated into nine (09) tasks as follows:

TASK 1 - Market Development and Evolution:

- Assessment of the evolution of the wholesale electricity market from the existing bilateral architecture towards an organized short-term market delivered through electronic trading platforms. Prepare a roadmap for the market to evolve to the next stage based on the assessments of policy, regulatory, institutional and system readiness, including a detailed evaluation of IT system capability and market participant capacity. The roadmap must specify detailed interventions needed across each of these dimensions to achieve operational readiness for transition to the short-term market. The roadmap shall include measures to be taken by different institutions along with timelines to achieve the desired readiness for evolution of wholesale electricity market.
- Development of detailed design and a comprehensive roadmap for the introduction of ancillary services as tradable market products, and support to ISMO in establishing a dedicated ancillary services market.
- Examination of options for the introduction of new market products and instruments under the CTBCM framework, including demand response and financial hedging instruments.
- Development of a Distributed Energy Resources (DERs) market design including structured rules, mechanisms, and platforms details required to enable small-scale, decentralized energy assets, such as rooftop solar, battery storage, electric vehicles, and demand-side management to participate in energy markets. A detailed roadmap for future implementation of a DER market must also be provided.
- Evaluation of the CTBCM design for BESS participation in energy arbitrage, ancillary services and congestion management and propose modifications in the regulatory framework and the design.

- Preparation of a phased roadmap with defined timelines for progressively lowering the 1 MW market demand participation eligibility threshold for an eventual transition toward retail competition. The roadmap shall be prepared based on the assessments of policy, regulatory, institutional, and system readiness, including evaluation of IT system capacity and provide detailed interventions across these dimensions
- Assessment and development of a phased roadmap for the unbundling of supply and distribution businesses to enable a gradual and responsible transition from a wholesale to retail electricity. The roadmap shall include transitional milestones aimed at promoting consumer choice, ensuring fair competition, and mitigating potential conflicts of interest.
- Development of a comprehensive roadmap for addressing stranded costs due to the legacy contracts associated with open access, ensuring these costs are phased out in a structured and transparent manner to prevent market distortions, safeguard consumers, and promote efficient price signals and investment incentives.
- Undertake a comprehensive assessment and develop a roadmap for the upgrade and standardization of billing systems to ensure accurate settlements and facilitate efficient consumer switching.
- Review of the approved Market Commercial Code (MCC) and recommend any necessary amendments or enhancements.
- Review of the existing Commercial Code Operating Procedures (CCOPs) under the MCC, recommend improvements where required, and assist in the development of any additional CCOPs as mandated under the MCC framework.
- Review of the existing power sector governance framework including the applicable laws, policies, codes, regulations, agreements, and other regulatory and governance instruments, and prepare a report outlining recommended improvements relevant to market development and operation.

TASK - 2 Market Operations:

- Analysis of market performance since its inception, with emphasis on identifying operational issues encountered during implementation and recommending appropriate corrective and preventive measures.
- Review of the Market Commercial Code (MCC) to develop a comprehensive understanding of market operations and associated operational processes and assess their practical application.
- Review of the Market Management System (MMS), including benchmarking against relevant international implementations, to identify requirements for system upgrade, enhancement, and optimization.
- Provision of advisory support to improve the execution of market-related operational processes to ensure efficient, transparent, and robust market outcomes.
- Assessment of prevailing operational practices, including approval and issuance procedures, to evaluate the effectiveness and efficiency of operational activities.
- Examination of existing mechanisms for managing operational issues, identify gaps in issue-identification, escalation, and resolution processes, and recommend structured improvements.
- Assessment of system integration and standardization between the MMS and upstream systems, including Metering Service Provider (MSP) metering application, Marginal Price application and System Operator Data Exchange Portal (SDXP), with particular focus on data exchange protocols,

input-output synchronization, interface consistency, and alignment with operational requirements.

Task 3- Market Surveillance:

- Support for the establishment and strengthening of the market surveillance function to monitor market behavior, outcomes, and performance under the CTBCM framework.
- Advisory support on the institutional setup of the market surveillance function, including processes, organizational structure, roles, responsibilities, and staffing requirements.
- Development and support of market monitoring and detection mechanisms to identify irregular behavior, potential market manipulation, or distortions in market outcomes.
- Defining standard processes and procedures for market surveillance activities, including monitoring, analysis, investigation support, and reporting.
- Identification of key data requirements, indicators, and benchmarks required for effective surveillance of market participant behavior and overall market performance.
- Development of an automated system with associated databases and analytical tools on suitable platforms for market data collection, monitoring, assessment, and reporting purposes.
- Establishing effective compliance arrangements to ensure adherence to the governing framework, including market rules, regulations, policies, codes, and the NEPRA Act.

Task 4 – ISMO Restructuring:

- Review of the governing legal, policy, and regulatory framework to develop a comprehensive understanding of ISMO's business requirements, including the licenses issued by the Regulator, the Grid Code, the Market Commercial Code, the company's Memorandum and Articles of Association, the National Electricity Policy and Plan, and the relevant provisions of the NEPRA Act.
- Review of the ISMO's three-year Business Plan to obtain a clear understanding of its strategic objectives, implementation plans, organizational culture, and other key business strategies.
- Assessment of ISMO's current and evolving organizational arrangements, including its organizational structure, job descriptions (JDs), functional mandates, and inter-departmental coordination mechanisms, in light of its statutory mandate and business requirements.
- Identification of structural gaps, functional overlaps, and capability risks, particularly in relation to ISMO's core functions of planning, system operations, market operations, compliance, and information technology.
- Benchmarking of ISMO's organizational design against leading international Independent System Operators (ISOs) and comparable institutions, taking into account its specific business requirements. Recognizing that market models vary across jurisdictions, the benchmarking exercise will focus on common structural, governance, and accountability principles, adapted to Pakistan's regulatory and market context.
- Identification of key functions and activities undertaken by international counterparts in line with global best practices and assess their relevance and applicability to ISMO.
- Development of a future-state ("to-be") organizational structure aligned with ISMO's mandate, based on the foregoing analysis and in close coordination with other Key Experts engaged under

this consultancy assignment. The proposed structure shall be scalable and capable of evolving with increasing market maturity and operational complexity.

- Setting out of key functional responsibilities, reporting lines, spans of control, governance arrangements, and decision-making authorities.
- Finalization of the “to-be” business processes, job descriptions (JDs), and key performance indicators (KPIs), in close coordination with the ISMO team.
- Comprehensive gap analysis between existing professional capacity and the capacity required to operate ISMO in line with modern international standards. Prepare a corresponding Capacity Building Plan and provide implementation support.
- Development and implementation of a coherent and integrated business performance monitoring framework to ensure timely execution of activities, achievement of strategic objectives, and effective tracking of associated KPIs.
- Provision of recommendations regarding staff retention strategies for the short, medium, and long term, aligned with institutional sustainability and succession planning objectives.

TASK 5 - Market Simulation & Modelling:

- Provision of the technical guidance on the simulation of various generation dispatch scenarios within the electricity market, including the development of appropriate reporting frameworks under differing market conditions and operational constraints.
- Assessment of the data inputs, parameters, and modelling assumptions used in dispatch simulations to identify material inconsistencies or deficiencies that may affect the accuracy and reliability of simulation results.
- Identification of modelling simplifications, approximations, structural constraints, or data limitations that may influence dispatch outcomes, and recommend measures to enhance model robustness and transparency.
- Benchmarking of ISMO’s existing simulation models against international best practices and comparable models developed and utilized by leading ISOs and Market Operators, and recommend improvements where necessary.
- Development of standardized templates and methodological guidance for the preparation of Market Outlook Reports in line with international best practices adopted by established ISOs, and provide support in enhancing the content, analytical depth, and presentation of such reports.
- Analyzing simulation outputs and market data to inform evidence-based market evolution, policy adjustments, and operational improvements.
- Development and refinement of financial models integrated with dispatch simulation models to evaluate market transactions, settlement outcomes, and broader market design scenarios.
- Design and incorporation of Battery Energy Storage Systems (BESS) into dispatch simulation and financial models, including representation of operational characteristics, charging/discharging constraints, and revenue streams.
- Review and enhancement of the methodologies used by the Market Simulation team for projecting marginal prices across short-, medium-, and long-term horizons, with a view to improving forecast accuracy and analytical consistency.

TASK 6 - Market Contracts Development:

- Development of the Security Package Documents (SPDs), building upon the drafts already prepared for solar and wind technologies, by:
 - i. finalizing the SPDs for wind and solar technologies; and
 - ii. developing comprehensive SPDs for thermal and hydel technologies, aligned with the design and operational principles of Pakistan's target wholesale electricity market.
- All SPDs shall support power procurement to be undertaken directly by Distribution Companies (DISCOs) under the CTBCM regime.
- Provision of advisory and drafting support to the Independent Auction Administrator (IAA)², DISCOs, and ISMO, working through ISMO, in the preparation and finalization of the above-referenced SPDs.
- Addressing potential risks and contingencies in SPDs, while remaining fully aligned with the prevailing regulatory framework and wholesale market dynamics.
- Provision of strategic and legal insights to facilitate efficient and cost-effective power procurement in compliance with applicable regulatory requirements.
- Identification of potential legal, financial, operational, and market-related risks associated with contractual arrangements and provide structured recommendations to mitigate such risks.
- Optimization of the SPDs to reflect the needs and risk allocation preferences of market participants within the Pakistani power sector and under the CTBCM framework.
- Analysis of, and recommendations on, the potential transition toward a more open and competitive contractual structure, where market participants assume greater commercial risk under streamlined ("leaner") security packages, taking into account progressive market maturity.
- Development of complete SPDs for thermal and hydel technologies, including but not limited to:
 - Power Purchase Agreements (PPAs)
 - Implementation Agreements
 - Buyer's Participation Agreements
 - Fuel Supply Agreements
 - All related annexures and schedules
- Preparation of template contracts for technology-oriented structured power purchase arrangements, in addition to the SPDs, applicable to non-regulated market participants or private bilateral transactions (e.g., among suppliers, traders, generators, and bulk consumers), including:
 - Generation-Following Contracts
 - Load-Following Contracts
 - Fixed Quantity (Profile-Based) Contracts
- Facilitation of structured consultation sessions with relevant stakeholders during the document development phase to ensure alignment, transparency, and stakeholder buy-in.
- Provision of support for submission, review, and approval of the finalized documents at the appropriate regulatory and governance forums.

² Under the applicable regulatory framework in Pakistan, the role of the IAA is with the Private Power Infrastructure Board (PPIB). The organization acts as a "one-window" facilitator for private sector investment in the country's power sector, negotiating security packages, implementing power policies, and managing projects involving conventional and renewable energy.

TASK 7 – Power Procurement and Auctions related support to the Independent Auction Administrator (IAA) Distribution Companies:

- Provision of strategic and technical advisory support to strengthen the Independent IAA function at PPIB in alignment with the requirements of Pakistan’s competitive electricity market framework.
- Advisory support on redefining and clarifying PPIB’s institutional role and mandate in its capacity as the IAA, ensuring clear accountability, governance arrangements, and functional independence.
- Development of standardized Standard Operating Procedures (SOPs) for auction-based power procurement mechanisms, covering end-to-end auction processes, evaluation protocols, approvals, and post-award activities.
- Preparation of comprehensive Auction Plan for IAA, including procurement strategy, sequencing of auctions, prequalification criteria, evaluation methodologies, timelines, and risk mitigation measures, as well as in drafting robust bidding documents.
- Support to PPIB in the design and development of an online bidding platform to facilitate transparent, efficient, and competitive auction-based procurement under the IAA framework.
- Provision of advisory input on the hardware and software requirements for the IT-based bidding platform.
- Conduct a gap analysis of existing human resource processes and IT systems in relation to the functions required to operationalize the IAA role under the approved competitive electricity market model, and recommend targeted interventions.
- Review of the existing legal, policy, regulatory, and contractual framework and recommend necessary amendments or alignments to effectively operationalize and strengthen PPIB’s IAA function.
- Capacity building of DISCOs in contract management and negotiation, particularly in the context of competitively procured power projects.
- Review of the processes adopted by DISCOs in the preparation of their Power Acquisition Plans and recommend improvements to enhance transparency, efficiency, and alignment with market-based procurement principles.
- Support to ISMO in evolving its capability in-terms of people, processes and technology for carrying out wheeling and other auctions under its mandate.

TASK 8 - Operationalization and Institutionalization of Energy Management System (EMS) Applications:

- Conducting independent technical validation and comprehensive review of existing EMS configurations, implementation methodologies, and operational procedures to identify gaps, risks, compliance issues, and optimization opportunities in alignment with regulatory requirements and evolving system operational needs.
- Collaboration closely with ISMO teams to test, tune, and fully operationalize EMS applications, ensuring seamless integration into real-time operational workflows and developing detailed operational guidelines and procedures covering planning, real-time operations, and post-dispatch analysis stages.

- Assessment, validation, and optimization EMS models, configurations, and associated operational procedures, including but not limited to State Estimation, Contingency Analysis, Optimal Power Flow (OPF), Reactive Reserve Monitoring, Congestion Forecasting, load modelling methodologies, tie-line configurations, and the representation of protection schemes and protection/relay coordination logic within EMS applications.
- Provision of specialized advisory support on the configuration, validation, and performance enhancement of the Dynamic Security Assessment (DSA) tool, including validation and tuning of generator dynamic models; assessment of tie-line dynamics and inter-area oscillations; development of advanced network modelling roadmaps (including HVDC modelling); enhancement of DSA analytical capabilities; and review of operational zoning practices and their impact on system reliability, load management, and islanding strategies.
- Support for the development, validation, and execution of the Operator Training Simulator (OTS), including simulation of black start and system restoration procedures, special protection schemes, major transmission and generation contingencies, protection relay operations, Automatic Generation Control (AGC) and frequency response behavior, load variations, islanding and resynchronization events, and emergency operating procedures using OTS scenario-building and simulation management tools.
- Development of guidelines for establishing a robust database governance and management framework for the Network Equipment Database, ensuring that all grid modifications and asset updates are accurately and promptly reflected in EMS models.
- Design and implementation of a comprehensive EMS Performance Monitoring Framework, including clearly defined Key Performance Indicators (KPIs) for system availability, solution accuracy and quality, computational performance, and response times.
- Development and standardization of operational reporting templates for EMS performance monitoring, incident tracking, and maintenance activities to enable data-driven management oversight and continuous improvement.
- Support for alignment and technical integration of EMS applications with complementary power system tools, including PSS[®]E, Wide Area Monitoring Systems (WAMS), DlgSILENT PowerFactory, and other relevant planning and analytical platforms.
- Participation in technical meetings and coordination sessions with key stakeholders, including SCADA-EMS vendors, power plants, transmission entities, and the Regulator, to provide expert technical input and guidance.
- Conduct of the structured workshops and technical training sessions for ISMO engineers, focusing on advanced operational use, configuration best practices, validation techniques, and performance optimization of implemented EMS applications.
- Development of strategic roadmaps, technical plans, and briefing documents to support the evolution and institutional maturity of EMS, defining functional targets, operational performance benchmarks, enhancement priorities, and actionable recommendations.
- Preparation of a SCADA-EMS readiness roadmap aligned with future market evolution, defining target EMS capabilities required for advanced market designs; assessing current-to-target gaps; identifying transition risks and mitigation measures; and outlining phased technical plans to support readiness for new market functions and products.

TASK 9 - Operationalization and Institutionalization of Generation Management System (GMS)

Applications:

- Conducting independent technical validation and comprehensive review of existing GMS configurations, implementation methodologies, and operational procedures to identify gaps, risks, compliance issues, and optimization opportunities in alignment with regulatory standards and evolving operational requirements.
- Collaboration with ISMO teams to test, tune, and fully operationalize GMS applications, ensuring seamless integration into real-time operational workflows and developing detailed operational guidelines and procedures for planning, real-time operations, and post-dispatch processes.
- Provision of specialized technical support for the operationalization of Unit Commitment (UC) and Economic Dispatch (ED) modules within the GMS, including review and validation of system configurations, optimization formulations, network and operational constraints, generation plant models, start-up/shut-down characteristics, ramping constraints, and other non-convex features.
- Review and provision of technical guidance on the configuration, categorization, and management of operating reserves to ensure consistency with Grid Code provisions, security standards, and real-time operational requirements.
- Provision of expert advisory support on Automatic Generation Control (AGC), including plant-level and system-level parameter configuration, control logic design, tuning methodologies, controller architecture, and stability considerations (e.g., dead-band settings, droop characteristics, and response sensitivity). This shall include review and advisory support for enabling Primary Frequency Response (PFR) and implementing coordinated primary and secondary frequency response at power plants, as well as guidance on tie-line control issues, frequency response testing, frequency band selection, and AGC performance monitoring and management.
- Development of a comprehensive GMS Performance Monitoring Framework, including clearly defined Key Performance Indicators (KPIs) covering system availability, solution optimality and quality, computational efficiency, reserve adequacy, and response times.
- Design and standardization of operational reporting templates for GMS performance monitoring, incident reporting, reserve utilization, AGC performance, and maintenance activities to support informed managerial decision-making.
- Participation in technical meetings and coordination sessions with key stakeholders- including SCADA-GMS vendors, generation companies, transmission entities (e.g., NGCP), and the Regulator- to provide expert technical input and recommendations.
- Conduct of structured workshops and technical training sessions for ISMO engineers, focusing on best practices in UC/ED optimization, AGC tuning, reserve management, system performance monitoring, and advanced operational use of GMS applications.
- Development of strategic roadmaps, technical plans, and briefing documents to support the progressive evolution and institutional maturity of GMS applications, defining functional targets, operational benchmarks, enhancement priorities, and actionable recommendations.
- Preparation of SCADA-GMS readiness roadmap aligned with future market evolution, defining target GMS capabilities required for advanced market designs; assessing current-to-target gaps; identifying transition risks and mitigation measures; and outlining phased technical plans to support readiness for new market functions and products.

TASK 10 - Transfer of Knowledge (Training) Program

- Proposing a Training and Capacity Building Plan, identifying training needs of ISMO as well as allied power sector entities implementing market reforms, consolidating requirements across all nine (09) tasks.
 - Strengthening ISMO's team through on-the-job training and knowledge transfer by the respective Key Experts throughout the assignment, enabling adoption of international best practices and long-term institutional sustainability.
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4. Deliverables and Reporting Requirements:**i. Deliverables:****TASK 1 - Market Development and Evolution:**

- Wholesale market evolution design, including a comprehensive transition roadmap.
- Design and roadmap for establishing a dedicated ancillary services market as a tradable product.
- Design and roadmap for integration of DER and detailed recommendations for BESS participation in CTBCM.
- Roadmap for lowering the 1 MW market-participation threshold, with readiness assessments and a transition plan for achieving retail competition.
- Phased roadmap for unbundling supply and distribution businesses, promoting competition and consumer choice.
- Assessment and roadmap for upgrading and standardizing billing systems for accurate settlements and consumer switching.
- Roadmap for phasing out stranded costs associated with legacy contracts.
- Report on review of MCC and CCOPs, with recommendations for improvements.
- Report on review of power sector laws, policies, codes, regulations, agreements, and governance documents, with recommendations for improvements, if needed.

TASK 2 - Market Operations:

- Market Operations Review Report, presenting analysis of market results since inception, identification of operational issues, and key findings affecting overall market performance.
- Market Commercial Code (MCC) Operations Assessment Report, documenting the review of operational provisions and their practical implementation within market operations.
- Market Management System (MMS) Review Report, including assessment of current MMS functionality, benchmarking against international practices, and recommendations for system upgrade, enhancement, and optimization.
- Operational Practices Assessment Report, covering review of prevailing operational practices, including approval and issuance processes, and providing recommendations to improve the execution and efficiency of operational activities.

- Systems Integration and Standardization Assessment Report, detailing MMS integration with upstream systems (including MSP and SDXP), data exchange arrangements, input-output synchronization, interface consistency, and alignment with operational inputs.

TASK 3 - Market Surveillance:

- Comprehensive Market Surveillance Framework Report, outlining the functions, roles, responsibilities, governance arrangements, and structural setup for market surveillance, compliance, and enforcement activities within the Market Operator function.
- Automated Market Surveillance System Design Report, detailing the design of an automated system, including associated databases, analytical tools, system architecture, and functional specifications for market monitoring, surveillance, and assessment.
- Market Surveillance and Assessment Process Manuals, comprising documented standard operating procedures, guidelines, and detailed process maps for surveillance, compliance monitoring, investigation support, and reporting activities.
- Sample Market Surveillance and Assessment Report, providing a structured template, recommended content, analytical methodology, and reporting approach for presenting findings on market behavior and outcomes to the Regulator.
- Data and Performance Metrics Report, identifying key data requirements, indicators, risk metrics, and benchmarking parameters necessary for effective surveillance of market participant behavior and overall market performance.
- Capacity-Building and Knowledge Transfer Outputs, including on-the-job training sessions, workshops, and comprehensive supporting documentation to strengthen ISMO's Market Surveillance Department and enable it to independently conduct surveillance and assessment functions.

TASK 4 - ISMO Restructuring:

- Inception Report: Detailing the proposed methodology, work plan, timeline, and information requirements (to be submitted within one (1) month of commencement).
- Interim Report: Presenting initial deliverables in accordance with the approved work plan, including identification of any urgent or priority issues (to be submitted within six (6) calendar months of commencement).
- Draft Final Report: Providing consolidated and refined deliverables for review and feedback (to be submitted within nine (9) calendar months of commencement).
- Final Report: Incorporating stakeholder feedback and presenting final deliverables, including presentation to the ISMO Board and facilitation of Board approval (to be submitted within twelve (12) calendar months of commencement).

TASK 5 - Market Simulation & Modelling:

- Market simulation models developed or refined in accordance with best international practices.
- Enhanced and updated versions of ISMO's existing market simulation models, incorporating recommended methodological and structural improvements.

- A standardized template for the Market Outlook Report, along with a draft Market Outlook Report prepared using the revised framework.
- A technical report outlining improved methodologies and projections for marginal price forecasting across various time horizons.
- Analytical and financial models to evaluate market transactions.
- Enhanced analytical capability of the team to support evidence-based market transformation and evolution.

TASK 6 - Market Contracts Development:

- A complete set of finalized SPDs for conventional technologies (thermal and hydel), including:
 - Power Purchase Agreement (PPA)
 - Implementation Agreement
 - Fuel Supply Agreement
 - Buyer's Participation Agreement
- All related annexures and schedules
- Finalized and updated SPDs for solar and wind technologies.
- Structured Power Purchase Contract Templates for non-regulated market participants, including:
 - Generation-Following Contract
 - Load-Following Contract
 - Fixed Quantity (Profile-Based) Contract

TASK 7 - Procurement related support to the Independent Auction Administrator (IAA) Distribution Companies:

- A detailed IAA Strengthening Plan outlining required interventions across people, processes, governance, and IT systems.
- A comprehensive Auction Plan aligned with market design and regulatory requirements.
- Complete and standardized bidding documents for auction-based procurement.
- A detailed report on the design and implementation framework for the online bidding platform for the IAA.
- Capacity-building sessions and training materials for IAA personnel on competitive auction design, implementation, and administration, including delivery of agreed training programs.
- Capacity-building sessions for DISCOs on contract management and negotiation in a competitive procurement environment.
- A Gap Analysis Report on DISCOs' Power Acquisition Plan preparation processes, including actionable recommendations for improvement.

TASK 8 - Operationalization and Institutionalization of Energy Management System (EMS) Applications

- Inception and Technical Assessment Report detailing the review of current EMS applications and identifying gaps, risks, and optimization opportunities.

- EMS Applications Technical and Operational Report documenting technical reviews, validation results, optimization measures, configuration enhancements, and tuning recommendations for EMS, OTS, and DSA applications.
- Standard Operating Procedures (SOPs) and Operational Guidelines to support the effective day-to-day use of EMS applications within the control room environment.
- Performance Monitoring, Data Governance, and Integration Framework covering KPIs, reporting structures, database governance mechanisms, and system integration arrangements.
- EMS Maturity and Market Readiness Roadmap outlining phased development, enhancement priorities, and technical readiness for future market evolution.

TASK 9 - Operationalization and Institutionalization of Generation Management System (GMS) Applications:

- Inception and Technical Assessment Report detailing the review of current GMS applications and identifying gaps, risks, and optimization opportunities.
- GMS Applications Technical and Operational Report documenting technical reviews, validation results, optimization measures, configuration enhancements, and tuning recommendations for GMS applications, including UC, ED, AGC, and reserve management modules.
- Standard Operating Procedures (SOPs) and Operational Guidelines to support the effective day-to-day use of GMS applications within the control room environment.
- Performance Monitoring, Data Governance, and Integration Framework covering KPIs, reporting structures, data governance mechanisms, and system integration arrangements.
- GMS Maturity and Market Readiness Roadmap outlining phased development, enhancement priorities, and technical readiness for future market evolution.

TASK 10 – Transfer of Knowledge (Training) Program:

- Training and Capacity Building Plan
- On-the-job training of respective ISMO's team engaged with Key Experts

The deliverables mentioned above under each task are indicative and are included to give the prospective Consultants an idea of the work expected under each task. The consultants may propose any other deliverables that are aligned with the overall task requirement and objective of the assignment in the technical proposal.

ii. Reporting Requirements and Schedule:

The Consultant will report to the Executive Director MO. The Market Development and Evolution Expert (Team Lead) will serve as Team Lead for the consultancy assignment and be responsible for overall project management, coordination and quality assurance of deliverables.

After the award of the contract, for each quarter shortly before it starts, the Consultant and Client will agree on the specific deliverables / reports to be submitted during the upcoming quarter. Based on this, the Consultant will formulate a Quarterly Action Plan (QAP) and submit to ISMO at latest by the

first working day of the related quarter. Each Quarterly Action Plan will also feature a complete methodology of the activities scheduled for the upcoming quarter along with the estimated LOE required to undertake the activities and complete deliverables agreed upon under the quarterly plan as well as any other information useful for the management of this project.

In short, the Quarterly Action Plan shall mention the specific deliverables, proposed by the Consultant with reference to the scope of work listed under these TORs, on which the Consultant will be working on for submission to ISMO during the respective quarter.

QAP Table reflects reporting requirements of deliverables as under:

S#	Milestone Submission Schedule	Details
1	Mobilization	After issuance of Notice to Proceed by ISMO
2	Inception Report + Quarterly Action Plan (QAP) # 1 within 10 calendar days from Mobilization	Inception Report: The Consultant's understanding of the project including the detailed plan to implement the project QAP: Detailed plan/schedule of activities to be carried out in next Quarter for completion of the respective quarterly deliverables agreed with ISMO
3	Quarterly Progress Report (QPR) of all corresponding quarters within the project duration (Quarter # 1 – Quarter # n-1) within 10 calendar days after the end of respective quarter + QAP of all corresponding quarters within the project duration (Quarter # 2 – Quarter # n ³) before 10 calendar days of start of next quarter	QPR: Report on status of activities performed in the respective Quarter reflecting actual progress on completion of agreed deliverables as per relevant QAP QAP: Detailed schedule of activities in next Quarter for completion of the agreed deliverables
4	Quarterly Progress Report (QPR) # n (within 10 calendar days after the end of quarter) + Completion Report (within 20 calendar days after end of Quarter # n)	QPR: Report on status of activities performed in the respective Quarter reflecting actual progress on completion of agreed deliverables as per relevant QAP Completion Report: Review of the overall progress of the project reflecting actual progress on completion of agreed deliverables as per TOR.

³ 'n' represents total number of quarters within the project duration starting from notice to proceed.

5. Qualification of Firm and Team Composition and Qualifications

1. Incorporation Period

The firm must have been duly incorporated and operational for a minimum period of ten (10) years as of the date of submission in the same business

2. Minimum Two Similar Assignments

The firm shall provide evidence of at least two prior assignments of comparable scope and complexity, demonstrating relevant experience.

3. Corporate Capacity of Firm

The firm shall demonstrate that its proposed team, supported by adequate back-end resources, possesses the requisite qualifications and experience to effectively deliver the assignment.

Following are the key staff required for undertaking the assignment:

Key Expert 1 – Market Development and Evolution Expert

Qualifications:

At least a bachelor's degree in engineering, science, finance, economics or law. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- Minimum 15 years of international experience in design, development & implementation of competitive electricity market(s) with Security Constrained Economic Dispatch.
- Demonstrated hands-on experience in supporting the transition to competitive electricity markets in multiple jurisdictions, particularly those operating under a Security-Constrained Economic Dispatch (SCED) framework, is highly desirable.
- Strong understanding of electricity market design, including market models and structures, market legal, policy and regulatory frameworks, various market products, market evolution dynamics etc.
- Previous experience as team lead or leadership positions will be added advantage.

Estimated Level of Effort (LoE):

The Market Development and Evolution Expert will provide an estimated Level of Effort (LoE) of twelve (12) person-months over the duration of the contract.

Key Expert 2 - Market Operations Expert**Qualifications:**

At least a bachelor's degree in engineering, science, finance, accounting, or economics. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- A minimum of ten (10) years of international experience in electricity market operations within Independent System Operators (ISOs), Market Operators, or comparable autonomous electricity market institutions.
- Demonstrated hands-on experience in the operational aspects of competitive electricity markets, including market settlement systems and coordination between market operations and system operations.
- Strong understanding of electricity market operations, including market clearing and settlement principles, operational procedures, market codes, and system–market coordination.
- Proven experience in reviewing, improving, or supporting market operational processes, including system integration, data management and flows, and operational workflows in mature or transitioning electricity markets.
- Prior involvement in advisory, operational review, or implementation support roles related to market operations and administration will be considered highly desirable.

Estimated Level of Effort (LoE):

The Market Operations Expert will provide an estimated Level of Effort of eight (8) person-months over the duration of the contract.

Key Expert 3 - Market Surveillance Expert**Qualifications:**

At least a bachelor's degree in engineering, science, finance, accounting, information technology (IT), or economics. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- A minimum of ten (10) years of international experience in electricity market surveillance within Independent System Operators (ISOs), Market Operators, or comparable autonomous electricity market institutions.
- Demonstrated hands-on experience in the analysis of electricity markets from a market surveillance perspective, including monitoring of market participant behavior and oversight of compliance with applicable market rules and regulatory requirements.
- Strong understanding of electricity market structures and design, including market monitoring frameworks, surveillance and assessment methodologies, quantitative and qualitative data analysis techniques, and the use of relevant analytical and monitoring tools.

Estimated Level of Effort (LoE):

The Market Surveillance Expert will provide an estimated Level of Effort of five (5) person-months over the duration of the contract.

Key Expert 4 - ISMO Restructuring Expert**Qualifications:**

At least a bachelor's degree in engineering, economics, finance, management sciences, information technology (IT), or business administration. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- A minimum of ten (10) years of international experience in organizational restructuring within reputable large-scale institutions, including at least one restructuring assignment undertaken for an Independent System Operator (ISO).
- Demonstrated hands-on experience in institutional restructuring initiatives, including development of organizational structures and charts, drafting of job descriptions, preparation of process manuals and process maps, formulation of action plans and business plans, and conduct of gap analyses.
- Strong understanding of institutional restructuring frameworks, including "as-is" and "to-be" assessments, governance and reporting structures, accountability frameworks, corporate structuring, and change management principles.

Estimated Level of Effort (LoE):

The ISMO Restructuring Expert will provide an estimated Level of Effort of eight (8) person-months over the duration of the contract.

Key Expert 5 - Market Simulation & Modelling Expert**Qualifications:**

At least a bachelor's degree in engineering, information technology (IT), data science, economics, science, accounting, or finance. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- A minimum of ten (10) years of relevant experience in areas such as power system simulation and modelling, least-cost dispatch modelling, short- and medium-term dispatch planning, hydrothermal coordination, security-constrained optimization, market price simulation, and data analytics, across multiple jurisdictions.
- Demonstrated hands-on experience with internationally recognized market simulation and optimization tools and software widely used in the power sector.
- Prior professional experience with reputable international ISOs operating centralized dispatch markets will be considered an advantage.

Estimated Level of Effort (LoE):

The Market Simulation & Modelling Expert will provide an estimated Level of Effort of eight (8) person-months over the duration of the contract.

Key Expert 6 - Market Contracts Development Expert**Qualifications:**

At least a bachelor's degree in engineering, finance, accounting, science, economics, or law. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- A minimum of ten (10) years of international experience in the power sector, including the development and structuring of market-based contractual frameworks across multiple jurisdictions.
- Demonstrated hands-on experience in drafting, negotiating, and finalizing contractual documents related to the power sector.
- In-depth knowledge of Pakistan's power sector structure, regulatory framework, and market dynamics will be considered an added advantage.

Estimated Level of Effort (LoE):

The Market Contracts Development Expert will provide an estimated Level of Effort of six (6) person-months over the duration of the contract.

Key Expert 7 - Independent Auction Administrator (IAA) Restructuring & Strengthening Expert

Qualifications:

At least a bachelor's degree in engineering, finance, accounting, management sciences, science, or law. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- A minimum of ten (10) years of international experience in the design and/or operation of power procurement auctions and bidding platforms within competitive electricity markets, preferably across multiple jurisdictions.
- Demonstrated hands-on experience in change management, organizational restructuring, and business process reengineering will be considered an advantage.
- Relevant experience in jurisdictions operating centralized dispatch markets will be considered a plus.

Estimated Level of Effort (LoE):

The IAA Restructuring & Strengthening Expert will provide an estimated Level of Effort of seven (7) person-months over the duration of the contract.

Key Expert 8 - Energy Management System (EMS) Applications Expert**Qualifications:**

At least a bachelor's degree in electrical engineering. Master's degree or higher qualification will be considered an added advantage.

Required Experience:

- A minimum of fifteen (15) years of international experience in the power sector, with a strong focus on the design, configuration, tuning, validation, and operationalization of Energy Management Systems (EMS) on SCADA-EMS platforms.
- Demonstrated in-depth expertise in EMS applications, including validation and optimization of State Estimation, Contingency Analysis, Optimal Power Flow (OPF), Reactive Reserve Monitoring, Congestion Forecasting, and related analytical tools.
- Proven hands-on experience in Dynamic Security Assessment (DSA), including validation of generator dynamic models, transient stability analysis, HVDC modelling, and integration of real-time EMS data with offline planning and simulation tools such as PSS®E and DSA platforms.
- Prior experience working with major SCADA/EMS vendors (e.g., Hitachi, Siemens, GE, or equivalent) in EMS configuration, customization, validation, and performance tuning will be considered highly desirable.

Estimated Level of Effort (LoE):

The EMS Applications Expert will provide an estimated Level of Effort of eight (8) person-months over the duration of the contract.

Key Expert 9 - Generation Management System (GMS) Applications Expert
Qualifications: At least a bachelor’s degree in electrical engineering. Master’s degree or higher qualification will be considered an added advantage.
Required Experience: • A minimum of fifteen (15) years of international experience in the power sector, with a strong focus on the design, configuration, tuning, validation, and operationalization of Generation Management Systems (GMS) on SCADA platforms. • Demonstrated in-depth expertise in Automatic Generation Control (AGC), including primary and secondary frequency response, control loop tuning, reserve management, and compliance with Grid Code requirements. • Proven hands-on experience in Unit Commitment (UC) and Economic Dispatch (ED), including application of optimization solvers such as AMPL and CPLEX, and practical implementation in real-time or day-ahead operational environments. • Prior experience working with major SCADA/GMS vendors (e.g., Hitachi, Siemens, GE, or equivalent) in system configuration, customization, validation, and performance tuning will be considered highly desirable.
Estimated Level of Effort (LoE): The Generation Management System (GMS) Applications Expert will provide an estimated Level of Effort of eight (8) person-months over the duration of the contract.

The Consultant may propose higher than the minimum input specified in this section and may include additional resources in its proposal if deemed necessary.

6. Assignment Duration

The estimated duration of the assignment “Consultancy Services for Supporting the Operation and Development of the Competitive Trading Bilateral Contract Market (CTBCM) in Pakistan’s Power Sector” is until November 2027.

7. Client’s Input

ISMO shall provide:

- Access to relevant data, documents and systems.
- Designated focal persons from Client side
- Facilitation of identifying stakeholder.

8. Selection method

The Consultant will be selected using **Quality & Cost Based Selection (QCBS)** in accordance with the **World Bank Procurement Regulations for IPF Borrowers (November 2023)**.