M.P. MADHYA KSHETRA VIDYUT VITARAN CO. LTD. BHOPAL

EXPRESSION OF INTEREST(EOI) No. MD/MK/04/1726

"Development of Business Analytics using Artificial Intelligence/Machine Learning (AI/ML) under Revamped Distribution Sector Scheme (RDSS)"

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No. MD/MK/04/P-IV/1726 **Bhopal, Date: 24 -09-2024**

Expression of Interest (EOI)

MPMKVVCL, Bhopal invites offers from competent agencies for developing business analytics using AI/ML and providing day to day support to Discom for effective implementation and utilisation thereafter. The Eligibility Criteria and Scope of Work is detailed in subsequent clauses. The purpose of this EOI is to have a deeper understanding of AI/ML as well its utilisation with respect to Discom Business. Experienced Agencies are invited to share their expertise and business insights and approach.

The interested agencies must submit their Expression of Interest as per the Key Dates:

S.No.	Tender Stage	Date & Time
1.	Publishing Date	25.09.24 at 12:00 hrs
2.	Document Download/Sale Start Date	25.09.24 at 12:30 hrs
3.	Pre-Bid Meeting Date	NA
4.	Bid Submission Start Date	25.09.24 at 16:00 hrs
5.	Bid Submission Closing Date	10.10.24 at 15:00 hrs
6.	Bid Opening Date	11.10.24 at 15:00 hrs

CGM (Procurement)
M.P.M.K.V.V. Co. Ltd., Bhopal

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1. BACK GROUND & OBJECTIVES

Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited (MPMKVVCL) was incorporated as a wholly owned Government Company on 31st May 2002, under the Companies Act 1956, the same has been notified vide order No. 5555/RS/4/13/2001 dated 1st July 2002 of the Government of Madhya Pradesh. The Company undertakes the activities of distribution and retail supply in the areas covered by the Commissioners of Bhopal, Narmadapuram, Gwalior, and Chambal. The Company obtained a certificate of commencement of business on 16th July 2002 from Registrar of Companies, Madhya Pradesh and Chhattisgarh, Gwalior. Subsequently vide Government of Madhya Pradesh notification No. 3679/FRS/18/13/2002 dated 31.05.2005, the Company has been provided functional autonomy with effect from 01.06.2005. The CIN Number of Company is U40109MP2002SGC015119. The Government of Madhya Pradesh vide its order no. 2671/12/13 dated 29th March 2012 had transferred all the shares of the Company to M. P. Power Management Company Limited and subsequently, our Company is now a subsidiary of M. P. Power Management Company Limited, Jabalpur.

OBJECTIVE

The main objective of the company is better execution of work for achieving efficiency gain and to make company commercially viable, progressively self-sustainable and less government dependent. Along with this, a balance between the quality service and logic tariff is to be maintained to safeguard the interest of consumers.

2. BROAD SCOPE OF WORK

MPMKVVCL intends developing business analytics using Artificial Intelligence/Machine Learning (AI/ML) and providing day to day support to Discom for effective implementation and utilisation thereafter. The purpose of this EOI is to have a deeper understanding of AI/ML as well its utilisation with respect to Discom Business.

3. SYNOPSIS FOR APPROACH FOR IMPLEMENTATION OF AI/ML

Considering the usefulness of the applications, the results obtained & the factors affected by them, few applications presently adopted by Discom have been found eligible for implementation of AI/ML by company. These applications are divided according to their key intervention area and brief description of each along with existing problems & scope of AI/ML is being given so that the appropriate implementation of AI can be planned.

3.1 Area-I: Consumer Indexing and Energy Accounting

3.1.1 A Common MDM System- It is developed by Discom-CZ in respect of all the three Discoms of MP. It supports storage, archiving, retrieval & analysis of all meters (Feeders, DTRs & Consumers) data including that of Smart meters and various other MIS along with validation & verification algorithms. The MDMS complies with the CEA guidelines “Functional Requirements of AMI”. It acts as a central data repository.

MDMS imports raw or validated data in defined formats and export the processed and validated data to various other systems sources and services in the agreed format. It provides validated data for upstream systems such as billing, consumer Information system, customer care, analytics, reporting, Network planning & analysis, load analysis etc.

- Integration with Billing System & monthly billing data
- ATR (Action Taken Report) System which has a workflow for end-to-end analysis from acquisition of meter-data/event (for the various events recoded in the Interval Meters) to billing of additional units and realization thereof.
- Smart metering system- will be implemented in near future

3.1.2 Unified Billing System

A new in –house billing system "NGB" is developed by the DISCOMs to replace RMS and CC&B both and provide unified billing solution**.**

Problem Statement: Beyond any reasonable doubt, it's true that despite numerous policies & efforts, the lack of end customers' satisfaction & low revenue produces the bleak outcome of Discom's achievement. The following issue under above category still persists even after continuous efforts: -

- Identification of consumer paying capacity or pattern
- non-regular paying consumer information
- high loss area information
- low collection efficiency
- low billing efficiency etc.

Solution: AI-enabled billing software can not only resolve above mentioned problem through AI algorithm but also can provide detailed reports of all based on accounting history. For instance, if an AI system has all billing records, it will generate data on the timeliness of payments, customer longevity, methods of payments used and consumption pattern etc.

This will enable Discom to make data-driven decisions that will induce better-billing outcomes. AI can learn from looking at historical data of both valid and fraudulent bills and it can make decisions whether to commence the payment procedure or mark consumers for review. AI can also assist us in finding any anomalies, inconsistencies, and disparities within the bills. Thus by, tweaking billing process, detecting and preventing frauds, as well as streamlining incoming payments are just a few ways in which AI-powered billing system can drastically change accounting for good.

3.2 Area-II: AT&C Loss Reduction

Problem Statement

Electricity Theft Detection: Electricity theft is one of the major problems of electric utilities. The dishonest electric power users produce financial loss to the utility companies. It is not possible to inspect these thefts manually.

The Interval Meters record all technical anomalies/events. In case of occurrence of more than one events in a Meter the events are analysed separately (In isolation) by the technical team. It is pertinent to note that severity level of the anomaly would be more only when the two events supplement each other and make the case more severe. For example, if a blood pressure patient is also suffering from diabetes, then the patient is required to be examined considering both the diseases. There may be cases where two

diseases are not related and don't have any combined effect. The meter events are also required to be examined with similar logic. AI based system could help in assessing the severity level of such simultaneous events in terms of probability of theft.

Table indicates Simultaneous events in a meter

S. no.	Event1	Event2	Event3	Combined Severity Level imparted manually
1	Meter top cover open	Current/Voltage unbalance/missing		0.5
2	Meter top cover open	Current/Voltage unbalance/missing	Low consumption	0.75
3	Current/Voltage unbalance	Low consumption		0.5
4	Current/Voltage Missing	Low consumption		0.5
5	Voltage unbalance	PT Missing		0.75
6	Voltage unbalance	PT Missing	Current without voltage	1.0
7	Current unbalance	Current missing/ CT short		0.5
8	Current unbalance	Current missing/ CT short	Low consumption	1.0
9	Magnetic tamper	Over consumption	MD overshoot	1.0

Solution- AI will help to assess Case-Severity by combining the effect of multiple Meter Events. Also, AI based improvised system will be efficient in identifying the suspects with high accuracy. Intelligent anti-power-theft AI algorithm is required for monitoring the power consumption data to recognize electricity power theft.
Discom has AMR data of HT & LT High value consumers which can be utilized for AI implementation.

3.3 Area-III: Consumer experience enhancement

Customer satisfaction is defined as a measurement that determines how happy customers are with a company's products, services, and capabilities. Customer satisfaction information can help a company determine how to best improve/ changes its services. There are following application are presently working for customer services.

3.3.1 iSampark

To address consumer complaints and grievances timely and efficiently MPMKVVCL have implemented a customer care center. Consumers can call and complaint regarding their electricity issues/ regarding bill/general complaints/power supply issues & other services. This Application provides the resolution to the consumer within the specified time. They can track & monitor their complaints according to the Level whether it HT OR LT Complaint and take the proper follow up from CCR. Web portal notifies affecting consumers via SMS regarding Scheduled maintenance/Unscheduled Shutdown/Breakdown over 11KV and 33 KV Feeders taken by Discom and Transmission Company Officers.

3.3.2 Chatbot

A structured chatbot to handle consumers queries related to Bill Download, Complaint Registration, viewing of complaint's status, etc.

3.3.3 Photo Meter Reading

An in-house mobile application is developed which is used by the meter readers to take pictures of energy meters for validation of actual current meter reading and reduces probability of read accumulation in meters resulting in incorrect bling.

3.3.4 WhatsApp

A Business account of WhatsApp is configured so that consumers can receive alerts/notifications (related to bills, complaints, payments, shutdowns, application status, etc.) on their registered WhatsApp number.

Problem Statement: Customer satisfaction is based on three most important aspects: fast resolution, real-time support, and a friendly agent. Despite making constant efforts to solve the consumer's queries/issues on time, the consumer satisfaction could not be achieved at that level. There are still many issues like long on-hold time, incorrect tagging of complaints to officer/locations, long resolution time, non-optimum complaint handling procedure, manual intervention etc. are present.

Solution: AI will help to provide around-the-clock interaction, automatic generated email, optimize agent availability & wait times, automatically escalate & classify cases using sensitivity & domain expertise analytic, handle multiple queries at once, analyze huge data & convert it into reports etc.

3.4 Area-IV: Demand Forecasting & Power Procurement

Demand forecasting involves proper load demand planning, adequate maintenance schedule for buying electricity from transmission company and efficient distribution through the supply lines. Therefore, an accurate demand forecasting will go a long way to maximize the efficiency of the planning process in the Discom.

Web based MDAS System- Web based MDAS System for feeder Meters which fetches data from all 33 kV feeders on a regular interval meter of 15 minutes.

Problem Statement: Load forecasting task is difficult due to the complex nature of loads which may vary depending on the seasons and the total consumption for two similar seasons may vary. Also, Difficulties getting accurate data on consumption behaviour due to changes in factors such as pricing and the corresponding demand based on such a price change. It is sometimes difficult to accurately fit the numerous complex factors that affect demand for electricity into the forecasting models. In addition, it may not be easy to obtain an accurate demand forecast based on parameters such as change in temperature, humidity, and other factors that influence consumption. The utility may suffer losses if they do not understand and decide on an acceptable margin of error in short term load forecasting. The usage behaviour varies between consumers using different types of meters and especially between the smart and traditional meters as well as different tariffs.

Solution: Development/Improvisation of AI based Day-ahead Load Forecasting System can be utilized for loads forecasting including smart grid, next day load demands, load forecasting in distributed systems etc. This may not only reduce power purchase cost but also may optimize supply chain and prevent from having an excessive amount of electricity in stock or out-of-stock.

3.5 Availability of different type of data at Discom

Through various projects, applications & internal efforts, the company keeps the different types of information, keep them updated on real time & use them for different type of analysis, audit & forecasting. This data can definitely be useful for the implementation of AI.

3.5.1 Data Warehouse- Fetches data from various data sources like ERP, Billing System, Payment Server, CRM, PRAYAS, SANKALP, iSAMPARK and Consumer related APPs, internal App etc.

3.5.2 Power BI- for the proper monitoring and representation of various critical factors related to Company, Reports are developed in Power BI tool which are revenue related, Cash Collection related, Arrears related, regional review related automated etc. More than 100 dashboards on Power BI pertaining to various departments are available on our Portal.

3.5.3 SCADA-The SCADA project envisages automating electrical distributions systems by implementing a supervisory control and data acquisition system (SCADA) for improving reliability, uninterrupted and quality power supply to the consumers, plugging pilferage points, faster identification of faults & early restoration of power,

proper metering, strategic placement of capacitor banks & switches, proper planning and design of distribution network and cutting costs of labour for manual work.

3.5.4 RT-DAS- Real Time Data Acquisition System (RT-DAS) project for measurement of SAIFI/SAIDI at 11KV feeder level & provide accurate measurement & Improvement in reliability of the power supply, 24x7 power supply for consumers in urban area, Reduction of Losses to meet AT&C loss reduction trajectory, improvement in quality of supply like voltage level, PF etc.

Under SCADA & RT-DAS project following data is being recorded & centrally monitored by Control Center of more than 363 substations of Discom.

- Real time On-OFF data of feeder, Power Transformer, Capacitor Bank, etc.
- Current, Voltage, Power Factor, Energy, Frequency, reactive Power of Feeder & Power Transformer
- OTI & WTI temperatures & alarms
- Fault data of Feeder & Breakers
- Use of Fault passage indicators for early restoration of faults etc.

3.5.5 Smart Meters and Time Series Meter

Smart Metering installation is in process under MPMKVVCL, Bhopal. Benefits of Smart Metering can thoroughly be realised by proper and effective data analytics.
The standard data derived from Smart Meters can help in overview of the operational & billing related systems, data analytics can be leveraged to further reach onto predictive and strategic aspects.

4. PROPOSED SCOPE OF WORK

- **Validation of data integrity:** Reviewing the data to ensure all the 123 parameters are captured and correctly at regular frequency and check for any errors (systemic/profile related)
  - Pilot data study across 2-3 shortlisted division to identify the data received and its subsequent usage in current scenario
- **Use-cases for data analytics implementation:** Prioritize and shortlist the use-cases (basis the data & parameters availability) to be integrated in the system through engagement with the DISCOM (ex. theft/loss reduction, network & asset management, etc.)
- **Data processing and analytics:** Analyse the data for each of the identified use cases, cheek for sufficiency and define the routines/rules leveraging algorithms like anomaly detection. pattern recognition, time series forecasting. etc, for determining key parameters
  - Pilot study and end-to-end implementation- of the use-case in select demographics (mix of rural & urban)
  - Review the available set of data w.r.t each use-case and check for any gaps in the current data
  - Create a data-to-action plan to address the gaps (if any) and improve the availability of data
  - Findings and data correlation can be determined by-running the data analytics engine based on the routines/rules defined (specific to use-cases)
  - Repeat the process for each of the prioritized/selected use cases
- **Follow-through:** Impact assessment against each implementation and cost benefit analysis for further scaling

- **Integrated MIS for reporting:** Creating a standard MIS reporting structure that integrates validated data along with the use-case specific data.
- Integration of the use-case specific data into the MIS for a consolidated visibility

5. QUALIFYING CRITERIA

Agencies with prior experience with Discoms on IT/OT Applications and AMI / Smart Metering in India/Abroad are eligible to participate in this EoI:

- Software Development Companies/System Integrators.
- Utilities/PSUs/Consultants etc.
- Communication/Network Service Providers.
- Smart Grid Implementing Agencies.
- Other Agencies can also participate.

6. SUBMISSION OF EOI

The interested agencies must submit their Expression of Interest on mptender portal upto dtd 10.10.2024 at 3:00 PM. Any clarification in this regard, the agencies/bidder may submit their queries through email at **:** **dgmproc4@gmail.com,rameshwar.chaturvedi@gmail.com**

The agency shall submit following information with EoI;

a. Information about agency,
b. Agency's experience on similar type of assignments,
c. Agency's approach and methodology to execute the work.

7. PRESENTATION ON PROPOSAL

MPMKVVCL, Bhopal may shortlist agencies based on the proposal submitted against EoI. The short-listed agencies may be required to make a presentation before a committee appointed by the Discom on their Approach & Methodology and suggestions for improvement of scope of work.

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