



## **TERMS OF REFERENCE (TOR)**

### **CONSULTANCY SERVICES FOR POWER QUALITY ANALYSIS**

## BACKGROUND

K-Electric (KE) is a vertically integrated power utility company that serves the economic and commercial hub of Pakistan by providing power to the city of Karachi, the country's largest metropolitan area. K-Electric covers an area of 6,500 square kilometers and serves 2.8 million consumers (20 million+ inhabitants). The company is committed to building trust and satisfaction with its customers and maintain a reliable power supply with electromechanical compatibility. However, some of the company's industrial customers have reported issues of load drop, process disruption, and equipment malfunction when using K-Electric's power supply. To address these issues, K-Electric is interested in conducting power quality analysis to identify the problems and their root cause, so that corrective or mitigation actions can be taken. The goal of the power quality analysis is to improve the reliability and performance of the electrical system.

## OBJECTIVE

The objective of this power quality analysis project is for KE to engage the services of an experienced engineering consultancy to conduct an extensive study and diagnostic assessment of KE and its customers' electric power systems. The goal is to identify any power quality concerns and propose practical solutions that address all these concerns. The proposed solutions should be feasible to implement for KE and its clients under study and should also suggest improvement initiatives wherever necessary. The overall goal is to improve the reliability and power quality of the electric power systems for KE and its customers.

## PREQUALIFICATION CRITERIA

The following pre-conditions must be met in order for the consultant to be considered for this power quality analysis project:

1. The consultant must have been in business for at least five years.
2. The prospective consultant must demonstrate strong knowledge of relevant international and regulatory standards and provide strong references with similar problem statements.
3. The consultant must provide a template for the pre-requisites from the utility and customer for data collection, considering the nature of the industry and relevant international standards.
4. The consultant must have the necessary resources (manpower, tools, and measuring equipment) available to complete the project.
5. **PEC Certificate / Professional Engineering Registration Authority Certificate of company and relevant team members.** This is mandatory requirement.
6. Any previous working experience with KE.
7. Local presence of foreign/international companies.
8. Any similar previous working experience in Pakistan.

## SCOPE OF WORK

The scope of services for this power quality analysis project includes the following:

1. Using measurement-based techniques and specialized power quality monitoring equipment to analyze KE's power quality according to IEC standards.
2. Studying the utility's and customer's networks and diagnosing the end-to-end implemented thresholds of control and protection processes, as well as the vulnerability curves of equipment and devices at the customer and utility ends. The diagnosis should also align compatibility with regulatory and relevant international standards for interconnected networks. This will include:
  - a. Evaluating the system's inherent behavior during normal and abnormal states (transients, switching, and faults at HV-11KV and EHV-132 and 220KV).
  - b. Identifying violations in terms of magnitude and duration for power quality parameters (voltage flicker,

- oscillation, voltage sag, voltage swell, voltage unbalance, total harmonic distortion, voltage drop, total disturbance, total disturbance level, emission, etc.) during normal and abnormal states (transients, instantaneous, and short duration) according to applicable regulatory and international standards.
- b. Studying and evaluating the coordination of relay settings at the consumer and utility ends.
  - c. Studying and evaluating harmonics injection in the network by key customers.
  - d. Determining the direction of disturbance in power quality.
3. Preparing a report based on the study, including proposed solutions that are supported by field surveys, diagnostics based on measured data, and validation using relevant tools.
  4. Engaging with prospective customers and the utility to validate the proposed solution.
  5. Providing oversight for the solution implementation at KE/customer end and monitoring the performance of the proposed solution for at least 3 months.
  6. Proposing improvement initiatives for consumers and the utility based on each study, in order to enhance reliability and power quality where feasible.
  7. As part of the power quality analysis project, the consultant will be responsible for preparing presentations and a report on the results of the analysis. This may include visual aids such as charts and graphs to illustrate the findings, as well as a written report that provides a detailed analysis of the power quality issues and recommendations for improvement. The presentation and report should be prepared in a clear and concise manner that is easy for the customer to understand. The consultant should also be prepared to answer any questions or concerns that the customer may have about the results of the analysis.

## KEY DELIVERABLES

The consultant is expected to provide the following deliverables as part of the power quality analysis:

1. A diagnostic report that includes an analysis of the causes of power disruptions, as well as schematics and a comparison of the electrical system to applicable standards at both the utility and consumer ends.
2. A root cause analysis (RCA) of load drop and equipment malfunction issues, along with recommendations for mitigating these issues.
3. Proposed solutions for immediate, short-term, and long-term remedial actions to improve power quality.
4. Recommendations for addressing any disturbances such as harmonics or power factor issues that may be affecting the utility network due to the nature of the load and switching at the consumer end.
5. A report detailing improvement initiatives based on the study.
6. As part of the power quality analysis project, the consultant will be responsible for presenting the results of the analysis to the customer on-site. The consultant should also be prepared to answer any questions or concerns that the customer may have about the results of the analysis. This on-site presentation should provide the customer with a clear understanding of the power quality issues that have been identified, as well as the proposed solutions for addressing those issues.
7. Weekly progress reviews to track progress and address any issues as they arise.

## TIMELINES

The following timelines have been set for the power quality analysis project:

1. Data collection, field surveys, and diagnostics: 5 working days.
2. Preparation and submission of the diagnostic, solution, and improvement recommendation report: 5 working days.
3. Engagement with prospective customers and the utility for validation: 5 working days.

4. Oversight for solution implementation (short-term): 5 working days.

#### **Due Diligence and Information on the TOR**

By submitting a proposal, the Consultant represents and warrants that it has studied and is thoroughly familiarized with the scope of work, requirements, specifications, conditions of this TOR, and with applicable laws, such that the Consultant accepts responsibility for and is prepared to execute and shall completely fulfill all obligations under this TOR.

By submitting a Proposal, the Consultant also accepts that it will not make any claim for or have any right to damages because of any misinterpretation or misunderstanding of the TOR, or because of any information which is known or should have been known to the Consultant.

#### **Company's Right to accept/ reject Bids**

The Company reserves the right to accept or reject any Bid, and to annul the Tendering process and reject all Bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or any obligation to inform the affected bidder of the grounds for the Company's action.

#### **Confidentiality**

The Consultant and the personnel shall not at any time communicate to any person or entity any confidential information acquired in the course of the services, nor shall the consultant and the personnel make public the recommendation formulated in the course of, or as a result of, the services.

#### **General**

- a. Each Proposal must have a cover letter signed by the authorized representative of the Consultant mentioning the name of the firm, office address, telephone number, facsimile number and the name of the authorized representative of the Consultant for all correspondence in relation to the Proposal.
- b. A statement of total compliance with the requirements of TOR documents including its provisions, procedures, schedules, amendments, corrigendum, annexure, forms, formats, conditions etc.
- c. Confirmation of period of validity of bid.

#### **Bid Bond (*Not Applicable for the purpose of this RFQ*)**

- a. The bidder shall furnish, as part of its Bid, original Bid Bond in favor of K-Electric for an amount equal to 2.5% of its Bid Value obtained from a first -class bank.
- b. The Bid Bond of the unsuccessful bidder shall be returned as promptly as possible but not later than 45 days after the expiry of the period of Bid validity prescribed by KE.
- c. The Bid Bond of the successful bidder shall be returned after submission of the Performance Bond in the form Bank Guarantee from any reputable scheduled Pakistani Bank acceptable to Company of amount 10% of the total Contract value.
- d. If the bidder fails to fulfil the terms and conditions of the RFP, then their Bid Bond will be forfeited by K-Electric and any further action can also be taken against the bidder deemed appropriate by K - Electric.
- e. Any Bid not secured in accordance with Instructions in this RFP will be rejected by KE as non- responsive.
- f. The Bid Bond shall be encashed:
  - i. If a bidder withdraws its Bid during the period of Bid validity specified by the bidder on the Bidding Form Format.
  - ii. The bidder does not accept the correction of his Bid Price.
  - iii. In the case of a successful bidder if the bidder fails:
    - To furnish Performance Bond in accordance with this Document.
    - To sign the Contract

#### **Performance Bond**

- a. Performance Bond @ 10% of the grand total PO Value in the shape of an irrevocable, independent, unconditional and direct obligation Bank Guarantee to be issued by a

Pakistani Scheduled Bank or an International Bank having branch in Pakistan (having long term credit rating of more than 'A' as appearing on the website of the State Bank of Pakistan) acceptable to KE as per KE approved format attached as Annexure C to this RFP. PB to submitted within 30 days of award.

- b. The Performance Bond shall secure all of the bidder's obligations, liabilities, payment of liquidated damages, indemnities, representations, guarantees, warranties and responsibilities under the Contract for the Works, including the integrity and quality of the bidder's workmanship, the timely and continuous performance of the Works, the performance of Works by the bidder and all other works and services to be provided by the bidder under the Contract / Purchase Order (PO)

The Performance Bond shall remain valid during the project period until the project completion date and will be returned to the Consultant once it has satisfactorily executed, completed, remedied defects including any punch list items in the works in accordance with the contract. The bidder shall be obligated to maintain and keep valid the Performance Bond until the Job Completion Certificate has been issued ("Performance Bond Expiry Date").

In the event that the Performance Bond is scheduled to expire prior to the then scheduled Performance Bond Expiry Date the bidder shall no later than 15 Days prior to the expiry of the Performance Bond procure extension of validity of the Performance Bond up to the then scheduled Performance Bond Expiry Date. Failure of the bidder to procure extension of the Performance Bond in accordance with this condition, i.e. 15 days prior to its expiry shall entitle the KE to encash the Performance Bond.

- a. The Performance Bond shall be returned to the bidder on Performance Bond Expiry Date on the request of bidder.
- b. The cost of complying with the requirements of this Clause shall be borne by the bidder.

#### Payment Criteria

1. 100% payment against respective scope of work will be made within 90 days (as per agreed payment milestones) upon the issuance of job/work completion certificate by user, submission of invoice along with all supporting documents (as required).
2. Consultant to propose payment milestones for the given scope and submit along with bid to KE for review and approval. Payment Milestone structure proposed by bidder will be an integral part of Techno - Commercial evaluation of bids. The final payment structure shall be mutually agreed at the time of negotiating the Contract / PO. For avoidance of doubt, **KE is not bound to accept the proposed payment structure.**

#### Bid Pricing

Prospective Consultants are required to provide bid price in PKR for the entire scope for individual customer basis and on Lump Sum basis in total

Part	Description of Bid Component	Bid Price (Lump sum)
A	CONSULTANCY SERVICES FOR POWER QUALITY ANALYSIS QUALITY ANALYSIS	

Note: Any travelling expenses shall constitute the part of above costs.

- Above quoted prices should be inclusive of WHT but exclusive of SST

KE shall have the right to eliminate any component/part of the bid from the scope of work of the Consultant selected through this bidding process. For avoidance of doubt, KE shall not have any liability or payment obligation for the bid components/parts that have not been assigned for work by issuing letter of assignment to the Consultant.

#### Supplier Code of Conduct

The bidder shall execute, Supplier's Code of Conduct at the time of submission of its proposal/bid as given in Annexure -B

### Conduct of Work

The Consultant shall be responsible for the management of all aspects of the scope. The Consultant shall nominate a Project Manager to liaise with KE's representative.

The Consultant shall work closely with the designated KE staff. KE's staff and representatives will be involved with the Consultant throughout the project. All the job/works performed by the Consultant will be with close coordination of KE's representatives. However, no responsibility will be laid on KE's staff and representatives. The Consultant shall implement internal quality control and assurance procedure during execution of the contract and shall demonstrate that they are being applied to work.

### Conflict of Interest

For the purposes of clarity of scope as being identified in the subject TOR, the Consultant will also provide an undertaking that shall specifically set out that it will, neither directly or indirectly be in "conflict of interest" with KE, from the date of Award of Contract.

### Publicity

All announcements, communications and documents published or statements made by the bidder or on its behalf relating to this TOR will only be made or published with the prior written consent of K -Electric, and will be true, fair, considered and accurate. If K-Electric's consent is not obtained, K -Electric shall be entitled to publish any announcements or documents it thinks fit in K -Electric's interest, and to require the bidder to vary or withdraw the relevant announcement, communication, document or statement.

### Disclaimer

The information contained in this TOR has been prepared to assist each bidder in making its own evaluation of the Project and does not purport to contain all of the information that such bidder may desire with respect to the Project. In all cases, the bidder is required to conduct its own due diligence, investigation, and analysis. None of K-Electric or its directors, officers, employees or advisors may make any representation or warranty, express or implied, as to the accuracy or completeness of this TOR or the information contained herein and none of K-Electric or its directors, officers, employees or advisors shall have any liability for the information contained in, or omitted from this TOR, nor for any of the written, oral, electronic or other communications transmitted to the bidder in the course of the bidder's investigation and evaluation of the Project and submission of its project proposal pursuant to this TOR. Only those representations and warranties that are made in a definitive written agreement, when and if executed, and subject to any limitations and restrictions as may be specified in such definitive written agreement, shall have any legal effect. Each bidder shall be responsible for its own independent evaluation and assessment of the Project and should consult its own professional advisors and consultants.

### Technical Scoring:

Technical Score
<b>Staff</b>
Availability of skilled staff (Project Manager, site manager (Electrical engineer), Health & Safety manager, Material manager, QA/QC engineer to execute the project on time.
Adherence to training requirements
Evidence on employment via SESSI/EOBI
<b>Business Acumen</b>

Is able to demonstrate that it has completed similar services and executed them successfully for the past five years.
Can provide full project management document with the following as per TORs 1- Project Gantt chart 2- Project Deliverables 3- Project key timelines/ milestones 4- resource mobilization 5- Complete and comprehensive report of each PQS on similar types of projects.
The consultant must provide a template for the pre-requisites from the utility and customer for data collection, considering the nature of the industry and relevant international standards.
<b>Experience</b>
Is registered with PEC in relevant category.
Any contracts / projects of similar nature with KE or any DISCOs or other energy companies
Is able to demonstrate that it has local as well as foreign presence.
can provide clean slate of no infringements/ blacklisting or show cause from any previous clients- Last 3 years data
<b>Health, Safety and Quality</b>
Compliance to KE's HSEQ policies
Submission of bidder's safety & quality standards and protocols (manuals, certifications, etc.)
Bidder's safety record for past 3 years
Availability of certified safety professionals
<b>Tools &amp; Measuring Equipments</b>
Availability of tools and standard equipment to successfully complete the tasks as per KE requirement. Complete details to be shared in the technical proposal with specifications. Power Quality Analyzer should be Class A as per <b>IEC 61000-4-30:2015</b>
Has adequate testing laboratories/facilities to carry out inspection / certifications.

## Commercial Scoring:

Commercial Score
<b>Package details</b>
Package 1 price (lumpsum)
<b>Payment terms</b>
Is able to provide best credit payment terms
<b>Performance Bond</b>
Is willing to submit 10% performance bond against the project
<b>Compliance to KE's T&amp;Cs</b>
Compliance to KE's T&Cs
<b>LD Clause</b>
Is willing to accept KE LD Clause

The following Annexures will form an integral part of this TOR.

Annexure - A: General Terms and Conditions

Annexure - B: Supplier Code of Conduct

Annexure - C: Performance Bond Format