MAHATRANSCO

Maharashtra State Electricity Transmission Co. Ltd.

Terms of Reference (TOR)

For

Selection of Project Management Consultant for providing consultancy services for Implementation of Corporate Level Data Warehouse in MSETCL

Contents

REF:-MSETCL/CO/(DC&M)/D&ES/RFP-1941

Subject: REQUEST FOR PROPOSAL FOR IMPLEMENTATION OF CORPORATE LEVEL DATAWARE HOUSE IN MSETCL.

Sir,

Maharashtra State Electricity Transmission Co. Ltd., intends to invite "Request for Proposal" (RFP) from consultants/agencies/Technical Institute for a period of one year for providing consultancy services for implementation of Corporate Level Data Warehouse for MSETCL.

The detailed Terms of Reference (TOR) are as follows:

1. GENERAL

1.1 The Authority seeks the services of qualified firms/Technical Institute for implementation of **CORPORATE LEVEL DATA WAREHOUSE** for MSETCL. The Terms of Reference (the "**TOR**") for this assignment are specified below.

1.2 The Project Management Consultant (PMC) shall assist the Authority and its Financial Consultant by furnishing clarifications as required for the financial appraisal of the Project and Bid Documents.

1.3 The PMC shall also participate in the pre-bid conference with the Bidders of the Project and assist the Authority in clarifying the technical aspects arising from the Bid Documents including the deliverables.

2. BACKGROUND

MSETCL has implemented automation in several substations through SCADAS & plans to implement it in remaining substations. The SCADA systems generates operational and non-operational data. Currently each substation is generating 100 – 150 MB/day. It is useful for operational as well as analytical purpose. This data at Sub-station level SCADA is mostly stored in local historians. But there are some inherent shortcomings in this existing arrangement for Data acquisition and processing for carrying out operational concerns. There is no predictive analytics functionality implemented in the existing system. The short-comings in the existing system are:

- Data collection in isolation
- There is no unified way of collection
- All data is not made available in standard format
- No control on data since data is generated by proprietary software and access to data is restricted

- No standardization of hardware and software technology hence no analysis can be provided on cross correlations.
- No advance analysis is provided
- No facility to control substation remotely
- No facility to perform fault analysis on historical data
- No integration with existing MIS system

3. OBJECTIVE

To develop and maintain the state-of-the-art C.D.W.S. having integration with existing MIS of MSETCL. The inputs to the CDWS shall include operational and non-operational data from substation SCADA/ Centralised Control Room SACDA, Remote access system of protection relays, asset data and manual data entry. The CDWS is to sustain high data transfer rate, high velocity storage & high response performance. All these capabilities with the data are to be manifested through multilayer CDWS which shall be utilised by Operations/Projects/Planning & Finance departments of MSETCL.

It is also envisaged that CDWS shall be source of data for several power sector analytical tools such as load flow studies, asset health analysis, fault analysis, trends of active & reactive power consumption & analytics reading & renewable energy generation..

4. SCOPE OF SERVICES

4.1 Scope of PMC:

- The PMC should understand the various aspect of the system which includes organization, users, existing system, and technical complexity.
- PMC should understand existing data generation and data flow, existing reporting system
- He should design and encourage next generation system, identifying component and overall specifications of component.
- PMC should complete blueprint of the project with all minute details which will be evaluated by owner/Agency on behalf of owner. The document should contain present and future storage requirement, hardware and system software requirement, application software requirement, listing of stakeholders and their views, integration with existing MIS, open and secure access of data warehouse, common unified format for the data which can be used by various types of software. The design plan should include possible uses of stream server, publish-subscribe model, stream analytics and time based data partitioning.
- PMC should make complete SRS for whole system in consultation with owner/Agency on behalf of owner
- PMC should advice MSETCL to prepare EOI/tender for Vendor.

- Testing components supplied by vender.
- Overall day to day monitoring of the Project and perform risk analysis and corrective action.
- **The PMC should also ensure that target system provides following essential properties**
    1. **Accessibility :** The PMC should ensure that the system should able to provide all access to all data in the open format which is generated by all sub-stations & which is required for decision making irrespective of the support of the vendor who has supplied the components.
    2. **Durability:** the PMC should ensure the system should provide full data guarantee irrespective of any type of hardware, network or any such failure. The PMC should list all types of failures and provide plan to overcome from such failures. The PMC should also ensure that there should not be any data loss due to operating conditions.
    3. **Security:** The PMC should ensure that the system should be full proof for any security hacks. The PMC should list all types of security attack and provide plan to overcome from such attacks.
    4. **Scalability:** the PMC should ensure that the system is scalable system at each level so that scalability should be achieved by adding components not by replacing them. The system should be designed to satisfy data needs for at least next 20 years.
    5. **Functional Completeness:** The PMC should ensure that the target system should be fully functionally complete and provide data & processing for fault diagnosis, fault analysis, fault prevention, fault prediction and total functional optimisation which will include but not limited to functionalities like forecasting of future load, indicating asset health.
    6. **Performance:** The PMC should ensure that the system should have real time response and such measures should be provided for each level.
    7. **External Interface:** The system should be able to interact with external systems like MIS & GIS systems to accomplish total system optimisation. It should also accommodate the external system like smart grid and should provide uniform data views.
    8. **Standards:** The components which will be used to provide build the system should indicate recent standards.
    9. **Maintainability:** The PMC should ensure that system can be fully maintained by the MAHATRANSCO in future. The PMC should ensure that the vendor should provide source code, full configurable software, data dictionary, data flows, documentation to incorporate new changes as well as operations, adequate

training at each level. The PMC should provide documentation templates to make such documentation standard.

10. **Controllability:** The s/s system gateway hardware should be capable of controlling remote operations of S/s along with data acquisition & transfer capability.
11. **Risk Management:** The PMC should provide risk analysis in terms of technical feasibility, cost overrun & time delay at each stage of the project and plan to minimize such risks.
12. **Testing**

- The consultant shall help/assist the utility for floating the Tender. The entire project can be classified in four stages.
    1. Site survey or data collection for assessment of existing system or analyzing present practices with respect to CDW
    2. Tendering stage: This stage, the consultant has to prepare the detailed tender document for implementation of CDW and submit to the utility for approval for floating the same.
    3. Offer's analysis: This stage consultant has to scrutinize the offers received during the tender stage. Consultant will technically verify all the offers received, prepare the technical comparative document with scoring for different parameters and submit the same to the utility. Consultant will not involve in the process of award of the contract as it may be under sole discretion of the utility.
    4. Post bid stage: This stage, the consultant will coordinate with the successful bidder during tender process, will be guiding the successful bidder regarding the project process flow and time lines for completion of the project.
- Coordinate the training of the staff at various levels for system usage.

4.2 Qualifying Requirement / Eligibility conditions of Project Management Consultant:

- The company should be infrastructure advisory and executioner in power sector with experience in project management in power sector in general.
- The company should be proficient in data management and data governance required for the power sector in general.
- The company should have working experience of 5 years at least with large public and private organizations on similar project as mentioned and successfully completed 2 projects including Smart-Grid/Analytics projects or equivalent.
- The company should have the experience in consultancy of 2 similar projects in transmission sector of power system.

- The company should be able to apply integrated, holistic, and comprehensive solutions in practice to the problems/projects undertaken in the power sector in general and transmission sector in particular.

4.3 Work Profile of Project Management Consultant:

4.3.1 Technical Work Profile: Technical work profile should include

- Ability to develop Business intelligence technologies, applications and practices for the collection, integration, analysis, and presentation of business information.
- Design and implementation of data warehouse of multiple levels and of sizes in the tune of hexabytes to petabytes and data marts design and implementation and installation strategies which includes for hardware as well as software.
- Handling high speed data streams in the tune of minimum 1000 transactions per milliseconds and perform real time analytics using state-of-the-art technology.
- Ability to analyze technical risks associated with data-generation points and data-transmission mechanisms, and data-exchange interfaces within the organization and external organizations using the existing SCADA systems at various levels and design new SCADA systems.
- Ability to design substation system hardware (Gateway) having capability of remote operations along with capability of data acquisition & transfer.
- Ability to integrate with the legacy systems/MIS systems.
- Ability to design comprehensive data security policy and data ownership policy of the organization.
- Ability to design training programs for the system usage by the staff of the work ordering organization.
- Working experience in transmission line infrastructure installations, electrical engineering knowledge to understand the new inventions, accidents and fault handling, outage management due to natural as well as artificial causes of the outages.

4.3.2 Managerial Work Profile

1. Managing Projects of varying sizes, complexities, and contractual types
2. Problem solving, team-work, decision making ability, delegation ability, manpower handling, field-work knowledge, and meeting deadline skills.

4.3.3 Financial Work Profile

1. Ability to handle financial risks which include cost over-runs , delays in installation, accident insurances, equipment damages, pay packets, foreign exchange, interest rate etc. among other things

5. PROJECT COST

The PMC shall work out indicative BOQ of various components and prepare rough cost estimates of the Project with a break up of cost for each component separately.

5.1 Financial analysis and bid process

Detailed financial analysis is not required to be undertaken by the Consultant. However, the Consultant shall provide the estimated construction costs, operation and maintenance costs, etc. as part of its preliminary financial analysis and appraisal of the Project. The PMC shall, also provide a preliminary assessment of the financial viability of the Project with a view to estimating the likely IRR over a period of 10 (ten) years, 15 (fifteen) years, 20 (twenty) years and 25 (twenty five) years respectively. It shall also provide assistance during the Bid Process for selection of the Contractor.

6. DELIVERABLES

The PMC shall deliver the following deliverables (the "**Deliverables**") during the course of this Consultancy. The Deliverables shall be so drafted that they could be given to the prospective bidders for guidance in preparation of their bids. Twenty hard copies and two soft copies in CDs of all the final reports, etc. shall be submitted to the Authority. For draft reports only five hard copies and one soft copy in CD shall be submitted to the Authority.

1. As-Is study of the MSETCL.
2. Cost estimation for implementation of Corporate Level Data warehouse along with end user application.
3. Corporate Level Data warehouse design along with end user application SRS and getting implementation done from vendor.
4. Successful testing of CDW
5. Key benefits from the project implementation

7. TIME AND PAYMENT SCHEDULE

7.1 Time Schedule

The time period for completion of the entire project will be maximum of 1 year. The activity schedule to be given by PMC as per the following format:

Sr. No.	Activity description	Time schedule
1	Preparations & Submissions of blue print of the entire project including cost & implementation schedule / SRS for end user application.	3 months

2	Tendering stage: This stage, the consultant has to prepare the detailed tender document for implementation of CDW and submit to the utility for approval for floating the same.	1 month
3	Offer's analysis: This stage consultant has to scrutinize the offers received during the tender stage. Consultant will technically verify all the offers received, prepare the technical comparative document with scoring for different parameters and submit the same to the utility. Consultant will not involve in the process of award of the contract as it may be under sole discretion of the utility.	2 month
4	Post bid stage: PMC shall co-ordinate with successful bidder for timely completion of the entire project including testing of the hardware & software	12 month

7.2 Payment schedule

The payment terms for the proposed project as follows

Sr. No.	Activity description	Payment schedule
1	Preparations & Submissions of blue print of the entire project including cost & implementation schedule.	20% of order value
2	Tendering stage: This stage, the consultant has to prepare the detailed tender document for implementation of CDW and submit to the utility for approval for floating the same.	20% of order value
3	Offer's analysis: This stage consultant has to scrutinize the offers received during the tender stage. Consultant will technically verify all the offers received, prepare the technical comparative document with scoring for different parameters and submit the same to the utility. Consultant will not involve in the process of award of the contract as it may be under sole discretion of the utility.	20% of order value
4	Post bid stage: PMC shall co-ordinate with successful bidder for timely completion of the entire project including testing of the hardware & software	40% of order value

8. MEETINGS / PRESENTATION

The Authority may review with the Consultant, any or all of the documents and advice forming part of the Consultancy, in meetings and conferences which will be held in Corporate office,

Mumbai at the Authority's office. The applicant can show presentation on their company. Further, the Consultant may be required to attend meetings and conferences with pre-qualified Bidders or the Selected Bidder. The expenses towards attending such meetings during the period of Consultancy, including travel costs and *per diem* shall be reimbursed in accordance with the Financial Proposal contained in Annexure X of Appendix of the RFP.

9. PROJECT CONSULTANCY TEAM

9.1 The PMC shall form a multi-disciplinary team (the "Consultancy Team") for undertaking this assignment as under:

Key Personnel :	**Data Analytic Consultant/ Expert**
Qualification	B.Tech / M.Tech in IT/ Electronics / Computer Science
Experience	Should have experience in handling large data acquisition from machines, designing storage of large systems & providing analytical solution for large power system or equivalent field. He should have successfully completed the important projects of above characteristics in past three years.
Responsibility	He shall be responsible for overall progress & completion of the project & will lead the entire project team.

Key Personnel :	**Domain Analytic Consultant/ Expert**
Qualification	B.Tech / M.Tech in Electrical Engineering
Experience	Should have at least 10 years of experience in implementation of large Transmission Projects/ Operations & Maintenance of Transmission Systems/ Testing & Automation in Transmission Network
Responsibility	He shall be responsible for project implementation & monitoring. He will be responsible for giving relevant suggestion regarding power sector domain including relevant analytical tools.

9.2 The PMC shall establish a Project Office at a suitable location in Mumbai for efficient and coordinated performance of its Services. All the Key Personnel shall be deployed at this office during the first 16 (sixteen) weeks as specified in the Manning Schedule forming part of the Agreement. The authorized officials of the Authority may visit the Consultant's Project Office any time during office hours for inspection and interaction with the Consultant's Personnel. It is not expected of the Consultant to carry out the operations

from the Head/Home Office. However, he may do so for the remaining consultancy services beyond the first 16 (sixteen) weeks.

9.3 The Consultant shall mobilize and demobilize its Professional Personnel and Support Personnel with the concurrence of the Authority and shall maintain the time sheet/ attendance sheet of the working of all Personnel in the Project Office. These time sheets/ attendance sheets shall be made available to the Authority as and when asked for and a copy of such record shall be submitted to the Authority at the end of each calendar month.

10. REPORTING

10.1 The Consultant will work closely with the Authority. The Authority shall establish a working Group (the "**WG**") to enable conduct of this assignment. A designated Project Director of the Authority will be responsible for the overall coordination and project development. He will play a coordinating role in dissemination of the Consultant's outputs, facilitating discussions, and ensuring required reactions and responses to the Consultant.

10.2 The PMC may prepare Issue Papers highlighting issues that could become critical for the timely completion of the Project and that require attention from the Authority.

10.3 The PMC will make a presentation on the reports for discussion with the WG at a meeting. This will be a working document. The PMC is required to prepare and submit a monthly report that includes and describes, *inter alia*, general progress to date; data and reports obtained and reviewed, conclusions to date, if any; concerns about availability of, or access to, data, analyses, reports; questions regarding the TOR or any other matters regarding work scope and related issues; and so on. The PMC' work on the TOR tasks should continue while the report is under consideration and is being discussed.

10.4 Regular communication with the WG and the Project Director is required in addition to all key communications. This may take the form of telephone/ teleconferencing, emails, faxes, and occasional meetings.

10.5 The Deliverables will be submitted as per schedule provided by the PMC.

11. DATA AND SOFTWARE TO BE MADE AVAILABLE BY THE AUTHORITY

Available data as may be required by the PMC will be provided by the Authority on request. The Nodal Officer designated by the Authority shall facilitate handing over of such information to the Consultant.

12. COMPLETION OF SERVICES

All the study outputs including primary data shall be compiled, classified and submitted by the Consultant to the Authority in soft form apart from the reports indicated in the Deliverables (Section 6). The study outputs shall remain the property of the Authority and shall not be used for any purpose other than that intended under these Terms of Reference without the permission of the Authority. The PMC shall stand completed on acceptance by the Authority of all the Deliverables of the PMC and execution of the Agreement or 52 (fifty two) weeks from the Effective Date, whichever is earlier. The Authority shall issue a certificate to that effect. The Consultancy shall in any case be deemed to be completed upon expiry of 1 (one) year from the Effective Date, unless extended by mutual consent of the Authority and the Consultant.

Yours faithfully,

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Chief Engineer (DCM)