



National Smart Grid Mission  
Ministry of Power  
Government of India



## MODEL REQUEST FOR PROPOSAL (RfP)

FOR THE APPOINTMENT OF  
AMI IMPLEMENTATION AGENCY  
FOR  
AMI PROJECTS IN INDIA



National Smart Grid Mission  
Ministry of Power  
Government of India



## MODEL REQUEST FOR PROPOSAL (RfP)

### FOR THE APPOINTMENT OF AMI IMPLEMENTATION AGENCY FOR AMI PROJECTS IN INDIA

#### Volume 1 – General Conditions of Contract

# RFP (Request For Proposal)

[Employer]  
[Employer Address]

[Date]

- A. [Employer] invites interested Companies and/ or Bidding Consortia and/ or any Consortium Member to purchase this Request for Proposal (this “RFP”) to participate in the bidding and selection process for the appointment of AMI Implementation Agency for AMI Project in [Utility] (the “Project”).
- B. This RFP can be downloaded from [website] and e-bidding at [website] on or before [date and time] by meeting the requisite criteria and following the procedure indicated therein.
- C. This RFP consists of two (2) Volumes, wherein the Bidders are expected to inform themselves of the content fully:

Volume-I: General and Commercial Terms

Volume-II: Technical Scope, Functional Requirement and Service Level Agreement

- D. All interested parties are requested to understand this RFP in detail in order to comply with [Employer]’s requirements including but not limited to the fees and deadlines, selection criteria, selection methodology, scope of work, and minimum technical standards.
- E. All interested parties requested to strictly abide by ALL terms prescribed in this RFP and provide accurate information to the best of their knowledge without misleading [Employer] to be considered for participation this Project.
- F. The schedule of this RFP is as follows (all times indicated herein are in IST):

**Event Information**

S. No.	Events	Date	Time
a)	Commencement of downloading of this RFP and e-bidding		
b)	Pre-bid meeting		
c)	Last date for online bidding		
d)	Last date for receipt of RFP		
e)	Technical Bid Opening		
f)	Financial Bid Opening	To be intimated	
[g)	Reverse Auction (if applicable)	To be intimated	]

- G. The nodal person for all inquiries, correspondence and clarifications with respect to this RFP and submission of the Bid shall be:

Name: [redacted]

Designation: [redacted]

Address:

Mobile:

Email:

- H. [Employer] reserves the right to reject any or all offers without assigning any reasons thereof.

Sincerely yours,

[Authorized Signatory]  
[Employer]

## Tender Disclaimer

- A. This RFP is not an agreement. This RFP may not be appropriate for all persons, and it is not possible for [Employer/ Utility] to consider the technical capabilities, investment objectives, financial situation and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in this RFP may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources.
- B. The information given is not an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. [Employer/ Utility] accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.
- C. [Employer/ Utility] or any of its employees, consultants or associates make no representation or warranty and shall have no liability to any person including any Bidder under any law, statute, rules or regulations, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise including the accuracy, adequacy, correctness, completeness or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way in this Bid stage.
- D. [Employer/ Utility] or any of its employees, consultants or associates also accept no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP.
- E. [Employer/ Utility] may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP.
- F. The issue of this RFP does not imply that [Employer/ Utility] is bound to select a Bidder for the Project and [Employer/ Utility] reserves the right to reject all or any of the Bidders or Bids or discontinue or cancel the bidding process without assigning any reason whatsoever.
- G. The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, traveling, food, lodging, expenses associated with any demonstrations or presentations which may be required by [Employer/ Utility] or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and [Employer/ Utility] shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation for submission of the Bid, regardless of the conduct or outcome of the Bidding Process.

## Document Checklist

Sr.	Document	Attached? (Yes/ No)	For Official Use
1.	Tender Fee in the form of Demand Draft.		
2.	Bid Security in the form of Demand Draft or Bank Guarantee as per format prescribed in <b>Annexure 1</b> .		
3.	Covering Letter for Submission of Bid by Lead Consortium Member as per format prescribed in <b>Annexure 3</b> .		
4.	Attested copy of Certificate of Registration/ Incorporation issued by the Registrar of Companies for each Consortium Member		
5.	Attested Copy of the Goods and Services Tax (GST) Registration Certificate of the Lead Consortium Member.		
6.	Attested copy of Provident Fund Code of Lead Consortium Member.		
7.	Attested copy of PAN Card for Lead Consortium Member.		
8.	Certificate of Commencement of Business issued by the Registrar of Companies for Lead Consortium Member.		
9.	<p>In case the Bidder being Indian Company is having collaboration with the Company incorporated outside India (Foreign Company), the Bidder shall in respect of such collaboration submit duly certified/authenticated copies of the following documents:</p> <ul style="list-style-type: none"> <li>• Certificate of Incorporation / Registration Certificate issued by the competent authority under the law in force in the country of its incorporation;</li> <li>• Memorandum and Articles of Association or document constituting the company and regulating its affairs;</li> <li>• List of board of directors or regulating/controlling body;</li> <li>• Address of its place of business in India, if any;</li> <li>• Audited annual financial statements and financial Net-worth for the last three years only of foreign entity;</li> <li>• Complete copy of agreement entered into by the Indian company with the foreign company together with gist of major terms, validity period, demarcation of scope of work, role and responsibilities of each party to the agreement, technical, financial and management aspects of the agreement;</li> <li>• Commitment of the foreign company to continue partnering with agreement and to discharge its role / functions under the agreement till the completion of AMI project including the FMS period, if assigned by <b>[Employer]</b></li> </ul>		

Sr.	Document	Attached? (Yes/ No)	For Official Use
10.	Consortium Agreement Format entered amongst all Members of the Bidding Consortium as per format prescribed in Annexure 4		
11.	Power of Attorney by each Consortium Member in favor of Lead Consortium Member as per format prescribed in Annexure 5		
12.	Power of Attorney by Lead Consortium Member authorizing an Individual Designated Representative for the Consortium as per the format prescribed in Annexure 6.		
13.	Letter of Consent by each Consortium Member reviewing each element of the Bid as per format prescribed in Annexure 7.		
14.	Company Profile document with evidence of fields of competence and office location for each Consortium Member.		
15.	<b>For Meter Manufacturing Technical Experience (Refer Clause 4.3.1.A.1):</b> <ul style="list-style-type: none"> <li>References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion in all respect.</li> <li>A valid registration certificate of manufacturing unit and details of the facility.</li> </ul>		
16.	<b>For Communications Network Experience (Refer Clause 4.3.1.B.1):</b> <ul style="list-style-type: none"> <li>Certificate of Incorporation and Registration certificate along with Memorandum &amp; Articles of Association. Copy of valid Licenses (In case of RF, Valid certificate issued by Wireless Planning &amp; Coordination (WPC) Wing of the Ministry of Communications, GOI)</li> <li>References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion of installation.</li> <li>Certificate from the client on successful implementation of the project</li> <li>Signed agreements/ MoUs for integration of NIC module or Certificate of successful integration</li> </ul>		

Sr.	Document	Attached? (Yes/ No)	For Official Use
17.	<p><b>For System Integration Experience (Refer Clause 4.3.1.C.1):</b></p> <ul style="list-style-type: none"> <li>• References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion of installation.</li> <li>• Certificate from the client on successful implementation and operation of the project.</li> </ul>		
18.	<p><b>For Financial Strength (Refer Clause 4.3.1.D):</b> Audited Annual financial statements, Balance Sheet and P&amp;L Account of all Consortium Members for the respective financial years.</p>		
19.	Record of similar work done by each Consortium Member along with copy of Letter of Award or Work Orders showing the activities carried out with necessary quantities along with contract value and Certificate of Satisfactory Completion from each client per formats prescribed in <b>Annexure 9</b>		
20.	<p><b>For Quality Certification (Refer Clause 4.3.1.A.2, 4.3.1.B.2, 4.3.1.C.2):</b> A valid ISO/ CMMI certificate on or before the date of publication of the tender for all the consortium members.</p>		
21.	Curriculum Vitae of all personnel		
22.	Project Plan as mentioned in Clause 4.14.11.		
23.	Bill of Quantities		
24.	Copy of Volume-I and Volume-II of this RFP with sign and official seal on every page.		

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# 1. Definitions and Abbreviations

## 1.1. Definitions

1. “AMI”	: “Advanced Metering Infrastructure (AMI)” including smart meters means the infrastructure required to enable the Distribution Licensee to accurately collect, monitor and analyse real-time consumption data from consumers, communicate price signals to consumers and where permitted control load
2 “AMI Implementing Agency” or “AMI-IA”	: Same as “Project Implementing Consortium”
3. “AMR”	: “Automated Meter Reading (AMR)” means the infrastructure required to enable the Distribution Licensee to accurately collect consumption data from consumers
4. “Bid(s)”	: The bid submitted by the Bidder(s) in response to this RFP
5. “Bidder(s)”	: Firms including company(es) registered or Consortium of companies/firms bidding in response to this RFP
6. “Bidding Consortium”	: The Consortium of Bidders legally bound as per the terms and formats of this RFP to bid for the Project.
7. “Consortium Member”	: Any Member of the Bidding Consortium other than the Lead Consortium Member.
8. “Contract”	: The Agreement between [Employer] and the Successful Bidder upon receiving the Letter of Award from [Employer] for implementation of the Project.
9. “Contractor”	: Same as “Project Implementing Consortium”
10. “Employer”	: Same as the “Project Management Agency” or PMA
11. “Financial Score”	: The score provided to the successful Qualifying Consortium based on the provisions provided in Clause 5.8 and/ or Clause 4.15.9 (if applicable)
12. “Financial Year” or “FY”	: Period starting from 1 April of the first calendar year to 31 March of the consecutive calendar year.

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13. “ <b>Lead Consortium Member</b> ”	: The Consortium Member taking the lead in submitting this RFP with eligibility, roles and responsibilities outlined in Clause 4.3.2 of this RFP and duly supported by the legal agreements as per formats in this RFP.
14. “ <b>MTS</b> ”	: Minimum Technical Standards as defined in Volume 2 of this RFP.
15. “ <b>Party</b> ” or “ <b>Parties</b> ”	: [Employer/PMA], [Utility], the Bidder, and the Project Implementing Consortium, individually or collectively, respectively.
16. “ <b>Project</b> ”	: [Utility]’s AMI Project defined in Section 3.
17. “ <b>Project Implementing Consortium</b> ” or “ <b>Contractor</b> ” or “ <b>AMI-IA</b> ”	: The Consortium or the Contractor with the highest score of the Evaluated Bid Value appointed by [Employer] upon signing of the Contract subsequent to the Letter of Award.
18. “ <b>Project Management Agency</b> ” or “ <b>PMA</b> ”	: Project Management Agency is a specialized entity, [Provide Name] which has been appointed by [utility] for designing, financing, implementing, operating and transferring the AMI project in its area of operation.
19. “ <b>Request for Proposal</b> ” or “ <b>RFP</b> ”	: This Tender No. [Tender Name and Details] including all its Volumes for Appointment of AMI Implementing Agency (including all clarification/ addendum/ amendment/ corrigendum/ etc. issued from time to time)
20. “ <b>Rupees</b> ” or “ <b>Rs.</b> ” Or “ <b>INR</b> ” or “₹”	: Indian Rupees
21. “ <b>Service(s)</b> ” or “ <b>Related Service(s)</b> ”	: Any service(s) performed or to be performed as a part of the project by the Contractor.
22. “ <b>Smart Meter</b> ”	: Smart meters are composite unit consisting of metrology elements, two way communication module/modules. It has functions such measurement, computation, event capturing, storing, communication and control
23. “ <b>Solution</b> ”	: The system within the Scope of Work of the Project as defined by this RFP, and implemented in its entirety including but not limited to the supply of hardware, transportation, software, installation, integration, testing, commissioning, training operation, maintenance and other services by the Project Implementing Consortium.

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24. “Successful Bidder”	: Successful Qualifying Consortium with the highest score of the Evaluated Bid Value
25. “Technical Score”	: The score provided to the technical evaluation Implementing Consortium based on the provisions provided in Annexure A
26. “Tender”	: Same as “RFP”

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## 1.2. Abbreviations

1. <b>AMI</b>	Advanced Metering Infrastructure
2. <b>AMI-IA/AIA</b>	Advanced Metering Infrastructure - Implementation Agency
3. <b>BG</b>	Bank Guarantee
4. <b>BoM</b>	Bill of Material
5. <b>BoQ</b>	Bill of Quantity
6. <b>C&amp;I</b>	Commercial and Industrial
7. <b>CC</b>	Control Circuit
8. <b>CIM</b>	Common Information Model
9. <b>CMMi</b>	Capability Maturity Model Integration
10. <b>CV</b>	Curriculum Vitae
11. <b>DCU</b>	Data Concentrator Unit
12. <b>DFID</b>	Department for International Development
13. <b>FMS</b>	Facility Management Services
14. <b>FRTU</b>	Field Remote Terminal Unit
15. <b>GPRS</b>	General Packet Radio Service
16. <b>GST</b>	Goods and Services Tax
17. <b>HES</b>	Head-End System
18. <b>IDBI</b>	Industrial Development Bank of India
19. <b>IPR</b>	Intellectual Property Rights
20. <b>ISO</b>	International Organization for Standardization
21. <b>IT</b>	Information Technology
22. <b>MDM</b>	Meter Data Management
23. <b>MTS</b>	Minimum Technical Standards
24. <b>NIC</b>	Network Interface Controller
25. <b>P&amp;L</b>	Profit & Loss
26. <b>PAN</b>	Permanent Account Number
27. <b>PF</b>	Provident Fund
28. <b>PLC</b>	Power Line Communication
29. <b>PMA</b>	Project Management Agency

30. <b>PO</b>	Purchase Order
31. <b>PON</b>	Power Outage Notification
32.. <b>PRN</b>	Power Restoration Notification
33. <b>RF</b>	Radio Frequency
34. <b>RFP</b>	Request for Proposal
35. <b>RTI</b>	Right to Information
36. <b>RTU</b>	Remote Terminal Unit
37. <b>SI</b>	System Integrator OR System Integration
38. <b>SLA</b>	Service Level Agreement
39. <b>WO</b>	Work Order
40. <b>XML</b>	Extensible Markup Language

## 2. Important Dates and Amounts

### Dates

	Date	Time
a) Commencement of downloading of this RFP and e-bidding		
b) Pre-bid meeting		
c) Last date for e-bidding		
d) Last date for receipt of RFP		
e) Bid Opening (if possible)		
f) Evaluation of Technical bid and Opening of Financial Bid		
g) Award of Contract to Project Implementing Consortium		

### Amounts for Bidding

A. Tender Fee to be submitted with the RFP as Demand Draft(Non-Refundable)	:
B. Estimated Cost of RFP	:
C. Bid Security as Demand Draft or Bank Guarantee, valid for a period of 1 year (Refundable)	:
D. Other Payments or Bank Guarantees for the Project Implementing Consortium shall be as per the terms and conditions defined in this RFP	

Note: All payments shall be made in the form of A/C Payee Demand Draft in favour of [Employer] payable at [Place] drawn on:

1. All Nationalized Banks including Public Sector Banks IDBI Bank Ltd.; or
2. Private Sector Banks authorized by RBI to undertake the state government business, i.e. [banks to be specified]

## **3. Introduction**

### **3.1. Background**

[Utility] has appointed [Name of Employer] as the “Project Management Agency (PMA)” or the “Employer” for designing, financing, implementing, operating and transferring the AMI project in its area of operation. PMA will appoint the AMI Implementation Agency (on behalf of [Utility]), finance the project and manage the entire project deployment and its operations. The project will be transferred to the utility at no cost at the end of the project period. The PMA will interface with both the utility and Contractor. As such, the Contractor will be interfaced with the PMA from both project implementation and contractual purposes. The roles and responsibilities of the Contractor and payment thereof are governed by the Terms and Conditions of this RFP.

<The Terms and Conditions of this RFP have been defined considering a large scale implementation of AMI project. It is therefore preferred, that this RFP be applicable for installation size of minimum 10 lakh Smart Meters>

< Instructions for Bidders:

- Note 1: The provisions in angle brackets ( <> ) are for guidance and should be omitted from the RFP before it is issued to prospective Bidders.
- Note II: All project-specific provisions in this RFP have been enclosed in square parenthesis and may be modified, as necessary, before issuing the RFP to prospective Bidders. The square parenthesis should be removed after carrying out the required modification>

### **3.2. About the AMI Project**

[Profile of Utility]

[Profile of Project Implementation Area]

[Coverage of the AMI Project]

### **3.3. About this Request for Proposal**

This Request for Proposal (this “RFP”) is issued by [Employer] on behalf of [Utility] for selecting a Consortium or a Contractor to implement [Utility]’s AMI Project.

This RFP is structured into two Volumes as follows:

**Volume-I: General and Commercial Terms**, which provides the Bidder a brief introduction about the Project as well as [utility/ employer]. The document explains the overall structure of the bid document and general terms and conditions applicable to each Bidder. This document also provides all commercial information to the Bidder, which include instructions to the Bidders, eligibility criteria, tender evaluation methodology, scope of work, general conditions of contract and all relevant formats for bidding.

**Volume-II: Technical Scope, Functional Requirement and Service Level Agreement**, which provides information regarding [utility]’s systems, the detailed functional requirements including minimum technical standards (MTS) to be achieved by the Contractor, as well as the service level agreement (SLA). The payment terms shall also be linked to the performance of the Bidder detailed in this Volume.

## **4. Instruction to Bidders**

### **4.1. General Instructions**

- 4.1.1. All Bidders shall comply with the dates and amounts indicated in Section 2 of this RFP.
- 4.1.2. The Bidders shall comply with and agree to all the provisions of this Section 4 of this RFP for various bidding considerations including but not limited to eligibility, costs, payments, information regarding [utility]'s systems, bid formats, bid submission and other considerations.
- 4.1.3. The Bidders shall be evaluated based on the norms and procedures laid out in Section 5 of this RFP.
- 4.1.4. The Bidders shall be required to undertake and Bid for the Scope of Work for the Project indicated in Volume II of this RFP, which describes the detailed scope.
- 4.1.5. The Functional Requirements to be completed by the Project Implementing Consortium within the Scope of Work is indicated in Section [1.4] of Volume II of this RFP. While, the performance of the Project implemented by the Project Implementing Consortium shall be judged based on the parameters given in Section [4] of Volume II of this RFP.
- 4.1.6. The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the Bid.

### **4.2. General Terms for Bidding**

- 4.2.1. The Bidders who wish to participate in online tenders will have to procure/should have legally valid digital certificate as per Information Technology Act 2000 using which they can sign their electronic bids. Bidders who already have a Digital Certificate need not procure a new Digital Certificate.
- 4.2.2. All bids should be digitally signed. For details regarding digital signature certificate and related training, the Bidder should contact at the following address:

[Name/ Division]  
[Address]  
[Telephone]  
[Email]

- 4.2.3. Bid prepared by the Bidders and all correspondence and documents relating to the Bid exchanged by the Bidder and [Employer] and its associates shall be written in the English language.
- 4.2.4. If for any reason the Bid of any Selected Bidder is rejected or Letter of Intent issued to such Selected Bidder is cancelled, [Employer] is empowered to take decisions for any of the following:

- Consider the next Lowest Evaluated Bid from qualifying Bidders; or
- Annul the bid process; or
- Take any such measure as may be deemed fit in the sole discretion of [Employer], as applicable.

4.2.5. Technical bid submitted by the Bidders before the Bid Submission Deadline, shall become the property of the [Employer] and shall not be returned to the Bidders.

4.2.6. [Employer] may, at its sole discretion, ask for additional information/ document and/ or seek clarifications from a Bidder after the Bid Submission Deadline, inter alia, for the purposes of removal of inconsistencies or infirmities in its Bid. However, no change in the substance of the Financial Bid shall be permitted by the [Employer], unless specifically sought by the [Employer] as per Clause 4.15.9.

4.2.7. Failure by [Employer] to require information from a Bidder that has not been properly provided shall not be construed as waiver on the part of [Employer] of the obligation of the Bidder to furnish the said data / information unless the waiver is in writing.

4.2.8. [Employer] may verify the Bidder's technical and financial data by checking with the Bidder's clients/ lenders/ bankers/ financing institutions/ any other person as necessary.

4.2.9. The Bidders shall satisfy themselves, on receipt of the RFP, that the RFP is complete in all respects. Intimation of any discrepancy shall be given to [Employer]'s nodal person for this RFP immediately. If no intimation is received from any Bidder within ten (10) days from the date of issue of the RFP, then it shall be considered that the issued document, complete in all respects, has been received by the Bidder.

4.2.10. The RFP document includes statements, which reflect the various assumptions arrived at by [Employer] in order to give a reflection of the current status in the RFP. These assumptions may not be entirely relied upon by the Bidders in making their own assessments. The RFP does not purport to contain all the information each Bidder may require and may not be appropriate for all persons. Each Bidder should conduct its own due-diligence/ investigations and analysis and should check the accuracy, reliability and completeness of the information in the RFP and obtain independent advice from appropriate sources.

### **4.3. Eligibility Criteria**

Qualification of Bidder will be based on meeting the minimum eligibility criteria specified below regarding the Bidder's Technical Experience and Financial requirement as demonstrated by the Bidder's responses in the corresponding Bid Schedules. The bid can be submitted by an individual firm or consortium of firms/companies (maximum [3] members; specific requirements for Consortium are given under 4.3.2 below).

The Employer may assess the capacity and capability of the bidder to successfully execute the scope of work covered under this RFP within stipulated completion period. This assessment shall inter-alia include (i) document verification; (ii) bidders work/manufacturing facilities visit; (iii) manufacturing capacity, details of works executed, works in hand, anticipated in future & the balance capacity available for present scope of work; (iv) details of

plant and machinery, manufacturing and testing facilities, manpower and financial resources; (v) details of quality control systems in place; (vi) past experience and performance; (vii) customer feedback; (viii) banker's feedback etc.

#### **4.3.1. Qualifying Requirement**

A Bidder is defined as per definition of bidder at Sr.No.5 of the definitions and abbreviations section.

**Document Indexing:** Bidder will attach an Index of documents submitted with this bid mentioning following details. This index will be used to locate the document easily and correlating correct document with correct QR.

1. QR clause as per RFP.
2. Title of document submitted against each QR.
3. Relevant page number in document.
4. Relevant clause no. in document.

Bidder must meet the following minimum eligibility requirements individually and in case of a consortium, collectively by the members of Consortium, except where specifically mentioned.

<b>A. QR For Meter Manufacturing (In case of a consortium, this requirement has to be met individually by one of the consortium members in its entirety)</b>			
<b>S.No.</b>	<b>Description</b>	<b>Qualifying Criteria</b>	<b>Evaluation Documents Required</b>
1	Technical Experience	<p>a) The Bidder must have</p> <p>1. Manufactured and supplied cumulative of [10,00,000] static electricity meters (including single phase and three-phase) as per relevant IS standards in an Indian Power Distribution Utility in the last [7] years</p> <p>Or</p> <p>2. Manufactured and supplied minimum [10,000] nos. of Meters for AMR (cumulative) with required hardware, software and other associated accessories in an Indian/Global Power Distribution Utility in the last [7] years and such project(s) should have been operational for at least [1] year</p> <p>Or</p> <p>3. Manufactured and supplied minimum [10,000] nos. of Meters for AMI (cumulative) with required hardware, software and</p>	<ul style="list-style-type: none"> <li>• References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion in all respects. (Required for A.1, A.2 and A.3)</li> </ul>

<b>A. QR For Meter Manufacturing (In case of a consortium, this requirement has to be met individually by one of the consortium members in its entirety)</b>			
S.No.	Description	Qualifying Criteria	Evaluation Documents Required
		<p>other associated accessories in an Indian/Global Power Distribution Utility in the last [7] years</p> <p>a) The bidder must have meter manufacturing facility in India including SMT PCB assembly as well as meter assembly and meter testing</p>	<ul style="list-style-type: none"> <li>• A valid registration certificate of manufacturing unit and details of the facility.</li> </ul>
2	Quality Certification	<p>a) The Bidder should be ISO 9001:2008 certified OR Bidder should have CMMI Level 3 (minimum) certification.</p> <p>b) Bidder should have ISO 14001 and OHSAS18001 certifications.</p>	<p>A valid ISO and OHSAS certificate on or before the date of publication of the tender.</p>
<b>B. QR For Communications Network (In case of a consortium, this requirement has to be met individually by one of the consortium members in its entirety)</b>			
S.No.	Description	Qualifying Criteria	Evaluation Documents Required
1.	Technical Experience	<p>a) The bidder should have been in the communications network installation / maintenance services business for the last [3] years in India/ Globally.</p> <p>b) The bidder should have implemented project(s) with at least [10,000] (cumulatively) communication module/endpoints (manufacturing, supply, installation, integration, maintenance &amp; management) involving Radio Frequency (RF) mesh in Licensed frequency band as permitted by WPC or in Unlicensed frequency band/ Power Line Carrier Communication (PLCC) or GPRS/3G/4G or Fiber Optic communication technology or combination of these technologies during the last [7] years in India/ Globally.</p> <p>c) The Bidder must have successfully integrated their NIC/ Communication module with meters of at least 3 manufacturers in India till HES and/or MDMS. (Refer Clause 5.1)</p>	<ul style="list-style-type: none"> <li>• Certificate of Incorporation and Registration certificate along with Memorandum &amp; Articles of Association. Copy of valid Licenses (In case of RF, Valid certificate issued by Wireless Planning &amp; Coordination (WPC) Wing of the Ministry of Communications, GOI)</li> <li>• References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion of installation.</li> <li>• Certificate from the client on successful implementation of the project</li> <li>• Signed agreements/ MoUs for integration of NIC module or Certificate of successful integration</li> </ul>
2	Quality Certification	<p>a) The Bidder should be an ISO 9001:2008 certified or Bidder should</p>	<p>A valid ISO/CMMI certificate on or before the</p>

**B. QR For Communications Network (In case of a consortium, this requirement has to be met individually by one of the consortium members in its entirety)**

S.No.	Description	Qualifying Criteria	Evaluation Documents Required
		have CMMI Level 3 (minimum) certification.  b) Bidder should have ISO 14001 and ISO 27001 certifications.	date of publication of the tender.

- If the bidder opts for communications network of GPRS/3G/4G or further variants, the communication provider need not be part of the consortium and the QR specified above for Communications Network would not be applicable. For evaluating the technical score for such bidder, the scoring would be divided proportionally to remaining parameters as defined in **Annexure A**.

**C. QR For System Integration (In case of a consortium, this requirement has to be met individually by one of the consortium members in its entirety)**

S.No.	Description	Qualifying Criteria	Evaluation Documents Required
1	Technical Experience	a) The Bidder must have experience of integration of head-end system with MDM on standard interfaces and data exchange models (CIM/XML) for at least [10,000] consumers (cumulatively) in an Indian/Global Utility (Power/ Water/ Gas/ Telecom) in the last [5] years.  b) The Bidder should have supplied, installed, tested and commissioned Control Centre hardware and application software for at least [10,000] end points (cumulatively) in an Indian/Global Utility (Power/ Water/ Gas/ Telecom) in last Seven (7) years which are in successful operation for at least One (1) year	<ul style="list-style-type: none"> <li>References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion of installation.</li> <li>Certificate from the client on successful implementation and operation of the project.</li> </ul>
2	Quality Certification	a) The Bidder should be an ISO 9001:2008 certified. b) Bidder should have CMMI Level 3 (minimum) certification. c) Bidder should have ISO 14001 and ISO 27001 certifications	A valid ISO/CMMI certificate on or before the date of publication of the tender.

**D. QR - Financial Criteria**

S.No.	Description	Qualifying Criteria	Evaluation Documents Required
1	Financial Requirement	a) Net Worth for the best three years out of last five financial years should be positive. Net worth means sum total of the paid up capital and free	Audited Annual financial statements, Balance Sheet and P&L Account for the respective financial years.

D. QR - Financial Criteria			
S.No.	Description	Qualifying Criteria	Evaluation Documents Required
		<p>reserves (excluding reserves created out of revaluation) reduced by aggregate value of accumulated losses (including debit balance in profit and loss account for current year) and intangible assets.</p> <p>b) Minimum Average Annual Turnover (MAAT) of the bidder for the best three years out of last five financial years should not be less than INR [X] Cr. MAAT means annual total income as incorporated in the profit &amp; loss account except non-recurring income e.g. sale of fixed assets.</p>	

- The company wise applicability of the qualifying requirement referred to in clause 4.3.1 is provided below:

Type of Company	Permissible Qualifying Requirement
Parent Company	Self and/or it's Wholly/ Majority Owned Subsidiary Company
Wholly/ Majority Owned Subsidiary Company	Self and/or its Parent Company
Minority Owned Subsidiary Company	Self only

- In case Bidder does not manufacture or produce any major equipment or component of the overall Solution to be provided as the Scope of Work, then the Bidder is required to submit the Manufacturer's /OEM's Authorization stating the required support from the Manufacturer/OEM with respect to supply, support, etc for a period of seven years from the date of operational acceptance of the system by the [Employer/ Utility].
- Basis the Public Procurement Policy for Micro and Small Enterprises (MSEs) Order by GoI dated March 23, 2012, it has been decided to give opportunity to Micro & Small Enterprises (MSEs) registered with National Small Industries Corporation (NSIC) (under Single Point Registration Scheme) through NSIC-Consortium route. In light of this, the Bidder shall source meters (as bought out) or downstream components of the meters from MSEs of value greater than or equal to 20% of the metering component of the contract price<sup>1</sup>. Out of this requirement of minimum 20% procurement from MSEs, 4% is earmarked for units owned by Schedule Caste /Schedule Tribes.
- For startup firms, gazette notification dated 17 Feb 2016, G.S.R. 180(E) and policy circular No. 1(2)(1)/2016-MA dated 10 March 2016, and the subsequently issued guidelines shall be considered for waiving off respective qualifying requirements for sourcing of meters subject to mandatorily meeting quality and technical specifications as specified in Volume-1 and Volume-2 of this RFP.

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<sup>1</sup> The Bidder shall provide details of meter procurement from MSEs in the BoQ in the format prescribed in Annexure 10 and 11.

- In case Smart Meters are imported by the bidder, then the bidder shall ensure that minimum 30% of Smart Meter supply shall be from its Indian manufacturing/ assembly unit.
- To be eligible for the tender for appointment of AMI implementation agency, the Bidder (or any of its consortium member) shall not have 5 (five) or more AMI projects / 20 Lakhs meters in India which are outstanding to be installed on the bid due date for submission.

#### **4.3.2. Consortium Bids**

4.3.2.1. In case a bid is submitted by a consortium of two or more firms/ companies (No. of members shall not be more than [3]) as consortium members, the members of consortium shall meet the following requirements:

- All the members of the consortium shall meet individually the financial requirement criteria given at 4.3.1.D.1 (a) above.
- The Lead Consortium Member shall meet not less than 50% of the minimum financial requirement criteria given at clause no. 4.3.1.D.1 (b) above.
- Each of the other Consortium Member(s) individually shall meet not less than [25%] of the minimum financial requirement criteria given at clause no. 4.3.1.D.1 (b) above.

In case of consortium, the following conditions shall also apply:

4.3.2.2. A consortium (the “Bidding Consortium”) shall be considered bidder provided that one of the members of the consortium shall be nominated as being in-charge (the “Lead Consortium Member”) and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the members.

4.3.2.3. In case the Bidder being Indian Company is having collaboration with the Company incorporated outside India (Foreign Company), the Bidder shall in respect of such collaboration submit duly certified/authenticated copies of the following documents:

- Certificate of Incorporation / Registration Certificate issued by the competent authority under the law in force in the country of its incorporation;
- Memorandum and Articles of Association or document constituting the company and regulating its affairs;
- List of board of directors or regulating/controlling body;
- Address of its place of business in India, if any;
- Audited annual financial statements and financial Net-worth for the last three years only of foreign entity;
- Complete copy of agreement entered into by the Indian company with the foreign company together with gist of major terms, validity period, demarcation of scope of work, role and responsibilities of each party to the agreement, technical, financial and management aspects of the agreement;
- Commitment of the foreign company to continue partnering with agreement and to discharge its role / functions under the agreement till the completion of AMI project including the FMS period, if assigned by [Employer]
- Any other papers or documents required by [Employer] at a later stage or in future.

- 4.3.2.4. The Lead Consortium Member shall submit the Bid to [Employer] and shall be liable towards fulfilling the obligations in this RFP.
- 4.3.2.5. The Lead Consortium Member shall have a valid Goods and Services Tax Registration Number, Provident Fund (PF) Code and Permanent Account Number (PAN) for the Republic of India.
- 4.3.2.6. The Lead Consortium Member shall designate and authorize one person to represent the Bidding Consortium in its dealings with [Employer] through a Power of Attorney as per Annexure 6 to perform all tasks including, but not limited to, providing information, responding to inquiries, signing of Bid on behalf of the Consortiums, etc.
- 4.3.2.7. Each member of the consortium shall have a registered office (under the Companies Act 1956 with Registrar of Companies) and operations in India.
- 4.3.2.8. Every Consortium Member shall provide consent to the Lead Consortium Member and make itself aware of all the proceedings of the bidding process and Project implementation through legally enforceable consortium agreement, power of attorneys, legal undertakings, etc. entered amongst all members of that Bidding Consortium including but not limited to those as prescribed in Annexure 4, Annexure 5 and Annexure 7. In the absence of duly executed formats, the Bid shall not be considered for evaluation and will be rejected.
- 4.3.2.9. The Bidder / member of consortium should not be blacklisted/barred by any Govt. Organization or Regulatory Agencies or Govt. Undertaking. Bidder should submit a self- undertaking signed by its Authorized Signatories for the same as per the format prescribed in Annexure 3.
- 4.3.2.10. The Lead Consortium Member shall submit the Bid after legitimately paying the purchase fees for the RFP, and submission of the Tender Fees and Bid Security as per the various terms, schedules and formats prescribed in this RFP.
- 4.3.2.11. The bid, and in case of successful bid the specified Form of Agreement, shall be signed so as to be legally binding on all consortium members (as per enclosed format in bidding document).
- 4.3.2.12. The Lead Consortium Member shall be authorized to incur liabilities and receive instructions for and on behalf of any and all members of the consortium, and the entire execution of the Contract shall be done with the Lead Consortium Member and payment under the contract shall be received by the Lead Consortium Member on behalf of the consortium as per power conferred to him in the Power of Attorney.
- 4.3.2.13. The Lead Consortium Member shall be liable for the entire contract in accordance with the contract terms, while other Consortium Members shall be liable severally for their portion of Work. The statement to this effect shall be provided along with RFP submissions including the Bid Form and Contract (in case of successful bid).

#### **4.4. Cost of Bidding**

4.4.1. The Bidder shall bear all costs associated with the preparation and submission of this Bid including post-bid discussions, technical and other presentations etc., and [Employer] shall in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

#### **4.5. Payment of Fees by Bidders**

4.5.1. Note: All payments shall be made in the form of A/C Payee Demand Draft in favour of [Employer] payable at [Place] drawn on:

- All Nationalized Banks including Public Sector Banks, IDBI Bank Ltd.; or
- Private Sector Banks authorized by RBI to undertake the state government business, i.e. [Name of banks to be specified]

4.5.2. All Bank Guarantees shall be provided by the Bidder/Lead Consortium Member in the format prescribed in **Annexure 1**.

4.5.3. Any Bid not accompanied by a substantially responsive Bid Security in accordance with **Annexure 1** shall be rejected by [Employer] as non-responsive,

4.5.4. The Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the signing of the contract with the Project Implementing Consortium.

4.5.5. The Bid Security of the Project Implementing Consortium shall be returned as promptly as possible once the Project Implementing Consortium has furnished the required Performance Security and signed the contract with [Employer].

4.5.6. The Bid Security may be forfeited if:

- The Bidder withdraws its Bid during the period of bid validity as specified in Clause 4.17.
- the selected Bidder:
  - fails to signs the Contract in accordance with **Annexure 12**; or
  - fails to furnish a Performance Security in accordance with Clause 5.10; or
  - fails to accept the correction of its Bid price pursuant to Clause 5.6; or
  - is found to have submitted false particulars/ fake documents; or
  - refuses to execute the work at his agreed scope/quoted rates, after [Employer] issues the Letter of Award;
  - is involved in incidents of manipulation of rates by cartelization.

4.5.7. The cost of all stamp duties payable for executing the RFP, Bid Documents or Project shall be borne by the relevant Lead Consortium Member.

4.5.8. No interest shall be paid to the Bidder on any amount submitted to [Employer], whether to be returned or not.

#### **4.6. Bidders to Inform Itself Fully**

4.6.1. The Bidder shall make independent enquiry and satisfy itself with respect to all the

required information, inputs, conditions (including site conditions) and circumstances and factors that may have any effect on its Bid. Once the Bidder has submitted the Bid, the Bidder shall be deemed to have examined the laws and regulations in force, and fixed its price taking into account all such relevant conditions and also the risks, contingencies and other circumstances which may influence or affect the services performed within the scope of work, as provided in this RFP. Accordingly, the Bidder acknowledges that, on being selected as Project Implementing Consortium, it shall not be relieved from any of its obligations under the RFP Documents nor shall be entitled to any extension of time for commencement of supply or financial compensation for any reason whatsoever.

- 4.6.2. The Bidders should particularly acquaint themselves with the technical requirements of [Utility]'s systems, operations, assets, equipment, statutory codes and standards.
- 4.6.3. The Bidder shall familiarize itself with the procedures and time frames required to obtain all Consents, Clearances and Permits required for implementation of the Project. [Employer and Utility] shall have no liability to obtain any of the Consents, Clearances and Permits required for setting up the Project other than those covered under [Employer / Utility]'s conventional business.

## **4.7. Compliance**

- 4.7.1. Any Consortium Member, Company, or its Subsidiary or its Affiliates shall participate as a Member of not more than two Consortium bids. No Consortium Member, Company, its Subsidiary or its Affiliates shall, directly or indirectly, become a party to submission of not more than [two] Bids. However, a lead consortium member or an individual Bidder shall not bid with any other consortium.
- 4.7.2. Notwithstanding anything stated above, [Employer] reserves the right to verify the authenticity of the documents submitted for meeting the Eligibility Criteria and may request for any additional information/ documents. [Employer] reserves the right at its sole discretion to contact the Bidder's bank, lenders, financing institutions and any other persons as necessary to verify the Bidder's information/documents for the purpose of qualification.
- 4.7.3. If at any stage of the bidding or Project execution process, any order/ ruling is found to have been passed in the last 1 (one) year preceding the Bid Submission Deadline by a competent Court of Law against or any appropriate Commission against any Consortium Members or its Affiliates for its material breach of any contract, then Bids from such Bidders shall be liable to be rejected in totality. All Bidders shall confirm in accordance to Annexure 3 that no such order(s)/ ruling(s) have been passed by a competent Court of Law or an appropriate Commission against it or its Subsidiary or its Affiliates. In case of any such order/ ruling, it is the duty of the Bidder to inform [Employer] for the same.
- 4.7.4. Any removal/ change/ replacement of manpower shall be notified to [Employer] within 7 (seven) calendar days along with the Curriculum Vitae of the personnel replacing the previous personnel.
- 4.7.5. If the Bid Security from any Bidder is forfeited or lapsed either partly or wholly during the

Bid process, then such Bidders and Consortia are liable for rejection.

- 4.7.6. Qualified Bidders and Project Implementing agency shall continue to maintain compliance with the Eligibility Criteria throughout the bidding process and project implementation period, respectively as the case may be. Failure to comply with the aforesaid provisions shall make the Bid and the Contract liable for rejection at any stage of the Project.
- 4.7.7. The Lead Consortium Member shall be the point of contact for the Consortium during the Bid process before award of the project to the Project Implementing Consortium, and [Employer] shall communicate directly to the contact person appointed through the Power of Attorney as per Clause 4.14.7. Settlement of any dispute amongst the Consortium Members shall not be the responsibility of [Employer], and [Employer] shall not bear any liability whatsoever in this account.
- 4.7.8. The Bidder shall include in its bid details of all major items of supply or services that it proposes to purchase or sublet, and shall give details of the name and nationality of the proposed Subcontractor, including vendors, for each of those items. Bidders are free to list more than one Subcontractor against each item of the facilities.
- 4.7.9. [Employer] reserves the right to remove any proposed subcontractor of the Bidder prior to award of any work related to either the Bidding or Project, or during the work, without assigning any reason thereof.

## **4.8. Study of [Utility]'s Existing Systems**

- 4.8.1. A standard brief regarding detail of existing systems relevant to the AMI project, as contained in the DPR of project, shall be provided by the utility. However, All Bidders are advised to visit and examine the site and existing Data Centre facilities where the facilities are to be installed and its surrounding, and obtain for itself, on its own responsibility and cost, all information that may necessary for preparing the Bid and entering into a contract for supply and installation of the facilities. The cost of visiting the site shall be at the bidder's own expense.
- 4.8.2. The Bidder and any of its personnel or agents will be granted permission, through the assistance of the [Employer], by the [utility] to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the bidder, its personnel and agents will release and indemnify the [Employer and Utility] and its personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of/or damage to property and any other loss, damage, costs and expenses incurred as a result of the inspection.

## **4.9. Clarifications**

- 4.9.1. Bidders, may seek clarifications on this RFP in writing, through a letter, fax or email to reach [Employer] no later than [15 (Fifteen)] calendar days prior to the Bid Submission Deadline.
- 4.9.2. [Employer] may issue clarification only, at its sole discretion, which is considered

reasonable by it.

- 4.9.3. Any such clarifications issued shall be sent to all the Bidders to whom the RFP has been issued.
- 4.9.4. [Employer] is not under any obligation to entertain/ respond to suggestions made or to incorporate modifications sought for.
- 4.9.5. For the avoidance of any doubt, it is hereby clarified that there shall be no extension in the Bid Submission Deadline on account of clarifications sought in accordance to Clause 4.9.4.

#### **4.10. Pre-Bid Meeting**

- 4.10.1. The Bidder's designated representative(s) is/are invited to attend a pre-bid meeting, which shall take place at the time stipulated in Section 2 of Volume I of this RFP at: [Address]
- 4.10.2. The purpose of the meeting will be to clarify any issues regarding this RFP in general and the Scope of Work in particular.
- 4.10.3. The Bidder shall submit any question or query to [Employer] in writing, to reach [Employer] not later than one week before the meeting in the format given in Annexure 2. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted as indicated hereafter.
- 4.10.4. Minutes of the meeting, including the text of the questions raised and the responses given, together with any responses prepared after the meeting, will be transmitted without delay to all purchasers of the RFP.
- 4.10.5. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

#### **4.11. Amendments to RFP**

- 4.11.1. During the bidding process, [Employer], for any reason may modify the RFP, including the timelines, by issuance of addendum / modification / errata and / or a revised document.
- 4.11.2. Revisions or amendments in the bidding guidelines may cause [Employer] to modify amend or supplement the RFP to be in conformance with any applicable Law. Such document shall be notified in writing through a letter or fax or e-mail to all the entities to which the RFP has been issued and shall be binding on them.
- 4.11.3. [Employer] shall not be responsible for any delay in receipt of the addendum/ modification/ errata and/ or revised document and receipt of the same by the Bidders shall be presumed by [Employer] upon taking all reasonable steps to notify the Bidders. Late receipt of any addendum/ modification/ errata and/ or revised document will not relieve the Bidder from being bound by that modification or the Bid Submission Deadline. All such amendments/modifications shall be issued at least seven (7) days

prior to the Bid Submission Deadline.

- 4.11.4. In order to provide reasonable time to the Bidders to take the modification into account in preparing their Bid, or for any other reasons, [Employer] may, at its discretion, extend the deadline/ timeline for Bid submission.

#### **4.12. Method of Submission of Bid**

- 4.12.1. Both Technical and Price Bids shall be submitted electronically at [e-procurement website] or before the Bid Submission Deadline following the instructions therein. Documents shall be scanned and uploaded wherever required, while some data shall be entered manually.
- 4.12.2. Bidders may prepare, edit, substitute or withdraw their offers any number of times online before the Bid Submission Deadline. After the Bid Submission Deadline, the Bidder shall not, or attempt to, change or withdraw the Bid under any circumstances. No written or online request in this regard shall be granted.
- 4.12.3. In addition to the electronic submission, the Bidder shall also provide [X] no. of hard copy(ies) of the original/revised(if any) Technical Bid to [Employer] in a sealed envelope before the Bid Submission Deadline at [Address].
- 4.12.4. The hard copy of the Technical Bid shall be sent to [Employer] via Registered Post with Acknowledgement Due (RPAD), speed post or courier [specify courier names] which should reach [Employer] before the Bid Submission Deadline. Whereas hand delivery is also accepted.
- 4.12.5. The sealed envelope shall contain hard copies of all original and/ or attested documents submitted in the physical submission of the Technical Bid. The separate sealed envelope shall also contain the requisite hard copies of the Tender Fee and Bid Security.
- 4.12.6. The sealed envelope shall be clearly marked on the top as “[Tender Name and Details].” The sealed envelope shall be addressed to the [Employer]. The sealed envelope shall also clearly mention the name of the Lead Consortium Member submitting the Bid.
- 4.12.7. The sealed envelope shall not contain the Financial Bid. The Financial Bid shall only be submitted electronically.
- 4.12.8. In case of discrepancy between the electronically submitted documents and the physically submitted documents in the sealed envelope, the electronically submitted documents and the information contained therein shall prevail and be treated as the final submission.
- 4.12.9. Insufficiency of the electronically submitted Bid shall not be compensated by any information, documentation or material provided additionally in the physically submitted documents in the sealed envelope

#### **4.13. Bid Formats**

- 4.13.1. The information and documents shall be submitted by the Bidders as per the guidelines, formats, schedules, fees, and other specification in this Section, as well as this RFP in general.
- 4.13.2. Strict adherence to the formats, wherever specified, is required. Wherever information has been sought in specified formats, the Bidder shall refrain from referring to brochures or pamphlets. Non-adherence to formats and/ or submission of incomplete information may be a ground for declaring the Bid as non-responsive. Each format has to be duly signed and stamped by the authorized signatory of the Bidder.
- 4.13.3. The Lead Consortium Member shall submit the Bid in compliance with the Eligibility Criteria and formats provided in this RFP.

#### **4.14. Technical Bid**

- 4.14.1. The Technical Bid shall contain a covering letter by the Lead Consortium Member duly designated and signed by all Members of that Bidding Consortium as per the format prescribed in **Annexure 3**.
- 4.14.2. The Technical Bid shall contain a legally enforceable Consortium Agreement ( in case of bidder is consortium) entered amongst all Members of that Bidding Consortium, designating one of the Members to be the Lead Consortium Member as per the format prescribed in **Annexure 4**. In the absence of a duly executed Consortium Agreement, the Bid shall not be considered for evaluation and will be rejected.
- 4.14.3. In case of a sole company approaching as a Bidder, the Consortium Agreement shall not be required.
- 4.14.4. The Technical Bid shall contain Power of Attorney from each Consortium Member in favor of the Lead Consortium Member as per the format prescribed in **Annexure 5**.
- 4.14.5. In case any Consortium Member is a foreign entity, then it may submit a Board resolution/ Power of Attorney/authorization, which should satisfactorily and unambiguously encompass all the terms and conditions of the Power of Attorney prescribed in **Annexure 5**.
- 4.14.6. Provided further that such Board resolutions/Power of Attorney/authorization, as specified above, in case of a foreign entity, shall be supported by an unqualified opinion issued by the legal counsel of such foreign entity, stating that the Board resolutions are in compliance with the applicable laws of the respective jurisdictions of the issuing company and the authorizations granted therein are true and valid. In the case of a foreign entity, in the event, any and/or all of the documents/resolutions are in any other language other than English, then a duly notarized copy of such translation shall also be required to be submitted
- 4.14.7. The Lead Consortium Member shall designate one person to represent the Bidding Consortium in its dealings with **[Employer]**. The person designated by the Lead

Consortium Member shall be authorized through a Power of Attorney as per Annexure 6 to perform all tasks including, but not limited to, providing information, responding to inquiries, signing of Bid on behalf of the Consortiums, etc. and attach the same in the Technical Bid.

4.14.8. The Technical Bid shall contain signed Letter of Consent as per Annexure 7 from each Consortium Member that the Bid has been reviewed and each element of the Bid is agreed to by them including but not limited to any commitment in the Project.

4.14.9. Tender Fees and Bid Security as prescribed in Section 2 as per the format prescribed in Annexure 1.

4.14.10. All documents required to prove/ substantiate the Eligibility of the Bidders and Bidding Consortium as required in Eligibility Criteria Clause 4.3. including:

- Company Profile document with evidence of fields of competence for each Consortium Member.
- Attested copy of Certificate of Registration/ Incorporation issued by the Registrar of Companies for each Consortium Member.
- Copy of the Goods and Services Tax (GST) Registration Certificate of the Lead Consortium Member.
- Provident Fund (PF) Certificate indicating PF Code of the Lead Consortium Member.
- Copy of Permanent Account Number (PAN) Card of the Lead Consortium Member.
- Certificate of Commencement of Business issued by the Registrar of Companies for Lead Consortium Member clearly indicating the number of years of operation

4.14.11. The Bidder shall provide a clear and concise Project Plan covering the following topics as a part of the Technical Bid:

- Understanding of [Employer] and its requirement with respect to project implementation;
- Details of proposed methodology;
- Project team structure ;
- Resource planning and estimation;
- Risk planning; and
- Detailed work plan and timelines along with clear mention of deliverables

4.14.12. The Technical Bid of the Bidder shall contain the detailed bill of quantities (BoQ) in the format prescribed in Annexure 10 that should commensurate with the Financial Bid without any mention of costs/ prices.

4.14.13. The BoQ shall be accompanied by the make, model, detailed specifications, literature, drawings, etc. of the supply in the Technical Bid demonstrating substantial responsiveness of the quoted Solution.

4.14.14. Alternative (alternate technology/architecture/design/functionality or proposals with multiple options) Bids shall be rejected.

#### **4.15. Financial Bid**

- 4.15.1. The Financial Bid shall only be submitted electronically as per the format prescribed in Annexure 11. No hard copy of the Financial Bid shall be submitted.
- 4.15.2. The Financial Bid shall clearly indicate the cost of all hardware, software, services, operation, maintenance, recurring costs, taxes, duties, levies, cess and all other costs that contribute to the installation, operation and maintenance of the Project. Price quoted should clearly mention the basic cost/ unit price, Goods and Service Tax (GST) and any other taxes/duties/levies. For any other taxes/duties/levies please specify the nature and rate of tax with proof. The rate of claimed taxes shall be mention by the bidder with the un-priced BoQ in submission of the technical bid. The Financial Bid will be evaluated basis total cost inclusive of all taxes/duties/levies.
- 4.15.3. The heads indicated in the BoQ of the financial bid is indicative. The Bidder shall add additional heads of equipment, services, etc. as deemed necessary by the Bidder in the Financial Bid.
- 4.15.4. The Bidder shall quote the charges for Facility Management Services (FMS). However these charges will be applicable only after the Operational Acceptance testing. Any link charges before the operation acceptance test shall be in the Bidder's scope.
- 4.15.5. Unit prices (exclusive of all taxes/duties/levies/cess etc.) quoted by the Bidder shall be firm and final, and shall remain constant throughout the period of execution of the Project and any subsequent contracts, and shall not be subject to any upward modifications.
- 4.15.6. Any items or prices omitted by the Bidder, if incurred at a later stage by the Bidder, within the scope of work as provided in this RFP, shall be borne by the Bidder with no financial liability on [Employer].
- 4.15.7. Any additional item beyond the Scope of Work required for expansions during the execution period of the Project shall be supplied by the Project Implementing Agency keeping the specifications and unit price same as per the BoQ and Financial Bid, respectively.
- 4.15.8. All prices in the Financial Bid shall be quoted in Indian Rupees. The Bidder shall bear the risk and absorb all costs related to foreign exchange variations during the execution of the Project. The variation in the statutory taxes will be borne by the [Employer] as mentioned in clause 6.20.
- 4.15.9. *Reverse Auction:* [Employer] reserves the right to conduct the reverse auction (if required) for the products/ services being asked in the tender. The terms and conditions for such reverse auction event shall be as per the Acceptance Form attached as Annexure - B of this document. The bidders shall mandatorily submit a duly signed copy of the Acceptance Form along with the tender document as a token of acceptance.
- 4.15.10. Alternative (alternate technology/architecture/design/functionality or proposals with multiple options) Bids shall be rejected.

#### **4.16. Bid Submission Deadline**

- 4.16.1. All Bids shall be electronically submitted and physically received by [Employer] no later than the Bid Submission Deadline indicated in Section 2 of this RFP.
- 4.16.2. Any bid received by [Employer] after the Bid Submission Deadline prescribed by [Employer] shall be rejected and returned unopened to the Bidder.
- 4.16.3. [Employer] may, at its discretion, extend this Bid Submission Deadline by amending the RFP at any time prior to opening of the Bids, in which case all rights and obligations of [Employer] and the Bidders shall thereafter be subject to the deadline as extended.

#### **4.17. Bid Validity**

- 4.17.1. The offer submitted in the Bid by the Bidder(s) shall be valid for a period of 6 Months from the submission of the Bid. The bid security shall be valid for [90] days beyond the end of validity period of the bid. This shall also apply if the period of the bid validity is extended.
- 4.17.2. All such offers, and terms and conditions set forth in this RFP shall be valid for the Project Implementing Consortium till the successful completion of the Project as certified by [Employer].
- 4.17.3. In exceptional circumstance, [Employer] may solicit the Bidder's consent to an extension of the bid validity period. The request and responses thereto shall be made in writing or by email. If a Bidder accepts to prolong the period of validity, the Bid Security shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request will not be required or permitted to modify its Bid.

## **5. Tender Evaluation Methodology**

### **5.1. Overview Bid Evaluation Process**

The Bidding process is designed to select the Project Implementing Agency through a series of technical parameters, giving certain weightage to the technical performance parameters in addition to the financial amounts quoted by the Bidder/ ( or Price discovered through the Reverse Auction process).

The Bid submitted by the Bidder shall consist of a Technical Bid and a Financial Bid. The Technical Bid shall be submitted as a hard and soft copy to [Employer], while the Financial Bid shall only be submitted electronically.

#### **First Stage-Fulfilment of Eligibility Criteria:**

The Technical Bids shall be opened by [Employer] and be checked for fulfilment of the Eligibility Criteria of the Bidder or Bidding Consortium.

**Second Stage-Technical Evaluation for Project Implementing Agency:** The Technical Bids of all Bidders qualifying the Eligibility Criteria shall be scored based on the criteria including but not limited to volume, reliability and timely delivery of similar work done, as outlined in Clause 4.3.1. The bidders scoring more than [60] marks out of 100 as described in technical bid evaluation (**Annexure A**) shall qualify for the next stage of evaluation. The evaluated technical scores will also be communicated to the Bidders.

**Third Stage-Opening of Financial Bid:** Financial Bids would be opened as per Clause 4.15 and 5.8, [and the Bidder would be asked to participate in the Reverse Auction process]. Basis this, Financial Scores shall be determined.

#### **Fourth Stage-Award of Project:**

<If award of the project is as per Lowest Bidder (L1) Selection, the following shall be added>  
The Qualifying Bidder with the highest evaluated financial bid score out of the Evaluated Bids (the “Successful Bidder”) shall be awarded the Project at the Quoted Price in the Financial Bid

<If award of the project is as per Reverse Auction, the following clause shall be followed>  
The Qualifying Bidder with the highest Financial Score out of the Evaluated Bids (the “Successful Bidder”) shall be awarded the Project at the Price discovered through the Reverse Auction process.

### **5.2. Opening of Technical Bids**

The Technical Bids shall be opened in presence of all the Bidders and their representatives at the date and time indicated in Section 2 of this RFP at [address].

The physical submission of the Technical Bids in the sealed envelope shall be opened simultaneously to check for the tender fees and the Bid Security.

The Bids shall be deemed to be under consideration immediately after they are opened and confirmation or receipt of the Tender Fee and Bid Security, and until an official intimation of award or rejection is made by [Employer] to the Bidders.

[Employer] shall then separately evaluate the Bids with respect to the Eligible Criteria, sufficiency of the submission, as well as other parameters outlined in this RFP.

### **5.3. Confidentiality**

Information relating to the examination, evaluation, comparison and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process.

Any attempt by a Bidder to influence [Employer] in the examination, evaluation, comparison, and post qualification of the Bids or Contract award decisions may result in the rejection of its Bid.

If any Bidder, from the time of opening the Technical Bids to the time of Contract award, wishes to contact [Employer] on any matter related to the bidding process, it should do so in writing.

### **5.4. Clarification**

To assist in the examination, evaluation, comparison and post-qualification of the Bids, [Employer] may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by [Employer] shall not be considered. [Employer]'s request for clarification and the response shall be in writing. No change in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by [Employer] in the evaluation of the Financial Bids.

### **5.5. Responsiveness of Technical Bid**

[Employer]'s determination of the responsiveness of a Technical Proposal is to be based on the contents of the Technical Proposal itself.

A responsive Technical Proposal is one that conforms to all the mandatory requirements, terms, conditions, and specifications of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:

- does not meet all the Minimum Technical Specifications; or
- affects the scope, quality, or performance of the Solution; or
- limits or is inconsistent with the RFP, the [Employer]'s rights or the Bidder's obligations;
- if rectified would unfairly affect the competitive position of other Bidders presenting responsive Technical Proposals  
or
- fails to successfully demonstrate their interoperability solution.

Only “non-material deviations” (which means only those deviations that do not qualify as material deviations as defined above) will be considered by the [Employer]. Please describe all the non-material deviations in the technical proposal.

If bidder desires to take any non-material deviation from the terms & conditions of the tender, it should be mentioned specifically in the deviation sheet as per the format prescribed in Annexure C. Unless such deviations are mentioned in this deviation sheet, the same will not be taken into consideration.

Except aforesaid deviations, the entire order, if placed, shall be executed in accordance with Specifications and any other conditions, variations/deviations etc. if found, elsewhere in this proposal should not be given any consideration while finalizing the tender. [Employer] reserves the right to accept or reject the deviation mentioned on deviation sheet proposed by the bidder.

## 5.6. Non-Conformities, Errors and Omissions

Provided that a Technical Bid is responsive, [Employer] may waive any non-conformity or omission in the Bid that does not constitute a material deviation.

Provided that a Technical Bid is responsive, [Employer] may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial, nonconformities or omissions in the Technical Bid related to documentation requirements. Such omission shall not be related to any aspect of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

Provided that the Technical Bid is responsive, [Employer] will correct arithmetical errors during evaluation of Price Proposals on the following basis:

- i. if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of [Employer] there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected;
- ii. if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected;
- iii. if there is a discrepancy between words and figures, the amount in words shall prevail. However, where the amount expressed in words is related to an arithmetic error, the amount in figures shall prevail subject to (i) and (ii) above.
- iv. Except as provided in (i) to (iii) herein above, [Employer] shall reject the Financial Bid if the same contains any other computational or arithmetic discrepancy or error.

If the Bidder that submitted the Lowest Evaluated Bid does not accept the correction of errors, its Bid shall be disqualified and its Bid Security shall be forfeited.

## 5.7. Evaluation of Technical Bid

All Bids will first be evaluated with respect to the Eligibility Criteria given in Clause 4.3.1.

All Bids successfully fulfilling the Eligibility Criteria shall be scored based on the parameters as per Annexure A.

The Bidders are informed that scores shall be credited only upon satisfactory submission of the necessary documents and certificates provided by clients of the Bidders as per Clause 4.3.1 and 4.14.10.

## **5.8. Opening of Financial Bid**

At the completion of the technical evaluation, [Employer] shall intimate the successful Implementing Consortia for opening of Financial Bids of the Qualifying Consortia.

The Financial Bids shall be opened in the presence of authorized representatives of all technically qualified consortia at the date and time indicated in Section 2 of this RFP at [address]. [The Bidders may be asked to participate in the Reverse Auction process, if undertaken, as per the Terms and Conditions provided in Annexure B.]

The [Quoted Price/ Price discovered through the Reverse Auction process] of all successful Qualifying Consortia shall be evaluated (basis commercial evaluation methodology as provided in Annexure A) and consequently a Financial Score (the “Financial Score”) shall be provided to the successful Qualifying Consortia.

<For reverse auction, the following clause shall be added>

The successful Qualifying Consortia with the highest Financial Score shall be the Successful Bidder and shall be awarded the Project at the Discovered Price in the Financial Bid

<For L1 Based Selection, the following clause shall be added>

The successful Qualifying Consortia with the highest Evaluated Bid Score shall be the Successful Bidder.

## **5.9. Award of Contract**

[Employer] shall present the Letter of Award to the Successful Bidder and invite the Performance Security in order to sign a Contract (the “Contract”) to implement the Project.

At the time the Contract is awarded, the quantity indicated in the BoQ of the Financial Bid shall not be modified. However, [Employer] reserves the right to increase or decrease the number of items under this contract subject to the limit of [X]% of the existing number of items, covered under the Contract, without any change in the unit prices or other terms and conditions of the RFP and the Bid.

Prior to the expiration of the period of Bid validity, [Employer] shall notify the successful Bidder, in writing, that its Bid has been accepted.

Until a formal Contract is prepared and executed, the notification of award shall constitute a binding Contract.

Promptly after notification, [Employer] shall send to the successful Bidder the Agreement for implementation of the Project.

Within fourteen (14) days of receipt of the Agreement, the successful Bidder shall sign, date, and return it to [Employer].

The successful Bidder shall provide an undertaking that the key staff identified for the project (as submitted in its Technical Bid) shall be available for the respective proposed work requirement, anytime during the duration of the Project, till its successful completion.

Within fourteen (14) days of the receipt of notification of award from [Employer], the successful Bidder shall furnish the Performance Security, using for that purpose the format of Performance Security given in [Annexure 13](#).

Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event [Employer] may award the Contract to the next successful Bidder whose offer is responsive.

Post award, the successful bidder will be intimated to demonstrate their interoperability solutions through use cases as per the requirements provided in [Annexure D](#) on a specified date. The successful bidder should be able to successfully demonstrate integration of their NIC/Communication module with meters of at least 3 manufacturers in India till HES and/or MDMS, before delivery of materials.

## **6. General Conditions of Contract**

### **6.1. Contract Documents**

- 6.1.1. Subject to the order of precedence set forth in the RFP, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory.

### **6.2. Interpretation**

In this Contract unless a contrary intention is evident:

- 6.2.1. [Employer/ Utility], the Bidder, and the Project Implementing Agency shall individually be referred to as "Party" and collectively as "Parties."
- 6.2.2. Unless otherwise specified a reference to a clause number is a reference to all of its sub-clauses;
- 6.2.3. Unless otherwise specified a reference to a clause, sub-clause or section is a reference to a clause, sub-clause or section of this Contract including any amendments or modifications to the same from time to time;
- 6.2.4. A word in the singular includes the plural and a word in the plural includes the singular;
- 6.2.5. A word importing a gender includes any other gender;
- 6.2.6. A reference to a person includes a partnership and a body corporate;
- 6.2.7. A reference to legislation includes legislation repealing, replacing or amending that legislation;
- 6.2.8. Where a word or phrase is given a particular meaning it includes the appropriate grammatical forms of that word or phrase which has a corresponding meaning;
- 6.2.9. In the event of an inconsistency between the terms of the RFP, Bid document and the subsequent Contract, the terms of this RFP hereof shall prevail.
- 6.2.10. Whenever a material or article is specified or described by the name of a particular brand, manufacturer or trade mark, the specific item shall be understood as establishing type, function and quality desired. Products of other manufacturers may also be considered, provided sufficient information is furnished so as to enable [Employer] to determine that the products are equivalent to those named.

### **6.3. Entire Agreement**

- 6.3.1. This RFP constitutes the entire agreement as a part of the Contract between Parties supersedes all communications, negotiations and agreements (whether written or oral) of Parties with respect thereto made prior to the date of Contract.

#### **6.4. Amendment**

6.4.1. No amendment or other variation of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of both [Employer] and the Project Implementing Consortium thereto.

#### **6.5. Waiver**

6.5.1. Subject to Clause 6.5.2 below, no relaxation, forbearance, delay, or indulgence by either Party in enforcing any of the terms and conditions of the Contract or the granting of time by either Party to the other shall prejudice, affect, or restrict the rights of that Party under the Contract. Neither shall any waiver by either Party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

6.5.2. The waiver by either Party of a breach or default of any of the provisions of this contract by the other Party shall not be interpreted as :

- A waiver of any succeeding breach of the same or other provision, nor shall any delay or omission on the part of the other Party to exercise; or
- A way to avail itself of any right, power, or privilege that it has or may have under this contract to operate as waiver of any breach or default by the other Party.
- Any waiver of a Party's rights, powers, or remedies under the Contract must be in writing, dated, and signed by an authorized representative of the Party granting such waiver, and must specify the right and the extent to which it is being waived.

#### **6.6. Severability**

6.6.1. If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract or the contract as a whole and the remaining provisions of the contract shall remain in full force and effect.

#### **6.7. Language**

6.7.1. The official language of the Contract is English. Contract as well as all correspondence and documents relating to the Contract exchanged by the Contractor and [Employer], shall be written in English. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Contract, the English translation shall govern.

6.7.2. The Contractor shall bear all costs of translation to English and all risks of the accuracy of such translation. The Contractor shall be bound to the English translation and what has been stated therein.

## **6.8. Consortium**

- 6.8.1. The Lead Consortium Member shall be liable for the entire contract in accordance with the contract terms, while other Consortium Members shall be liable severally for their portion of Work. Only the Lead Consortium Member shall have the authority to conduct all businesses for and on behalf of the consortium during the bidding process and, in the event the consortium is awarded the Contract, during contract execution. The composition of the consortium cannot be altered.
- 6.8.2. Without prejudice to Clause 6.8.1, for the purposes of fulfilment of its obligations as laid down under the Contract where [Employer] deems fit and unless the context requires otherwise, Contractor shall refer to the Lead Member who shall be the sole point of interface between [Employer] and the Consortium and would be absolutely accountable for the performance of its own, the other members of the Consortium and/or its team's functions as also the subcontractors.
- 6.8.3. All payments shall be made by [Employer] in favor of the Lead Consortium Member.

## **6.9. Notices**

- 6.9.1. All notices and other communications under this contract must be in writing, and must either be mailed by registered mail with acknowledgement due or hand delivered with proof of it having been received.
- 6.9.2. If mailed, all notices will be considered as delivered after 5 days, of the notice having been mailed. If hand delivered, all notices will be considered, when received by the Party to whom the notice is meant and sent for.
- 6.9.3. All notices under this contract shall be sent to or delivered to the nodal person as specified by the Parties.
- 6.9.4. A Notice shall be effective when delivered or on the Notice's effective date, whichever is later.

## **6.10. Governing Law**

- 6.10.1. The Contract shall be governed by and interpreted in accordance with laws of the India. The Courts of state capital shall have exclusive jurisdiction in all matters arising under this Contract.

## **6.11. Settlement of Disputes**

- 6.11.1. [Employer] and the Contractor shall make every effort to resolve amicably, by direct informal negotiation, any disagreement or dispute arising between them under or in connection with the Contract.
- 6.11.2. If the Parties fail to resolve such a dispute (the date of commencement of the dispute shall be taken from the date when this clause reference is quoted by either Party in a formal communication clearly mentioning existence of dispute or as mutually agreed)

or difference by mutual consultation within twenty-eight (28) days from the commencement of such consultation, either Party may require that the dispute be referred for resolution to the formal mechanisms specified in section 6.11.

- 6.11.3. All disputes or differences in respect of which the decision, if any, has not become final or binding as aforesaid shall be settled by arbitration in the manner hereinafter provided. The arbitration shall be conducted by three arbitrators, one each to be nominated by the Contractor and the Owner and the third to be appointed as an umpire by both the arbitrators in accordance with the Indian Arbitration Act. If either of the parties fails to appoint its arbitrator within sixty (60) days after receipt of a notice from the other party invoking the Arbitration clause, the arbitrator appointed by the party invoking the arbitration clause shall become the sole arbitrator to conduct the arbitration.
- 6.11.4. The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The venue of arbitration shall be [X].

## **6.12. Corrupt Practices**

- 6.12.1. [Employer] requires Bidders, Suppliers, and Contractors to observe the highest standard of ethics during the execution of such contracts.

- 6.12.2. The following definitions apply:

“Corrupt practice” means the offering, giving receiving, or soliciting, directly or indirectly, of anything of value to influence the action of any party in the procurement process or the execution of a contract;

“Fraudulent practice” means a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract;

“Collusive practices” means a scheme or arrangement between two or more Bidders, with or without the knowledge of the [Employer], designed to influence the action of any party in a procurement process or the execution of a contract;

“Coercive practices” means harming or threatening to harm, directly or indirectly, persons, or their property to influence their participation in a procurement process, or affect the execution of a contract.

- 6.12.3. [Employer] will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract.

- 6.12.4. After the award of the contract if it comes to the knowledge of [Employer] that the Supplier has engaged in corrupt, fraudulent, collusive, or coercive practices at any stage, [Employer] shall forthwith terminate the Contract as per the provisions of Clause 6.40.

## **6.13. Scope of Work**

- 6.13.1. The goods and services to be provided by the Contractor to [Employer] including but not limited to supply of hardware, transportation, software, installation, integration, testing, commissioning, training operation, maintenance and other services (the

“Solution”) are provided in Volume II of this RFP and subsequent details regarding the Functional Requirements, Minimum Technical Standards (MTS), Service Level Agreement (SLA) are provided in Volume-II of this RFP.

- 6.13.2. At the time of awarding the contract, [Employer] shall specify any change in the Scope of Work. Such changes may be due for instance, if the quantities of supply and Related Services are increased or decreased at the time of award.
- 6.13.3. Unless otherwise stipulated in the Contract, the Scope of Work shall include all such items not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for comprehensive, successful and satisfactory implementation of the Solution as if such items were expressly mentioned in the Contract.
- 6.13.4. All Goods and Related Services to be performed under the Scope of Work shall first be documented, detailed, designed, and specified for approval of [Employer]. The Contractor shall dispatch and/ or commence implementation of the Solution only after written dispatch approval/ clearance of [Employer]. In case of any amendments suggested by [Employer], the Contractor shall document the amendments and re-submit for [Employer]'s approval.

#### **6.14. Delivery**

- 6.14.1. Subject to provision in Clause 6.39, the completion of implementation of the Solution by the Contractor shall be in accordance with the Implementation Schedule as specified in **Annexure E**. The Contractor shall furnish all the details of shipping and other documents to [Employer].

#### **6.15. Contractor's Responsibilities**

- 6.15.1. The Contractor shall successfully implement the Solution as per the Scope of Work provided in Volume II of this RFP, and Functional Requirements, Minimum Technical Standards (MTS), Service Level Agreement (SLA) provided in Volume-II of this RFP.

#### **6.16. [Employer]'s Responsibilities**

- 6.16.1. Whenever implementation of any component of the Solution requires that the Contractor obtain permits, approvals, and import and other licenses from local public authorities, [Employer] shall, if so required by the Contractor, make its best effort to assist the Contractor in complying with such requirements in a timely and expeditious manner.
- 6.16.2. The Managing Director of [Employer] or any other person designated by the Managing Director of [Employer] shall act as the nodal point for implementation of the contract and for issuing necessary instructions, approvals, commissioning, acceptance certificates, payments etc. to the Contractor.
- 6.16.3. Managing Director of [Employer] or any other person designated by the Managing Director of [Employer] shall approve all such documents within 15 working days.

6.16.4. [Employer] may provide on Contractor's request, particulars/ information / or documentation that may be required by the Contractor for proper planning and execution of Scope of Work under this Contract.

6.16.5. [Employer] shall provide to the Contractor sitting space and infrastructure and utilities, in [Employer/Utility]'s offices at such location as may be mutually decided by the Parties.

6.16.6. The [Employer] in coordination with [Utility] will provide support on a list of items and services as mentioned in section 2.6 of Volume II of this RFP.

## **6.17. Contract Price**

6.17.1. The Contract Price shall be as specified in the Contract subject to provisions of Clause 6.20.

6.17.2. Prices charged by the Contractor for the Solution performed under the Contract shall not vary from the prices quoted by the Contractor in its Bid/ (or as discovered from the Reverse Auction process as per clause 4.15 and 5.8), with the exception of any price adjustments authorized in the RFP.

6.17.3. Prices shall not be subject to any upward/downward revision on any account whatsoever throughout the period of contract, with the exception of any price adjustments authorized under clause 6.20 and 6.31.

## **6.18. Terms of Payment**

6.18.1. The Contract Price shall be paid in the manner specified in the RFP. No invoice for additional work/change order on account of change order will be submitted by the Contractor unless the said additional work/change order has been authorized/ approved by [Employer] in writing.

6.18.2. The Contractor's request for payment shall be made to [Employer] in writing, accompanied by invoices describing, as appropriate, the relevant component of the Solution performed, accompanied by the documents submitted pursuant to Contractor's responsibilities.

6.18.3. All payments shall be made by [Employer] in favor of the Lead Consortium Member.

6.18.4. The release of payments shall be progressive and performance/ output-based as per the Payment Schedule in Clause 6.19, where the payments shall be made for measured deliverables and outputs on acceptance by [Employer].

6.18.5. The Project Implementing Consortium shall obtain sign-off for each milestone completed from the [Employer] and raise invoice against the same.

6.18.6. Payments shall be made promptly by [Employer], no later than sixty (60) days after submission of an invoice or request for payment by the Lead Consortium Member, and

[Employer] has accepted it.

6.18.7. Power to withhold: Notwithstanding anything contained in the Payment Schedule mentioned below, if in the opinion that Project Implementing Consortium is deficient in any manner in comparison to the prescribed standards, [Employer] shall be at liberty to withhold a reasonable portion of the payments due to the Contractor, till such work/ supply/ service is made confirming to the prescribed standards. These powers to withhold payments shall be without prejudice to any other power/ right of [Employer] under this Contract.

6.18.8. If any excess payment has been made by [Employer] due to difference in quoted price in proposal and Contractor's invoice, [Employer] may without prejudice to its rights recover such amounts by other means after notifying the Contractor or deduct such excess payment from any payment subsequently falling due to the Contractor.

6.18.9. The currency in which payment shall be made to the Contractor under this contract is Indian Rupees (INR).

## 6.19. Payment Schedule

The payment terms for AMI system establishment and related services milestones in sequence are given below:

S.No.	Milestone	Payment (% of the Contract Value Excluding FMS)
1	Interest bearing advance on acceptance of Letter of Award (LOA) and submission of 10% Performance Security Bank Guarantee (BG)	[10%]  (The annual interest rate shall be = SBI MCLR (as applicable from time to time) + [X%])
2	a) Approval of survey reports for 25% of project area coverage.  b) Delivery, site installation and commissioning of data centre with related hardware, software and equipment  c) Delivery, site installation and integration of first lot of 5% smart meters each with related hardware, software and equipment and successful completion Field Installation and Integration Test (FIIT) <sup>2</sup> .	[10% less interest amount accrued from interest bearing advance amount]/[20% if interest bearing advance has not been taken]

<sup>2</sup> As defined in Volume II of this RFP

S.No.	Milestone	Payment (% of the Contract Value Excluding FMS)
3	Delivery, installation and integration of 100% smart meters with the related software/Hardware, communication and successful completion of Field Installation and Integration Test (FIIT).	[30%] (to be released quarterly on pro-rata basis)
4	Installation and commissioning of field equipment, if any, and completion of site acceptance test (SAT) <sup>3</sup>	[10%]
5	3 months of successful operation of AMI system as per SLA/Guaranteed Performance Test (GPT) <sup>4</sup> , and Operational Acceptance <sup>5</sup> .	[20%]
6	Successful completion of 1 year warranty period	[10%]
7	Completion of 6 years operational period <sup>6</sup> (on per year basis)	Yearly payments as per below (total [10%]): [1.5%, 1.5%, 2%, 1.5%, 1.5%, 2%]
	<b>Total</b>	100%
8	Charges towards FMS during FMS period of 6 years (Total FMS charges for the period of 6 years should be minimum 20% of the total project cost)	On Quarterly basis on satisfactory completion of FMS.

\*Project Cost is sum total of all-inclusive cost for software, hardware supply and implementation cost (excluding FMS charges)

The Contractor shall, within fourteen (14) days of the notification of Contract award, provide a Performance Security in the form of Bank Guarantee to the tune of 10% of the Contract Value for the due performance of the Contract, based on the format prescribed in **Annexure 13**. The Performance Security in the form of Bank Guarantee shall be valid up to a period of two (2) years from the date of Operational Acceptance of the project.

Contractor shall also have to submit a separate BG with the value of 10% of FMS cost, valid for a period of 6 months beyond the FMS period of six years. This BG needs to be submitted prior to the discharge of Performance Security BG for contract performance based on the format prescribed in **Annexure 14**.

## 6.20. Taxes and Duties

6.20.1. For goods supplied from outside India, the Contractor shall be entirely responsible for all taxes, duties, stamp duties, license fees, and other such levies imposed outside India.

6.20.2. For goods supplied from within India, the Contractor shall be entirely responsible for all

3 As defined in Volume II of this RFP

4 As defined in Volume II of this RFP

5 As defined in Volume II of this RFP

6 For all equipment, the bidder shall provide warranty for a period of 1 year from the date of operational acceptance of the AMI system by **[Employer/Utility]**. After the completion of warranty period, the bidder shall provide 6 years of Facility Management Services (FMS) support for all supplied, installed and commissioned equipment.

the taxes, duties, license fees, other levies/ cess etc., incurred until the complete implementation of the Solution for [Employer].

6.20.3. The following may be noted regarding applicability of taxes, duties, cess etc .

- a) GST and Cess as applicable will be paid extra on a given taxable good and/or service. The amount and percentage (%) of GST and Cess as applicable should clearly be indicated separately. (GST/Cess means all applicable Tax/Cess under GST Laws. GST Laws means IGST Act, GST (Compensation to the State for Loss of Revenue) Act, CGST Act, UTGST Act and SGSCT Act, 2017 and all related ancillary legislations). The Input Tax Credit (ITC) available, if any, under the GST law as per the relevant Government policies wherever applicable shall be taken into account by the Bidder while quoting bid price.
- b) The Contractor should charge GST in Invoice at the rate as agreed to / mentioned in acceptance of tender only and any deviation in the same shall not be accepted. Further, any additional liability of GST (later on due to wrong mentioning of GST rate, mis-interpretation of HSN/SAC Code, etc.) over and above as charged in the invoice shall be borne by the Contractor.
- c) However, any refund received by the Contractor on account of GST charged from the [Employer]; such refund shall have to be passed on to the [Employer], along with interest if any. Such refund along with interest needs to be passed on suo-moto by the Contractor. Further, the [Employer] has a right to recover the amount of GST along with penal interest if GST charged is not paid / short paid to the government or fail to upload the details or uploads inaccurate particulars on GSTIN portal by the Supplier / Contractor within the stipulated time limit.
- d) In case, Government revises the rate of GST rate / Code during the tenure of the contract, the provision of [Employer]'s statutory variation clause 6.20.5 shall apply.
- e) In the event of any statutory increase in the rate of Input Tax Credit and / or due to inclusion of any other additional item of their inputs / input services under the ambit of the Input Tax Credit provisions under the GST Act, subsequent to the date of submission of the offer, the same should be passed on to [Employer] and the Contractor should inform such changes to [Employer] from time to time.
- f) The Contractor has to provide their GST Registration No. It is mandatory. Offer without GST Registration No. will be outright rejected.
- g) It shall be the responsibility of the bidders to pay all statutory taxes, duties and levies (including GST) and interest, if applicable on account of additional revised invoice issued for actual material supplied, to the concerned authorities for such return/supply of surplus material, which would otherwise have been, lawfully payable. The bidders shall submit an indemnity bond to keep Employer harmless from any liability, before release of such material to the bidder by Employer.

6.20.4. The contractor shall provide a copy of all paid tax challans/ receipts to [Employer] for record.

6.20.5. Any statutory increase or decrease in the taxes and duties including GST and Cess as applicable or in the event of introduction of new tax/cess or cessation of existing tax/cess subsequent to the Contractor's offer if it takes place within the original contractual delivery date will be to [Employer]'s account subject to the claim being supported by documentary evidence. However, if any decrease takes place after the contractual delivery date, the advantage will have to be passed on to [Employer].

6.20.6. Notwithstanding anything above or elsewhere in the Contract, in the event that the input tax credit of the GST charged by the Contractor is denied by the tax authorities to the Employer for reasons associated with non-compliance/ incorrect compliance by the Contractor, the Employer shall be entitled to recover such amount from the Contractor by way of adjustment from any of the subsequent invoices submitted by the Contractor to the Employer. In addition to the amount of GST, the Employer shall also be entitled to recover interest and penalty, in case any interest and/or penalty are imposed by the tax authorities on the Employer for incorrect/wrong availment of Input Tax Credit. The Employer shall determine whether the denial of credit is linked to the non-compliance/ incorrect compliance of the Contractor and the said determination shall be binding on the Contractor.

## **6.21. Performance Security**

6.21.1. The Contractor shall, within fourteen (14) days of the notification of Contract award, provide a Performance Security in the form of a bank guarantee to the tune of 10% of the Contract Value for the due performance of the Contract in the amounts and currencies specified in the RFP based on the format prescribed in Annexure 13.

6.21.2. The Performance Security shall be valid up to a period of two (2) years from the date of Operational Acceptance of the project.

6.21.3. The Contractor shall, at most fourteen (14) days before the discharge of Performance Security, provide a separate BG to the tune of 10% of the FMS cost for the due performance of the Contract in the amounts and currencies specified in the RFP based on the format prescribed in Annexure 14.

6.21.4. The separate BG with a value of 10% of the FMS cost shall be valid up to a period of six (6) months beyond the FMS period of 6 years.

6.21.5. Any payments shall be made to the Contractor only after receipt of the Performance Security by [Employer], and on expiry of Performance Security, only after receipt of the a separate BG for 10% of FMS cost by the [Employer].

6.21.6. [Employer] shall at its sole discretion invoke the Performance Security or the separate bank guarantee (for 10% of FMS cost), and appropriate the amount secured there under, in the event that the Contractor commits any delay or default in the

implementation of the Solution during the contract period (including FMS period) or commits any other breach of the terms and conditions of the Contract.

6.21.7. The Performance Security shall be discharged by [Employer] without any interest and returned to the Contractor not later than fourteen (14) days following the date of expiry of the performance security, unless specified otherwise in the RFP.

6.21.8. The separate bank guarantee (for 10% of FMS cost) shall be discharged by [Employer] without any interest and returned to the Contractor not later than fourteen (14) days following the date of expiry of this BG, unless specified otherwise in the RFP.

6.21.9. In case of any delay by the Contractor in performing the activities of the Scope of Work with respect to the Project Execution Timeline, then upon [Employer]'s request, the Contractor shall extend the validity of the Performance Security and/or the separate BG (for 10% of FMS cost) for the period for which the contract is extended.

## **6.22. Intellectual Property**

6.22.1. [Employer/ Utility] shall own and have an exclusive right in perpetuity to use all newly created Intellectual Property which have been developed solely during execution of this Contract, including but not limited to all Source code, Object code, records, reports, designs, application configurations, data and written material, products, specifications, reports, drawings and other documents which have been newly created and developed by the Contractor solely during the performance of Related Services and for the purposes of inter-alia use or sub-license of such services under this Contract. The Contractor undertakes to disclose all such Intellectual Property Rights arising in performance of the Related Services to [Employer/ Utility] and execute all such agreements/documents and file all relevant applications, effect transfers and obtain all permits and approvals that may be necessary in this regard to effectively transfer and conserve the Intellectual Property Rights of [Employer/ Utility]. To the extent that Intellectual Property Rights are unable by law to so vest, the Contractor assigns those Intellectual Property Rights to [Employer/ Utility] on creation.

6.22.2. The Contractor shall be obliged to ensure that all approvals, registrations, licenses, permits and rights etc. which are inter-alia necessary for use of the goods supplied / installed by the Contractor, the same shall be acquired in the name of [Employer/ Utility], and the same may be assigned by [Employer/ Utility] to the Contractor solely for the purpose of execution of any of its obligations under the terms of this Contract. However, subsequent to the term of this Contract, such approvals, registrations, licenses, permits and rights etc. shall endure to the exclusive benefit of [Employer/ Utility].

6.22.3. The Contractor shall ensure that while it uses any software, hardware, processes, document or material in the course of performing the Services, it does not infringe the Intellectual Property Rights of any person and the Contractor shall keep [Employer/ Utility] indemnified against all costs, expenses and liabilities howsoever, arising out any illegal or unauthorized use (piracy) or in connection with any claim or proceedings

relating to any breach or violation of any permission/license terms or infringement of any Intellectual Property Rights by the Contractor or its personnel during the course of performance of the Related Services. In case of any infringement by the Contractor, the Contractor shall have sole control of the defense and all related settlement negotiations

6.22.4. Subject to Clause 6.23, the Contractor shall retain exclusive ownership of all methods, concepts, algorithms, trade secrets, software documentation, other intellectual property or other information belonging to the Contractor that existed before the effective date of the contract.

## **6.23. Confidential Information**

6.23.1. Both Contractor and [Employer] undertake to each other to keep confidential all information (written as well as oral) concerning the business and affairs of the other, which has been obtained or received as a result of the discussions leading up to or the entering of the Contract.

6.23.2. After the entering of the Contract, [Employer] and the Contractor shall keep confidential and shall not, without the written consent of the other Party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other Party hereto in connection with the Contract, whether such information has been furnished prior to, during or following completion or termination of the Contract. Notwithstanding the above, the Contractor may furnish to its subcontractor such documents, data, and other information it receives from [Employer] to the extent required for the subcontractor to perform its work under the Contract, in which event the Contractor shall obtain from such subcontractor an undertaking of confidentiality similar to that imposed on the Contractor under this Clause.

6.23.3. [Employer] shall not use such documents, data, and other information received from the Contractor for any purposes unrelated to the Contract. Similarly, the Contractor shall not use such documents, data, and other information received from [Employer] for any purpose other than the design, procurement, or other work and services required for the performance of the Contract.

6.23.4. The obligation of a Party under Clauses 6.23.1 and 6.23.2 above, however, shall not apply to information that:

- [Employer] or Contractor need to share with the institutions participating in the financing of the Contract;
- now or hereafter enters the public domain through no fault of that Party;
- can be proven to have been possessed by that Party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other Party; or
- Otherwise lawfully becomes available to that Party from a third Party that has no obligation of confidentiality.

6.23.5. The above provisions of this Section 6.23 shall not in any way modify any undertaking of confidentiality given by either of the Parties hereto prior to the date of the Contract in respect of the Supply or any part thereof.

6.23.6. Each of the Parties to this contract, undertakes to the other to take all such steps as shall from time to time be necessary to ensure compliance with the provisions of the above clauses by its employees, agents and sub-contractors.

6.23.7. The provisions of this Clause 6.23 survive completion or termination, for whatever reason, of the Contract.

## **6.24. Subcontracting**

6.24.1. The Contractor shall not be permitted to subcontract its obligations under the Contract with [Employer]. However, scope of work related to auxiliary supply and services may be subcontracted after seeking prior approval of [Employer].

## **6.25. Conflict of Interest**

6.25.1. The Contractor shall not engage, and shall cause their Personnel not to engage, either directly or indirectly, in any business or professional activities which would conflict with the activities assigned to them under this Contract.

6.25.2. [Employer] considers a conflict of interest to be a situation in which a Party has interests that could improperly influence that Party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations, and that such conflict of interest may contribute to or constitute a prohibited corrupt practice.

6.25.3. The Contractor for [Employer] cannot participate in the bidding process or be appointed as a consultant or a third-party inspection agency for the same Project.

6.25.4. If the Contractor is found to be involved in a conflict of interest situation with regard to the present assignment, the [Employer] may choose to terminate this contract as per Clause 6.40 of this RFP.

## **6.26. Specifications and Standards**

6.26.1. Technical Specifications and Drawings:

- The Contractor shall ensure that the Goods and Related Services comply with the technical specifications and other provisions of the Contract.
- The Goods and Related Services supplied under this Contract shall conform to the standards mentioned in the Scope of Work. When no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the country of origin of the Goods.

6.26.2. Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the edition or the revised version of such codes and standards shall be those specified in the Scope of Work. During Contract execution, any changes in any such codes and standards shall be applied only after approval by [Employer] and shall be treated in accordance with Clause 6.38.

## **6.27. Packing and Documents**

- 6.27.1. The Contractor shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the final destination of the Goods and the absence of heavy handling facilities at all points in transit. [Employer] shall not be responsible in any manner for any loss or damage caused to the Goods during Transit.
- 6.27.2. The packing, marking, and documentation within and outside the packages shall comply strictly with best practices including such special requirements as shall be expressly provided for in the Contract and in any other instructions ordered by [Employer].

## **6.28. Insurance**

- 6.28.1. The Goods supplied under the Contract shall be fully insured by the Contractor, in INR, against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in the manner specified in the RFP.

## **6.29. Transportation**

- 6.29.1. The Contractor shall at its own risk and expense transport all the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable under all the circumstances.
- 6.29.2. Unless otherwise provided in the Contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the Contractor's Equipment.
- 6.29.3. Upon dispatch of each shipment of the Contractor's Equipment, the Contractor shall notify [Employer] in writing, fax or e-mail of the description of the Contractor's Equipment, the point and means of dispatch, and the estimated time and point of arrival in the country where the Site is located, if applicable, and at the Project Site. The Contractor shall furnish [Employer] with relevant shipping documents to be agreed upon between the parties.
- 6.29.4. The Contractor shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the Contractor's Equipment to the Project Site. [Employer] shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested by the Contractor. The Contractor shall indemnify and hold harmless [Employer] from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the Contractor's Equipment to the Site.

## **6.30. Inspection and Tests**

- 6.30.1. The Contractor shall at its own expense and at no cost to [Utility/ Employer] carry out all such tests and/or inspections of to ensure that the Goods and Related Services are complying with the functional parameters, codes and standards specified in the Scope of Work, to the satisfaction of [Utility/ Employer].
- 6.30.2. The inspections and tests may be conducted on the premises of the Contractor, at point of delivery, and/or at the final destination of the Goods, or in another place in India as per the requirement. Subject to Clause 6.30.3, if conducted on the premises of the Contractor or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to [Utility/ Employer].
- 6.30.3. [Utility/ Employer] or its designated representative shall be entitled to attend the tests and/or inspections referred to in Clause 6.30.2, provided that [Utility/ Employer] bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all travelling and board and lodging expenses.
- 6.30.4. Whenever the Contractor is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to [Utility/ Employer].
- 6.30.5. [Utility/ Employer] may require the Contractor to carry out any test and/or inspection to verify that the characteristics and performance of the Goods or Related Services comply with the technical specifications, codes and standards under the Contract, the cost of which shall be borne by the Contractor.
- 6.30.6. The Contractor shall provide [Utility/ Employer] with a report of the results of any such test and/or inspection.
- 6.30.7. [Utility/ Employer] may reject any Goods or Related Services or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Contractor shall either rectify or replace such rejected Goods or Related Services or parts thereof or make alterations necessary to meet the specifications at no cost to [Utility/ Employer], and shall repeat the test and/or inspection, at no cost to [Utility/ Employer ], upon giving a notice pursuant to Clause 6.30.4.
- 6.30.8. The Contractor agrees that neither the execution of a test and/or inspection of the Goods or Related Services or any part thereof, nor the attendance by [Utility/ Employer] or its representative, nor the issue of any report pursuant to Clause 6.30.6, shall release the Contractor from any warranties or other obligations under the Contract.

### **6.31. Liquidated Damages, Penalty and Incentive**

- 6.31.1. Except as provided under Clause 6.37, if the Contractor fails to deliver any or all of the Goods or perform the Related Services within the period specified in the Contract, [Employer] shall without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to [X]% of the value of the Goods or Related Services of contract value for each week or part thereof of delay until actual delivery or performance, subject to a maximum of [X]% of contract value, cumulatively for entire sum of Liquidated Damages across entire contract.

6.31.2. In addition, the Contractor is liable to [Employer] for payment of penalty as specified in Volume II of this RFP.

6.31.3. If the Goods and Related Services supplied do not meet the minimum specifications as per the Contract, and the same is not replaced/modified by the Contractor to meet the requirements within fourteen (14) days of being informed by [Employer], [Employer] shall reserve the right to terminate the contract and recover liquidated damages by forfeiting the Performance Security submitted to [Employer].

6.31.4. If the Contractor achieves milestone of "Successful completion of the Guaranteed Performance Test (GPT)" at least one month in advance than the timelines specified in the Contract, [Employer] shall provide an incentive of a sum equivalent to [1%] of contract value.

## 6.32. Warranty

6.32.1. The Contractor warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

6.32.2. Subject to Clause 6.27.1, the Contractor further warrants that the Goods shall be free from defects arising from any act or omission of the Contractor or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

6.32.3. The complete cover warranty shall remain valid for the period of 7 years after operational acceptance of the AMI system by [Employer/Utility]

6.32.4. The Contractor shall be responsible for comprehensive maintenance of all the equipment and systems supplied & installed under this Contract during one year of warranty period + balance six years of FMS period. The Warranty+FMS period shall commence after completion of the project i.e. after Operational Acceptance. There may be some variation during detailed engineering. Contractor will have to make their own assessment of the systems and deploy manpower accordingly. However, it is to be ensured that specified manpower of requisite qualification are deployed.

6.32.5. The Maintenance of the system supplied & installed by the Contractor shall be comprehensive. The Contractor shall be responsible for providing all the spares (cards/modules/accessories etc.) for supplied & installed equipment. The spares shall be provided/arranged by the contractor at no extra cost to Employer. For early restoration during the emergency condition, if spares are made available by Employer, the same shall have to be replenished by the Contractor within thirty (30) days.

6.32.6. [Employer] shall give a Notice to the Contractor stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. [Employer] shall afford all reasonable opportunity for the Contractor to inspect such defects.

6.32.7. Upon receipt of such Notice, the Contractor shall, within the period specified in the RFP or stipulated by [Employer], expeditiously repair or replace the defective Goods or parts thereof, at no cost to [Employer].

6.32.8. If having been notified, the Contractor fails to remedy the defect within the period of warranty specified; [Employer] may proceed to take within a reasonable period such remedial action as may be necessary, at the Contractor's risk and expense and without prejudice to any other rights which [Employer] may have against the Contractor under the Contract.

### **6.33. Liability/ Indemnity**

6.33.1. The Contractor hereby agrees to indemnify [Employer/ Utility], for all conditions and situations mentioned in this clause, in a form and manner acceptable to [Employer/ Utility]. The Contractor agrees to indemnify [Employer/ Utility] and its officers, servants, agents ("[Employer/ Utility] Indemnified Persons") from and against any costs, loss, damages, expense, claims including those from third parties or liabilities of any kind howsoever suffered, arising or incurred inter alia during and after the Contract period out of:

- any negligence or wrongful act or omission by the Contractor or its agents or employees or any third Party associated with Contractor in connection with or incidental to this Contract; or
- Any infringement of patent, trademark/copyright or industrial design rights arising from the use of the supplied Goods and Related Services or any part thereof.

6.33.2. The Contractor shall also indemnify [Employer/ Utility] against any privilege, claim or assertion made by third party with respect to right or interest in, ownership, mortgage or disposal of any asset, property, movable or immovable as mentioned in any Intellectual Property Rights, licenses and permits

6.33.3. Without limiting the generality of the provisions of this Clauses 6.32.1 and 6.32.2, the Contractor shall fully indemnify, hold harmless and defend [Employer/ Utility] Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which [Employer/ Utility] Indemnified Persons may hereafter suffer, or pay by reason of any demands, claims, suits or proceedings arising out of claims of infringement of any domestic or foreign patent rights, copyrights or other intellectual property, proprietary or confidentiality rights with respect to any Goods, Related Services, information, design or process supplied or used by the Contractor in performing the Contractor's obligations or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the Contractor shall make every reasonable effort, by giving a satisfactory bond or otherwise, to secure the suspension of the injunction or restraint order. If, in any such suit, action, claim or proceedings, the Goods or Related Services, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the Contractor shall promptly make every reasonable effort to secure for [Employer/ Utility] a license, at no cost to [Employer/ Utility], authorizing continued use of the infringing work. If the Contractor is unable to secure such license within a reasonable time, the Contractor shall, at its own expense,

and without impairing the specifications and standards, either replace the affected work, or part, or process thereof with non-infringing work or part or process, or modify the same so that it becomes non-infringing.

6.33.4. Survival on Termination: The provisions of this Clause 6.33 shall survive Termination

#### **6.34. Defence of Claims**

6.34.1. If any proceedings are brought or any claim is made against [Employer] arising out of the matters referred to in Clause 6.33, [Employer] shall promptly give the Contractor a notice thereof, and the Contractor may at its own expense and in [Employer]'s name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claims.

6.34.2. If the Contractor fails to notify [Employer] within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then [Employer] shall be free to conduct the same on its own behalf.

6.34.3. [Employer] shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

#### **6.35. Limitation of Liability**

6.35.1. Except in cases of gross negligence or willful misconduct:

- neither Party shall be liable to the other Party for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Contractor to pay liquidated damages to the [Employer]; and
- The aggregate liability of the Contractor to [Employer], whether under the Contract, in tort, or otherwise, shall not exceed the amount specified in the Contract Price. Provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the Contractor to indemnify [Employer] with respect to patent infringement.

#### **6.36. Change in Laws and Regulations**

6.36.1. Unless otherwise specified in the Contract, if after the date of the Invitation for Bids, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in India where the sites is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery Date, then such Delivery Date shall be correspondingly increased or decreased, to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract.

#### **6.37. Force Majeure**

6.37.1. The Contractor shall not be liable for forfeiture of its Performance Security, liquidated

damages, or termination for default if and to the extent that it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

6.37.2. "Force Majeure" shall mean any event beyond the reasonable control of the Employer or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:

- a) war, hostilities or warlike operations (whether war be declared or not), invasion, act of foreign enemy and civil war;
- b) rebellion, revolution, insurrection, mutiny, usurpation of government, conspiracy, riot and civil commotion; and
- c) earthquake, landslide, volcanic activity, flood or cyclone, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster

6.37.3. If a Force Majeure situation arises, the Contractor shall promptly and no later than seven (7) days from the first occurrence thereof, notify [Employer] in writing of such condition and the cause thereof. Unless otherwise directed by [Employer] in writing, the Contractor shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

6.37.4. The decision of [Employer] with regard to the occurrence, continuation, period or extent of Force Majeure shall be final and binding on the Contractor.

## **6.38. Change Orders and Contract Amendments**

6.38.1. [Employer] may at any time order the Contractor through Notice in accordance Clause 6.9 ("Change Order") to make changes within the general scope of the Contract in any one or more of the following:

- drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for [utility];
- Specifications for hardware, software and Related Services;
- Quantity variation for items under this contract subject to the limit of +/- 20% of the existing number of items, covered under the Contract, at same per unit cost
- Variation in requirement as per Annexure G of Volume-2 at mutually agreed cost which should not be more than the quoted price for the same item.
- the method of shipment or packing;
- the place of delivery; and
- the Related Services to be provided by the Contractor.

6.38.2. If any such Change Order causes an increase or decrease in the cost of, or the time required for, the Contractor's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery and Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Contractor for adjustment under this Clause must be asserted within twenty-eight (28) days from the date of the Contractor's receipt of [Employer]'s Change Order.

6.38.3. No variation or modification of the terms of the contract shall be made except by written amendment signed by the Parties.

### **6.39. Extensions of Time**

6.39.1. If at any time during performance of the Contract, the Contractor or its Subcontractors should encounter conditions impeding timely delivery of the Goods or completion of Related Services pursuant to Clause 6.15 of this RFP, the Contractor shall promptly notify [Employer] in writing of the delay, its likely duration, and its cause. As soon as practicable after receipt of the Contractor's notice, [Employer] shall evaluate the situation and may at its discretion extend the Contractor's time for performance, in which case the extension shall be ratified by the Parties by amendment of the Contract.

6.39.2. Except in case of Force Majeure, as provided in Clause 6.37 or where the delay in delivery of the Goods or completion of Related Services is caused due to any delay or default of [Employer], any extension granted under Clause 6.39.1 shall not absolve the Contractor from its liability to the pay of liquidated damages pursuant to 6.31.

### **6.40. Termination**

6.40.1. Termination for Default:

- a. [Employer] may, without prejudice to any other remedy for breach of Contract, by Notice of default sent to the Contractor, terminate the Contract in whole or in part:
  - i. if the Contractor fails to deliver any or all of the Goods or Related Services within the period specified in the Contract, or within any extension thereof granted by [Employer] pursuant to Clause 6.39; or
  - ii. if the Contractor, in the judgment of [Employer] has engaged in corrupt, fraudulent, collusive, or coercive practices, as defined in Clause 6.12, in competing for or in executing the Contract; or
  - iii. if any representation made by the Bidder in the proposal is found to be false or misleading; or
  - iv. if the Contractor commits any breach of the Contract and fails to remedy or rectify the same within the period of two weeks (or such longer period as [Employer] in its absolute discretion decide) provided in a notice in this behalf from [Employer]; or
  - v. as specified in the Service Level Agreement.
- b. In the event [Employer] terminates the Contract in whole or in part, pursuant to 6.40.1 (a), [Employer] may procure, upon such terms and in such manner as it deems appropriate, Goods or Related Services similar to those undelivered or not performed, and the Contractor shall be liable to [Employer] for any additional costs, Goods and Services for such similar Goods or Related Services. However, the Contractor shall continue performance of the Contract to the extent not terminated.

6.40.2. Termination for Insolvency: [Employer] may at any time terminate the Contract by giving Notice to the Contractor if the Contractor becomes bankrupt or otherwise insolvent. In

such event, termination will be without compensation to the Contractor, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to [Employer].

#### 6.40.3. Termination for Convenience:

- a. [Employer], by Notice sent to the Contractor, may terminate the Contract, in whole or in part, at any time for its convenience. The Notice of termination shall specify that termination is for [Employer]'s convenience, the extent to which performance of the Contractor under the Contract is terminated, and the date upon which such termination becomes effective.
- b. The Goods that are complete and ready for shipment within twenty-eight (28) days after the Contractor's receipt of the Notice of termination shall be accepted by [Employer] at the Contract terms and prices. For the remaining Goods, [Employer] may elect:
  - i. To have any portion completed and delivered at the Contract terms and prices; and/or
  - ii. to cancel the remainder and pay to the Contractor an agreed amount for partially completed Goods and Related Services and for materials and parts previously procured by the Contractor.

#### 6.40.4. Consequences of Termination: Upon Termination of the Contract, the Contractor shall:

1. Prepare and present a detailed exit plan within five (5) calendar days of termination notice receipt to the Managing Director of [Employer] ("Exit Plan").
2. The Managing Director of [Employer] and along with designated team will review the Exit plan. If approved, Contractor shall start working on the same immediately. If the plan is rejected, Contractor shall prepare alternate plan within two (2) calendar days. If the second plan is also rejected, [Employer] will provide a plan for Contractor and it should be adhered by in totality.
3. The Exit Plan should cover at least the following :
  - a. Execute all documents that may be necessary to effectively transfer the ownership and title, including OEM warranties in respect of all equipment;
  - b. Handover all developed codes, related documentation and other Configurable Items, if any in his possession;
  - c. Handover the list of all IT Assets, passwords at all locations to [Employer].
4. The Contractor and the Authorized Personnel from [Employer] will sign a completion certificate at the end of successful completion (all points tracked to closure) of the Exit Plan.

### 6.41. Assignment

#### 6.41.1. The Contractor shall not assign, in whole or in part, their obligations under this Contract.

## **6.42. Disclaimer**

- 6.42.1. [Employer] reserves the right to share, with any consultant of its choosing, any resultant Proposals in order to secure expert opinion.
- 6.42.2. [Employer] reserves the right to accept any proposal deemed to be in the best interest of the [Employer].

## **6.43. Public Disclosure**

- 6.43.1. All materials provided to [Employer] by the Bidder are subject to Country and [Employer] public disclosure laws such as Right To Information (RTI), etc.
- 6.43.2. The Contractor's Team shall not make or permit to be made a public announcement or media release about any aspect of this Contract unless [Employer] first gives the Contractor its written consent.

## **6.44. SLA Audit**

- 6.44.1. A designated team/ person from [Employer] will review the performance of Contractor against the SLA each month. The review/ audit report will form basis of any action relating to imposing penalty on or breach of contract of the Contractor.

## **6.45. Adherence to Safety Procedures, Rules, Regulations and Restriction**

- 6.45.1. Contractor shall comply with the provision of all laws including labour laws, rules, regulations and notifications issued there under from time to time. All safety and labour laws enforced by statutory agencies and by [Employer/ Utility] shall be applicable in the performance of this Contract and Contractor's Team shall abide by these laws.
- 6.45.2. Access to the Data Centre Sites and [Employer/ Utility]'s locations shall be strictly restricted. No access to any person except the essential personnel belonging to the Contractor who are genuinely required for execution of work or for carrying out management/maintenance who have been explicitly authorized by [Employer/ Utility] shall be allowed entry to the Data Centre Sites and some [Employer/ Utility]'s locations. Even if allowed, access shall be restricted to the pertaining equipment of [Employer/ Utility] only. The Contractor shall maintain a log of all activities carried out by each of its personnel.
- 6.45.3. The Contractor shall take all measures necessary or proper to protect the personnel, work and facilities and shall observe all reasonable safety rules and instructions. Contractor's Team shall adhere to all security requirement/regulations of [Employer/ Utility] during the execution of the work. [Employer/ Utility]'s employees and associates also shall comply with safety procedures/policy.
- 6.45.4. The Contractor shall report as soon as possible any evidence, which may indicate or is likely to lead to an abnormal or dangerous situation and shall take all necessary emergency control steps to avoid such abnormal situations.

6.45.5. [Employer/ Utility] will be indemnified for all the situations mentioned in this clause in the similar way as defined in Clause 6.35.

#### **6.46. Non-Solicitation of Staff**

6.46.1. For the purpose of this RFP and Contract, all Parties to this Contract agree, not to solicit either directly or indirectly with a view to provide or offer employment to, offer to contract with or entice a staff member of the other Party to leave without the consent of the other during the term of this agreement and for an additional period of 180 days after termination.

#### **6.47. Survival**

6.47.1. The clauses of this contract, which by nature are intended to survive termination of this contract, shall remain in effect after such termination

## Annexure

### Annexure A: Tender Evaluation Methodology

#### Technical Evaluation Methodology

The overall technical evaluation methodology has been provided in the table below.

S.No.	Description	Qualifying Criteria	Maximum Score	Maximum Score if Communication Provider not part of Consortium
1	<b>Manpower Experience</b>	Strength of the team proposed for undertaking the assignment including the qualification, experience and time proposed on field as well as on support & maintenance	[20]	[25]
2	<b>Meter Manufacturing Experience</b>	<p>The Bidder must have</p> <p>1. Manufactured and supplied cumulative of [10,00,000] static electricity meters (including single phase and three-phase) as per relevant IS standards in an Indian Power Distribution Utility in the last [7] years</p> <p>Or</p> <p>2. Manufactured and supplied minimum [10,000] nos. of Meters for AMR (cumulative) with required hardware, software and other associated accessories in an Indian/Global Power Distribution Utility in the last [7] years and such project(s) should have been operational for at least [1] year</p> <p>Or</p>	[40]	[45]

S.No.	Description	Qualifying Criteria	Maximum Score	Maximum Score if Communication Provider not part of Consortium
		3. Manufactured and supplied minimum [10,000] nos. of Meters for AMI (cumulative) with required hardware, software and other associated accessories in an Indian/Global Power Distribution Utility in the last [7] years		
3	<b>Experience in Integration with MDM</b>	The Bidder must have experience of integration of head-end system with MDM on standard interfaces and data exchange models (CIM/XML) for at least [10,000] consumers (cumulatively) in an Indian/Global Utility (Power/ Water/ Gas/ Telecom) in the last [5] years.	[10]	[15]
4	<b>Experience in Control Centre Design</b>	The Bidder should have supplied, installed, tested and commissioned Control Centre hardware and application software for at least [10,000] end points (cumulatively) in an Indian/Global Utility (Power/ Water/ Gas/ Telecom) in last Seven (7) years which are in successful operation for at least One (1) year	[10]	[15]
5	<b>Experience in Communication</b>	The bidder should have implemented project(s) with at least [10,000] (cumulatively) communication module/endpoints (manufacturing, supply, installation, integration, maintenance & management) involving Radio Frequency (RF) mesh in Licensed frequency band as permitted by WPC or in Unlicensed	[20]	[0]

S.No.	Description	Qualifying Criteria	Maximum Score	Maximum Score if Communication Provider not part of Consortium
		frequency band / Power Line Carrier Communication (PLCC) or GPRS/3G/4G or Fiber Optic communication technology or combination of these technologies during the last [7] years in India/ Globally.		
		<b>Total</b>	<b>100</b>	<b>100</b>

The technical evaluation parameters have been discussed in detail below

#### **1. Manpower Experience (20%/25% of Maximum Technical Score)**

This evaluates the strength of the team proposed for undertaking the assignment including the qualification, experience and time proposed on field as well as on support & maintenance.

The proposed core team shall comprise of the following experts:

Requirement	Criteria	Score	Score when Communication Provider not part of consortium
Expert 1: Team Leader/Project Manager	Expert in AMI Implementation including metering and related aspects, installation and management of smart meters, communication network, last mile connectivity, head end system and MDMS.	5	7
Expert 2	Expert in System Integration covering application software, hardware and network installation, integration design and ability to manage multiple partners with different skill sets in different technology domains.	5	6
Expert 3	Expert in cyber security related aspects covering planning and implementing high level system security requirements, managing data privacy and confidentiality, information flow through adequate authorizations, threat modelling and security testing.	5	6
Expert 4	Expert in communication protocols and in implementing applications using different communication technologies and ensuring communication inter-operability across applications/functionalities.	5	6

Above core team shall not be allowed to be replaced during project execution. In exceptional cases same maybe done with prior approval. Within each CV, the following evaluation metric will be followed:

- General qualifications (Relevant education, training and experience ): (50% weightage)
- Adequacy for the Assignment (Experience evaluated through number of completed assignments, with full marks for 5 completed assignments. For assignments less than 5, marks to be prorated accordingly): (50% weightage)

## 2. Overall Experience (40%/45% of Maximum Technical Score)

### A. AMR/ Static Meter Experience

Requirement	Criteria	Score	Score when Communication Provider not part of consortium
Bidder must have manufactured and supplied minimum [10,000] nos. of Meters for AMR (cumulative) with required hardware, software and other associated accessories in an Indian/Global Power Distribution Utility in the last [7] years and such project(s) should have been operational for at least [1] year	>=40,000	20	22
	>=20,000 and <40,000	15	17
	>=10,000 and <20,000	10	12

OR

Requirement	Criteria	Score	Score when Communication Provider not part of consortium
The Bidder must have successfully manufactured & supplied static electricity meters as per relevant IS standards in an Indian Power Distribution Utility in the last [7] years	>=2,500,000	20	22
	>=1,500,000 and <2,500,000	15	17
	>=1,000,000 and <1,500,000	10	12

### B. AMI Experience

Requirement	Criteria	Score	Score when Communication Provider not part of consortium
Bidder must have manufactured and supplied minimum [10,000] nos. of Meters for AMI (cumulative) with required hardware, software and other associated accessories in an Indian/Global Power Distribution Utility in the last [7] years	>=30,000	20	23
	>= 15,000 and <30,000	15	18
	>= 10,000 and <15,000	10	13

**C. Experience in Integration with MDM (10%/ 15% of Maximum Technical Score)**

Requirement	Criteria	Score	Score when Communication Provider not part of consortium
The Bidder must have experience of integration of smart meter head-end system with MDM on standard interfaces and data exchange models (CIM/XML) for at least [10,000] consumers (cumulatively) in an Indian/Global Power Utility (Power/ Water/ Gas/ Telecom) in the last [5] years.	>= 50,000	10	15
	>=25,000 and <50,000	7	12
	>=10,000 and <25,000	5	10

**D. Experience in Control Center Design (10%/ 15% of Maximum Technical Score)**

Requirement	Criteria	Score	Score when Communication Provider not part of consortium
The Bidder should have supplied, installed, tested and commissioned Control Centre hardware and application software for at least [10,000] end points (cumulatively) in an Indian/Global Utility (Power/ Water/ Gas/ Telecom) in last Seven (7) years which are in successful operation for at least One (1) year	>= 50,000	10	15
	>=25,000 and <50,000	7	12
	>=10,000 and <25,000	5	10

**E. Experience in Communication Project (20%/ 0% of Maximum Technical Score)**

Requirement	Criteria	Score	Score when Communication Provider not part of consortium
The bidder should have implemented project(s) with communication module/endpoints (manufacturing, supply, installation, integration, maintenance & management) involving Radio Frequency (RF) mesh in Licensed frequency band or in Unlicensed frequency band as permitted by WPC / Power Line Carrier Communication (PLCC) or GPRS/3G/4G or Fiber Optic communication technology or combination of these technologies during the last [7] years in India/ Globally.	>= 50,000	20	0
	>=25,000 and <50,000	15	0
	>=10,000 and <25,000	10	0

## **Commercial Evaluation Methodology**

The commercial evaluation of the Bidder will be as follows:

Commercial Score of the Bidder =  $(L1/L) \times 100$

Where,

L1 = Lowest Proposed Financial Quote amongst all the Bidders

L = Proposed Financial Quote of the concerned Bidder

## **Annexure B: Acceptance Form for Participation in Reverse Auction Event**

[To be defined by Employer/ Utility]

**(To be signed and stamped by the bidder)**

In a bid to make our entire procurement process more fair and transparent, [Employer] intends to use the reverse auctions as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

**The following terms and conditions are accepted by the bidder on participation in the bid event:**

1. [Employer] shall provide the user id and password to the authorized representative of the bidder. (*Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form*).
2. [Employer] decision to award the work would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of [Employer], bid process, bid technology, bid documentation and bid details to any other party.
4. The bidder is advised to fully make aware themselves of auto bid process and ensure their participation in the event of reverse auction and failing to which [Employer] will not be liable in any way.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of [Employer].
6. In case of intranet medium, [Employer] shall provide the infrastructure to bidders. Further, [Employer] has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case an auction event is restarted, the best bid as already available in the system shall become the basis for determining start price of the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by [Employer].
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies at project site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by [Employer].
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all-inclusive prices offered during conclusion of the auction event for arriving at Contract amount.
13. Reverse auction process is deemed to have been started upon receipt of 'Online Sealed Bids' from the bidders within the prescribed time frame as per Business Rules

defined in Annexure. After receipt of 'online sealed bids', start price & bid decrement will be decided by [Employer] and the same shall be communicated to the Bidder, to start the RA process. Only those bidders who have submitted the 'online sealed bid' within the scheduled time shall be eligible to participate further in RA process. The H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process provided minimum three bidders are left after removal of H1 bidder. However, the [Employer] reserves the right to include/ exclude H1 bidder in the RA process. The decision on inclusion/exclusion of H1 bidder will be intimated to the bidders before the start of the RA process.

14. All bidders who had given online sealed bid will see their rank and L1 price and their ranking L1, L2 etc. would be based on their last quoted price received in online sealed bid irrespective of their original price bid.
15. [Employer] will consider the lowest online sealed bid as the starting price of the RA process. The lowest bidder in online sealed bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.

**Signature & Seal of the Bidder**

## Annexure C: Format for Deviation Sheet

[Reference No.]

From:

[Address of the Bidder]  
[Telephone No., Fax No., Email]  
[Date]

To:

[Nodal Officer of Employer],  
[Address]

### Sub: Non-Material Deviation

Ref: [Tender Details]

Dear Sir,

Please find below our proposed non-material deviation from the terms and conditions of the tender:

Tender Clarifications – Terms and Conditions			
S.No.	Tender Reference (Section/ Clause Number)	Details of Clauses/ Sections needing deviation	Deviation Proposed
1			
2			

Thanking you,

Yours Sincerely,  
[Insert Signature here]  
[Insert Name here]

[Insert Designation here]

## Annexure D: Use Cases for Demonstration of Interoperability Solutions

Note for Successful Bidder:

1. The demonstration test setup should include at least one item of each node of the vendor solution
2. The NIC/ Communication Module is assumed to be in place for both the meter as well as the DCU (PLC) / Access Point (RF Mesh)
3. All use cases shall be tested for each meter make

Sr.	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
1.	Read Demand & Energy Data Automatically from Customer Premises	Requesting instantaneous, interval & events data from meters	MDM	HES	Meter no, Reading date & time, reading params (KWh, KVAh, KW etc.)
		Acquire instantaneous, interval / events data from meters by HES which then reaches MDM system.	HES	MDM	Meter no, Reading date & time, reading params (KWh, KVAh, KW etc.)
		At scheduled freq meter sends data to HES (thru DCU/ACP). Consumption details will be 15 min block data, and data could be incremental to what was sent by meter in preceding instance	Meter	HES	Meter no, reading date & time, KW, KVA, KWH, KVAH, PF
		At scheduled freq meter sends billing data to HES (thru DCU/ACP).	Meter	HES	Meter no, reading date & time, KW, KVA, KWH, KVAH, PF
2.	Meter disconnection/reconnection	Meter Connect / Disconnect operation	MDM	HES	Meter no, group of meters, instruction to close switch
		Customer meter connection / disconnection	HES	Meter	Meter number, action (reconnect)
		Connection Status Update Request	MDM	HES	Meter no, group of meters, switch status
		Connection Status Update	HES	MDM	Meter no, group of meters, switch status
3.	Utility detects tampering or theft at customer site	Tamper events captured by meter sent to HES which	HES	MDM	Meter no, tamper Code / description, tamper occurrence date & time

Sr.	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
		in turn reaches MDM for further action.			
		Meter sending the high priority events to HES as and when occurred	Meter	HES	Meter no, event date & time, event Code /description
		Meter is sending the non-critical events data to HES as per scheduled frequency.	Meter	HES	Meter no, event date & time, event Code /description
		On detection of valid tamper event or malfunction, connection is disconnected.	MDM	HES	Customer no, meter no, action to be triggered(disconnect), action date & time
		HES sends disconnect command to meter (thru DCU/ACP)	HES	Meter	Meter no, action (disconnect)
		Once pre-programmed disconnecting tamper event becomes NORMAL meter performs auto re-connection and send notification to HES	Meter	HES	Meter number, action (connect)
		HES sends re-connect command to meter (thru DCU/ACP)	HES	Meter	Meter no, action (re-connect)
4.	Missed interval readings	Missed Interval and Reads Data (Gap Reconciliation)	HES	MDM	Meter no, readings with date & time
		On identifying missed interval, HES will re acquire data for the missing period from meter	HES	Meter	Meter no, from date & time, to date & time (for which data is missing)
		On receiving data request command from meter, meter will send data to HES	Meter	HES	Meter no, reading date & time, KW, KVA, KWH, KVAH
5.	Customer connection has an outage	Outage/restore event recorded by meter is sent to head-end as and when event occurs	Meter	HES	Meter no, event date & time, event (outage/restoration)

Sr.	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
		Power Outage Notification (PON)	HES	MDM	Meter no, Outage Date & Time, Power On Off count
6.	Customer connection restore from outage	Power Restoration Notification (PRN)	HES	MDM	Meter no, Restoration Date & Time, Power On Off count
		The outage/restore event recorded by meter is sent to HES as and when event occurs	Meter	HES	Meter number, event date and time, event (outage/restoration)
7.	Remote firmware upgrades/ meter configuration changes	Configuration Commands: Change tariff parameters, Synchronize clock, Registers reset (status, maximum, tampering)	MDM	HES -> Meter	Meter number, tariff parameters, registers status, event type and priority
8.	Load monitoring at demand side	When there is a load violation event recorded in the meter, the information is sent to the CC	Meter	HES	Meter no, max demand, date & time of load violation
9.	New meter installed at site	Energization (Trigger showing meter has energy flowing thru)	MDM	HES	Meter no, Energization date & time
		Meter Read/ commissioning/sync Failures	HES	MDM	Meter no, date of last successful readings received, last logged date & time
10	Time synchronization	Sync up of meters / DCUs/ master data and Network Hierarchy in case of installation of new meters / DCUs	HES	MDM	Network identification info including DCUs
11	Metering network changes	Change in Meter / DCU Network Hierarchy	HES	MDM	Network identification info including data concentrators

## Annexure E: Project Implementation Schedule

The project implementation schedule for AMI system establishment and timelines for related services milestones from date of signing of contract are given below:

<The timelines defined in the table below are applicable for an installation size of 10 lakh Smart Meter, considering project includes 10 separate utility divisions, each with base of up to 1 lakh consumers. For additional divisions included in the project, the work would be done in parallel and therefore there would be no additional changes in timeline. However, for every increment in consumer base of any particular division by 6000 consumers (above 1 lakh), a corresponding addition of 1 month shall be included in the above timelines>

S.No.	Milestone	Timeline (in months) from the date of signing of Contract
1	<ul style="list-style-type: none"> <li>• Delivery, site installation and commissioning of data center with related hardware, software and equipment after successful completion Field Installation and Integration Test (FIIT); and</li> <li>• Delivery, site installation and integration of first lot of 5% smart meters each with related hardware, software and equipment and successful completion Field Installation and Integration Test (FIIT) .</li> </ul>	<b>[6]</b>
2	Delivery, installation and integration of 100% smart meters with the related software/Hardware, communication and successful completion of Field Installation and Integration Test (FIIT) <sup>7</sup>	<b>[15]</b>
3	Installation and commissioning of field equipment, if any, and completion of Site Acceptance test (SAT) <sup>8</sup>	<b>[18]</b>
4	3 months of successful operation of AMI system as per SLA/Guaranteed Performance Test (GPT) <sup>9</sup> , and Operational Acceptance <sup>10</sup> .	<b>[22]</b>
5	Warranty (Defect Liability) Period – 1 year	<b>[34]</b>
6	FMS Period – 6 Years	<b>[106]</b>

The Employer expects the timeline for successful installation, commissioning and integration of all AMI Hardware, Software, field material in Project Area and Site Acceptance test (SAT) shall not exceed timeline as described above from the date of signing of the Contract.

<sup>7</sup> As defined in Volume II of this RFP

<sup>8</sup> As defined in Volume II of this RFP

<sup>9</sup> As defined in Volume II of this RFP

<sup>10</sup> As defined in Volume II of this RFP

## **Annexure 1: Format of Bank Guarantee for Bid Security**

*[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 100/-) or appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting Bid are required to follow the applicable law in their country]*

Reference No. ....  
Dated: .....

Bank Guarantee No. ....

To:  
[Employer]  
[Address]

Dear Sir/ Madam,

WHEREAS..... [Insert name of the Company/Lead Consortium Member] with address ..... [Insert address of the Company/Lead Consortium Member] having its registered office at ..... [Insert address of the Company/Lead Consortium Member] (Hereinafter, the "Bidder") wishes to participate in Tender No. [Tender Details] (the "RFP") issued by [Employer] (hereinafter, the "Employer") for Appointment of AMI Implementing Agency for Implementation of AMI Project.

And WHEREAS a Bank Guarantee for [Amount] valid [Date] is required to be submitted by the Bidder along with the RFP.

We, .....[Insert name of the Bank and address of the Branch giving the Bank Guarantee] having our registered office at .....[Insert address of the registered office of the Bank] hereby give this Bank Guarantee No. .....[Insert Bank Guarantee number] dated .....[Insert the date of the Bank Guarantee], and hereby agree unequivocally and unconditionally to pay immediately on demand in writing from the Employer any officer authorized by it in this behalf any amount not exceeding [Amount] to the said Employer on behalf of the Bidder.

We ..... [Insert name of the Bank] also agree that withdrawal of the Bid or part thereof by the Bidder within its validity or non-submission of Performance Security by the Bidder within the stipulated time of the Letter of Award to the Bidder or any violation to the relevant terms stipulated in the RFP would constitute a default on the part of the Bidder and that this Bank Guarantee is liable to be invoked and encashed within its validity by the Employer in case of any occurrence of a default on the part of the Bidder and that the amount is liable to be forfeited by the Employer.

This agreement shall be valid and binding on this Bank up to and inclusive of ..... [Insert the date of validity of the Bank] and shall not be terminable by notice or by Guarantor change in the constitution of the Bank or the firm of the Bidder Or by any reason whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or variations or alternations made, given, conceded with or without our knowledge or consent by or between the Bidder and the Employer.

NOTWITHSTANDING anything contained hereinbefore, our liability under this guarantee is restricted to [Amount]. Our Guarantee shall remain in force till [Date]. Unless demands or claims under this Bank Guarantee are made to us in writing on or before [Date], all rights of the Beneficiary under this Bank Guarantee shall be forfeited and we shall be released and discharged from all liabilities there under.

<i>[Insert the address of the Bank with complete postal branch code, telephone and fax numbers, and official round seal of the Bank]</i>	<i>[Insert signature of the Bank's Authorized Signatory]</i>
<i>Attested</i>	
..... [Signature] (Notary Public)	
Place: .....	Date: .....

#### **INSTRUCTIONS FOR SUBMITTING BANK GUARANTEE**

1. Bank Guarantee to be executed on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign entities submitting Bids are required to follow the applicable law in their country.
2. The Bank Guarantee by Bidder shall be given from Nationalized Banks including Public Sector Banks.
3. Private Sector Banks authorized by RBI to undertake the state Government business are [Specify Name of Banks]
4. The Banks shall be the recognized or notified by the Finance Department, Government of [name of the state] from time to time.
5. The full address along with the Telex/Fax No. and e-mail address of the issuing bank to be mentioned.

## Annexure 2: Format for Sending Query to Employer

[Query may be sent in hard copy to the [Nodal Officer of Employer], at the below-mentioned address AND/ OR via email to [E-mail ID]]  
[Reference No.]

From:

[Address of the Bidder]  
[Telephone No., Fax No., Email]  
[Date]

To:

[Nodal Officer of Employer],  
[Address]

**Sub: Query.**

Ref: [Tender Details].

Dear Sir/ Madam,

Please find below our query with respect to the RFP subject to the terms and conditions therein:

Sr.	RFP Volume (I/II)	Reference Clause No.	Page No.	Concise Query
1.				
2.				
3.				

Thanking you,

Yours Sincerely,  
[Insert Signature here]  
[Insert Name here]  
[Insert Designation here]

### **Annexure 3: Format of Covering Letter by Lead Consortium Member for Submission of Bid**

*[Covering Letter shall be on the official letterhead of the Lead Consortium Member of the Bidding Consortium]*

[Reference No.]

From:

[Address of the Lead Consortium Member]

[Telephone No., Fax No., Email]

[Date]

To:

[Employer]

[Address]

**Sub: Bid for Appointment of AMI Implementing Agency for Implementation of AMI Project.**

Ref: [Tender Details]

Dear Sir/ Madam,

We, the undersigned ..... [Insert name of the Lead Consortium Member] having read, examined and understood in detail the RFP for Appointment of AMI Implementing Agency for Implementation of AMI Project hereby submit our Bid comprising of Technical and Financial Bids.

1. We give our unconditional acceptance to the RFP including but not limited to all its instructions, terms and conditions, and formats attached thereto, issued by [Employer], as amended. In token of our acceptance to the RFP, the same have been initialed by us and enclosed to the Bid. We shall ensure that our Consortium shall execute such requirements as per the provisions of the RFP and provisions of such RFP shall be binding on us.

#### **2. Fulfilment of Eligibility**

We undertake that we fulfill the Eligibility Criteria stipulated in the RFP and fulfill all the eligibility requirements as the Lead Consortium Member as outlined in the RFP.

#### **3. Bid Security**

We have enclosed a Bid Security of [Amount] in the form of a Bank Guarantee No ..... [Insert Bank Guarantee Number] (OR Demand Draft) dated ..... [Insert date of the Bank Guarantee] as per Annexure 1 of the RFP from ..... [Insert name of Bank providing Bid Bond] and valid up to [Date].

#### **4. No Deviation**

We have submitted our Financial Bid strictly as per terms and formats of the RFP, without any deviations, conditions and without mentioning any assumptions or notes for the Financial Bid in the said format.

## **5. Acceptance**

We hereby unconditionally and irrevocably agree and accept that the decision made by [Employer] in respect of any matter regarding or arising out of the RFP shall be binding on us. We hereby expressly waive any and all claims in respect of Bid process.

We confirm that there are no litigations or disputes against us, which materially affect our ability to fulfill our obligations with regard to fulfilling our obligations as per the RFP.

## **6. Familiarity with Relevant Indian Laws and Regulations**

We confirm that we have studied the provisions of the relevant Indian laws and regulations as required to enable us to submit this Bid and execute the RFP Documents, in the event of our selection as Selected Bidder. We further undertake and agree that all such factors as mentioned in Clause 6.10 of the RFP have been fully examined and considered while submitting the Bid

## **7. Contact Person**

Details of the contact person representing our Bidding Consortium supported by the Power of Attorney prescribed in Annexure 6 of the RFP are furnished as under:

Name: .....  
Designation: .....  
Company: .....  
Address: .....  
Mobile: .....  
Phone: .....  
Fax: .....  
Email: .....

8. We are submitting herewith the Technical Bid containing duly signed formats, both in electronic and physical forms, (duly attested) as desired by you in the RFP for your consideration.

9. We are also submitting herewith the Financial Bid in electronic form only, as per the terms and conditions in the RFP.

10. It is confirmed that our Bid is consistent with all the requirements of submission as stated in the RFP and subsequent communications from [Employer].

11. The information submitted in our Bid is complete, strictly as per the requirements stipulated in the RFP and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our Bid.

12. We confirm that all the terms and conditions of our Bid are valid for acceptance for a period of one (1) year from the Bid Submission Deadline.

13. We confirm that we have not taken any deviation so as to be deemed non-responsive with respect to the provisions stipulated in the RFP.

14. We confirm that no order/ ruling has been passed by any Competent Court or Appropriate Commission against us or any of our Consortium Members or Associates in the preceding one (1) year from the Bid Submission Deadline for breach of any contract and that the Bid Security submitted by the us or any of our Consortium Members has not been forfeited, either partly or wholly, in any bid process in the preceding one (1) year from the Bid Submission Deadline.

15. We confirm that we have not been blacklisted/barred by any Govt. Organization or Regulatory Agencies or Govt. undertaking.

Dated the ..... *[Insert date of the month]* day of ..... *[Insert month, year]* at ..... *[Insert place]*.

Thanking you,

Yours Sincerely,  
[*Insert Signature here*]  
[*Insert Name here*]  
[*Insert Designation here*]

## **Annexure 4: Format of Consortium Agreement to be entered amongst all Members of a bidding Consortium**

*[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 100/-) or appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting Bid are required to follow the applicable law in their country.]*

### **FORM OF CONSORTIUM AGREEMENT BETWEEN**

M/s....., M/s. ...., M/s.  
....., AND M/s. ..... for bidding for Tender No.  
[Tender Details] (the "RFP") dated [Date] as per its Clause 4.3.2

**THIS Consortium Agreement** (hereinafter referred to as "Agreement") executed on this ..... [date] day of ..... [month], ..... [year] between:

1. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called the "**Party 1**," which expression shall include its successors, executors and permitted assigns);
2. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called the "**Party 2**," which expression shall include its successors, executors and permitted assigns);
3. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called the "**Party 3**," which expression shall include its successors, executors and permitted assigns);  
.
4. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called the "**Party n**," which expression shall include its successors, executors and permitted assigns);

*[The Bidding Consortium should list the name, address of its registered office and other details of all the Consortium Members above.]*

for the purpose of submitting the Bid in response to the RFP and in the event of selection as Selected Bidder to comply with the requirements as specified in the RFP and ensure execution of the RFP Documents as may be required to be entered into with [Employer].

Party 1, Party 2, Party 3, ... and Party n are hereinafter collectively referred to as the "Parties" and individually as a "Party".

**WHEREAS** Clause 4.3.2 of the RFP stipulates that the Bidders qualifying on the strength of a Bidding Consortium shall submit a legally enforceable Consortium Agreement in a format specified in the RFP, whereby each Consortium Member undertakes to be liable for its Roles and Responsibilities, provide necessary guarantees and pay required fees as required as per the provisions of the RFP, as specified herein.

**WHEREAS** any capitalized term in this Agreement shall have the meaning ascribed to such term in the RFP document.

**NOW THEREFORE, THIS INDENTURE WITNESSTH AS UNDER:**

In consideration of the above premises and agreement all the Parties in this Consortium do hereby mutually agree as follows:

1. In consideration of the selection of the Consortium as the Bidding Consortium by [Employer], we the Members of the Consortium and Parties to the Consortium Agreement do hereby unequivocally agree that M/s..... [Insert name of the Lead Member], shall act as the Lead Member as defined in the RFP for self and agent for and on behalf of M/s. ...., M/s. ...., M/s. ...., and M/s. .... [the names of all the other Members of the Consortium to be filled in here].
2. The Lead Consortium Member is hereby authorized by the Members of Consortium and Parties to the Consortium Agreement to bind the Consortium and receive instructions for and on behalf of all Members. The Roles and Responsibilities of all other members shall be as per the **Annexure** to this Agreement.
3. The Lead Consortium Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all their respective Roles and Responsibilities. Each Consortium Member further undertakes to be individually liable for the performance of its part of the Roles and Responsibilities without in any way limiting the scope of collective liability envisaged in this Agreement in order to meet the requirements and obligations of the RFP.
4. In case of any breach of any of the commitment as specified under this Agreement by any of the Consortium Members, then all Members of the Consortium and Parties shall be liable to meet the obligations as defined under this RFP.
5. Except as specified in the Agreement, it is agreed that sharing of responsibilities as aforesaid and obligations thereto shall not in any way be a limitation of responsibility of the Lead Member under these presents.
6. This Consortium Agreement shall be construed and interpreted in accordance with the Laws of India and Courts at [Place] shall have the exclusive jurisdiction in all matters relating thereto and arising there under.
7. It is hereby agreed that the Lead Consortium Member shall furnish the Bid Security, as stipulated in the RFP, on behalf of the Bidding Consortium.
8. It is hereby agreed that in case of selection of Bidding Consortium as the Project Implementing Consortium, the Parties to this Consortium Agreement do hereby agree that they shall furnish the Performance Security and other commitments to [Employer] as stipulated in the RFP. The Lead Member shall be responsible for ensuring the submission of the Performance Security and other commitments on behalf of all the Consortium Members.
9. It is further expressly agreed that the Consortium Agreement shall be irrevocable and, for the Project Implementing Consortium, shall remain valid over the term of the Project, unless expressly agreed to the contrary by [Employer].

10. The Lead Consortium Member is authorized and shall be fully responsible for the accuracy and veracity of the representations and information submitted by the Consortium Members respectively from time to time in response to the RFP for the purposes of the Bid.

11. It is expressly understood and agreed between the Members of the Consortium and Parties that the responsibilities and obligations of each of the Members shall be as delineated as annexed hereto as **Annexure** forming integral part of this Agreement. It is further agreed by the Members that the above sharing of responsibilities and obligations shall not in any way be a limitation of responsibilities and liabilities of the Members, with regards to all matters relating to the execution of the Bid and implementation of the Project envisaged in the RFP Documents.

12. It is clearly agreed that the Lead Consortium Member shall ensure performance indicated in the RFP and if one or more Consortium Members fail to perform its/their respective obligations, the same shall be deemed to be a default by all the Consortium Members.

13. It is hereby expressly agreed between the Parties to this Consortium Agreement that neither Party shall assign or delegate or subcontract its rights, duties or obligations under this Agreement to any person or entity except with prior written consent of [Employer].

14. This Consortium Agreement:

- a) has been duly executed and delivered on behalf of each Party hereto and constitutes the legal, valid, binding and enforceable obligation of each such Party;
- b) sets forth the entire understanding of the Parties hereto with respect to the subject matter hereof; and
- c) may not be amended or modified except in writing signed by each of the Parties and with prior written consent of [Employer].

IN WITNESS WHEREOF, the Parties to the Consortium Agreement have, through [Employer], executed these presents and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

1. Common Seal of ..... For M/s. .... (Party 1)  
has been affixed in my/ our presence [Signature of Authorized Representative]  
pursuant to Board Resolution dated .....  
..... [Name of the Authorized Representative]  
[Designation of the Authorized Representative]

1.1. Witness 1

[Signature of Witness 1]

Name:  
Designation:

For M/s. .... (Party 1)  
[Signature of Authorized Representative]  
[Name of the Authorized Representative]  
[Designation of the Authorized Representative]  
1.2. Witness 2

[Signature of Witness 1]

Name:  
Designation:

**2.** Common Seal of .....  
has been affixed in my/ our presence  
pursuant to Board Resolution dated  
.....

For M/s. .... (Party 2)  
[Signature of Authorized Representative]  
.....  
[Name of the Authorized Representative]  
[Designation of the Authorized Representative]

2.1. Witness 1

[Signature of Witness 1]

.....  
Name:  
Designation:  
**3.** Common Seal of .....  
has been affixed in my/ our presence  
pursuant to Board Resolution dated  
.....

.....  
Name:  
Designation:  
For M/s. .... (Party 3)  
[Signature of Authorized Representative]  
.....  
[Name of the Authorized Representative]  
[Designation of the Authorized Representative]

3.1. Witness 1

[Signature of Witness 1]

.....  
Name:  
Designation:  
..

.....  
Name:  
Designation:

**N.** Common Seal of .....  
has been affixed in my/ our presence  
pursuant to Board Resolution dated  
.....

For M/s. .... (Party N)  
[Signature of Authorized Representative]  
.....  
[Name of the Authorized Representative]  
[Designation of the Authorized Representative]

N.1. Witness 1

[Signature of Witness 1]

.....  
Name:  
Designation:

.....  
Name:  
Designation:

Role and Responsibility of each Member of the Consortium:

1. Roles and Responsibilities of the Party 1 (Lead Consortium Member):
  2. Roles and Responsibilities of the Party 2
  3. Roles and Responsibilities of the Party 3
- .
- .

N. Roles and Responsibilities of the Party N

## **Annexure 5. Format of Power of Attorney by Consortium Member in favor of Lead Consortium Member**

*[To be provided by each Consortium Member (other than the Lead Consortium Member) in favour of the Lead Consortium Member.]*

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**WHEREAS** [Employer] has issued for Tender No. [Tender Details] (the “RFP”) dated [Date] for inviting Bids in respect of Appointment of AMI Implementing Agency for Implementation of AMI Project(the “Project”) on the terms contained in the RFP;

**WHEREAS** M/s....., M/s. ...., M/s. and M/s. .... [Insert names of all Members of Consortium] the Members of the Consortium are desirous of submitting a Bid in response to the RFP, and if selected, undertaking the responsibility of implementing the Project as per the terms of the RFP;

**WHEREAS** all the Members of the Consortium have agreed under the Consortium Agreement dated ..... (the “Consortium Agreement”), entered into between all the Members and submitted along with the Bid to appoint ..... [Insert the name and address of the Lead Consortium Member] as Lead Consortium Member to represent all the Members of the Consortium for all matters regarding the RFP and the Bid;

**AND WHEREAS** pursuant to the terms of the RFP and the Consortium Agreement, we, the Members of the Consortium hereby designate M/s ..... [Insert name of the Lead Member] as the Lead Consortium Member to represent us in all matters regarding the Bid and the RFP, in the manner stated below:-

Know all men by these presents, we ..... [Insert name and address of the registered office of the Member 1], .....  
[Insert name and address of the registered office of the Member 2],....., ..... [Insert name and address of the registered office of the Member n] do hereby constitute, appoint, nominate and authorize .....  
[Insert name and registered office address of the Lead Consortium Member], which is one of the Members of the Consortium, to act as the Lead Member and our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of Consortium’s Bid in response to the RFP issued by [Employer] including signing and submission of the Bid and all documents related to the Bid as specified in the RFP, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which [Employer] may require us to submit. The aforesaid attorney is further authorized for making representations to [Employer] named in the RFP, and providing information / responses to [Employer], representing us and the Consortium in all matters before [Employer] named in the RFP, and generally dealing with [Employer] named in the RFP in all matters in connection with our Bid, till completion of the bidding process as well as implementation of the Project, if applicable, in accordance with the RFP.

We, as Members of the Consortium, hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

We, as Members of the Consortium, hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

**Signed by the within named .....** [Insert the name of the executant Consortium Member] **through the hand of Mr./ Ms./ Dr. .....**  
**duly authorized by the Board to issue such Power of Attorney dated this .....**  
**day of .....**

**Accepted**

..... (Signature of Attorney)  
[Insert Name, designation and address of the Attorney]

**Attested**

.....  
(Signature of the executant)  
(Name, designation and address of the executant)

.....  
Signature and stamp of Notary of the place of execution

**Common seal of ..... has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....**

**WITNESS:**

**1. .... (Signature)**

Name .....  
Designation.....

**2. .... (Signature)**

Name .....  
Designation.....

---

**Notes**

- a. *The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s).*

- b. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.*
  - c. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).*
-

## **Annexure 6. Format of Power of Attorney by Lead Consortium Member authorizing an Individual Designated Representative for the Consortium**

*[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 100/-) or appropriate value as per Stamp Act relevant to place of execution. Foreign companies submitting Bids are required to follow the applicable law in their country.]*

Know all men by these presents, we .....*[Insert name and address of the registered office of the Lead Consortium Member of the Bidding Consortium]* do hereby constitute, appoint, nominate and authorize Mr./Ms. ....*[Insert name and residential address]*, who is presently employed with us and holding the position of ..... as our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid in response to Tender No. **[Tender Details]** for Appointment of AMI Implementing Agency for Implementation of AMI Project (the "Project") issued by **[Employer]**, including signing and submission of the Bid and all other documents related to the Bid, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document which **[Employer]** may require us to submit. The aforesaid attorney is further authorized for making representations to **[Employer]**, and providing information / responses to **[Employer]**, representing us in all matters before **[Employer]**, and generally dealing with **[Employer]** in all matters in connection with our Bid till the completion of the bidding process as per the terms of the RFP.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.

All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

**Signed by the within named .....** *[Insert the name of the executant company]* through the hand of Mr./ Mrs. ....**duly authorized by the Board to issue such Power of Attorney dated this .....** day of .....

### **Accepted**

..... (Signature of Attorney)  
[Insert Name, designation and address of the Attorney]

### **Attested**

.....  
(Signature of the executant)  
(Name, designation and address of the executant)

.....  
Signature and stamp of Notary of the place of execution

**Common seal of ..... has been affixed in my/our presence pursuant to Board of Director's Resolution dated.....**

**WITNESS:**

1. .... **(Signature)**

**Name .....**

**Designation.....**

2. .... **(Signature)**

**Name .....**

**Designation.....**

---

**Notes:**

- a. *The mode of execution of the power of attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s).*
  - b. *In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.*
  - c. *Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favor of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).*
-

## **Annexure 7: Format of Letter of Consent by Consortium Member reviewing each element of the Bid**

*[On the letter head of each Member of the Consortium including Lead Member]*

[Reference No.]

From:

[Address of the Lead Consortium Member]

[Telephone No., Fax No., Email]

[Date]

To:

[Employer]

[Address]

**Sub: Bid for Appointment of AMI Implementing Agency for Implementation of AMI Project.**

Ref: [Tender Details]

Dear Sir/ Madam,

We, ..... [Insert name of the undersigned Consortium Member] Member of Consortium Lead by ..... [Insert name of the Lead Consortium Member] have read, examined and understood the RFP and RFP Documents for Appointment of AMI Implementing Agency for Implementation of AMI Project.

We hereby confirm our concurrence with the RFP including in particular the Consortium Agreement and the Bid submitted by ..... [Insert name of the Lead Consortium Member], in response to the RFP. We confirm that the Bid has been reviewed and each element of the Bid is agreed to including but not limited to the commitment and obligations of our Company.

The details of contact person are furnished as under:

Name : .....

Designation : .....

Name of the Company : .....

Address : .....

Phone Nos. : .....

Fax Nos. : .....

E-mail address : .....

Dated the ..... day of ..... of 20.....

Thanking you,

Yours faithfully,

.....  
[Signature, Name, Designation of Authorized Signatory of Consortium Member and Company's Seal]

Business Address:  
*[Name and address of principal officer]*

## **Annexure 8: Format of Summary of Audited Financial Statements**

*[On the Official Letterhead of the Chartered Account.]*

**[Reference No.]**

From:

**[Address of the Lead Consortium Member]**

**[Telephone No., Fax No., Email]**

**[Date]**

To:

**[Employer]**

**[Address]**

**Sub: Audited Financial Statement for ..... [Insert name of Consortium Member].**

**Ref: [Tender Details]**

Dear Sir/ Madam,

This is to certify that ..... [Insert name of Consortium Member] having its Registered Office at ..... [Insert Registered Address of the Consortium Member] with PAN No. ..... [Insert PAN No.] are in the business of ..... [Insert briefly the nature of the business], have recorded the following turnovers and profits:

<b>TURNOVER FOR LAST FIVE YEARS</b>		
Sr.	Relevant Revenue Head	Turnover Amount (In
1.		
2.		
3.		
4.		
<b>A.</b>	<b>Total</b>	
<b>(In Words)</b>		

The above Turnovers and Net Profits are arrived from our Audit Reports for the LAST FIVE years duly submitted to the Income Tax Department along with our Audit Reports.

Hence we certify from the records submitted to us. Thanking you,

Sincerely yours,

[Official seal of the Chartered Accountant]

Date: [Date]

Place: [Place]

.....

[Insert Name of the Chartered  
Accountant]

[Insert address and contact  
information of the Chartered  
Accountant]

### Annexure 9: Record of Similar Work Done

S No	Name of Client Company	Date of PO/ WO	Expected date of completion as per PO/ WO	Actual Date of Completion as certified by Client	No. of Consumers catered to.	No. of nodes (incl. meters, DCUs, etc.)	PO/ WO Value (In INR)	Confirm attachment of PO/ WO	Confirm attachment of satisfactory work completion certificate from Client
1.									
2.									
3.									
4.									
5.									

## Annexure 10: Format of Bill of Quantities

*Please Note: The list is indicative only. This needs to be detailed out and customized by [Employer/ Utility] basis project requirement*

**Table 1: Bill of Materials and Services for Smart Meters [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Meters (including Communication module/NIC card)</b>		
1.1	Single phase whole current Smart Meter	Nos.	
1.2	Three Phase whole current Smart Meter	Nos.	
1.3	Three Phase whole current Smart Meter (Net-Meter)	Nos.	
1.4	Three phase CT operated Smart Meter	Nos.	
1.5	Three phase CT operated Smart Meter (for DT)	Nos.	
1.6	Feeder Meter	Nos.	
1.7		Nos.	
1.8	....		
	Sub Total 1		
<b>2.</b>	<b>Mandatory Spares</b>		
2.1	X% of Sub total 1	Lot	
2.2	....		
..	..		
	Sub Total 2		
<b>3.</b>	<b>Installation &amp; Commissioning</b>		
3.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job	
3.2	....		
..	..		
	Sub Total 3		
<b>4.</b>	<b>Other Requirement</b>		
4.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job	
	Sub Total 4		
<b>5.</b>	<b>Communications Hardware</b>		
5.1	NIC/ Communication Module (price to be quoted only for sourcing additional quantity if required.)	Nos.	
5.2	Data Concentrator Units/Access points		
....	.....		
	Sub Total 5		

**Table 2: Bill of Materials and Services for Software [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Application Software</b>		
1.1	Meter Data Acquisition Software (MDAS)/Head End System (HES)	Lot	
1.2	Meter data management (MDM) .....	Lot	
1.3	....		
..	..		
	Sub Total 1		
<b>2.</b>	<b>Data Archiving Software</b>		
2.1	Data Archiving and SAN management software	Lot	
2.2	....		
..	..		
	Sub Total 2		
<b>3.</b>	<b>Network Management Software</b>		
3.1	Centralized network management software along with patch management & identity management	Lot	
3.2	Antivirus software for all machines in control center	Lot	
3.3	Access control software with single sign on feature		
...	....		
..	..		
	Sub Total 3		
<b>4.</b>	<b>Installation &amp; Commissioning</b>		
4.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job	
4.2	....		
..	..		
	Sub Total 4		
<b>5.</b>	<b>Other Requirement</b>		
5.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job	
	Sub Total 4		

**Table 3: Bill of Materials and Services for Hardware [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Hardware for Application</b>		
1.1	Application Server	Set	
1.2	Web Server	Set	
1.3	....	Set	
1.4	....		
1.5	....		
..	..		
	Sub Total 1		
<b>2.</b>	<b>Hardware for Storage</b>		
2.1	SAN based storage	Nos.	
2.2	Data Archiving Server	Nos.	
2.3	....		
..	..		
	Sub Total 2		
<b>3.</b>	<b>Hardware for Network Management</b>		
3.1	Network Management server	Lot	
3.2	Centralized management console	Lot	
3.3	....		
..	..		
	Sub Total 3		
<b>4.</b>	<b>Hardware for Network Management</b>		
4.1	Workstation consoles	Set	
4.2	....		
..	..		
	Sub Total 4		
<b>5.</b>	<b>Network Hardware</b>		
5.1	Firewall with Network-based intrusion prevention system (NIPS)	Set	
5.2	Router	Set	
5.3	LAN Switch	Set	
5.4	....		
5.5	....		
..	..		
	Sub Total 5		
<b>6.</b>	<b>Mandatory Spares</b>		
6.1	X% of Sub total 1+2+3+4+5	Lot	

S. No.	Item Description	Unit	Quantity
6.2	....		
..	..		
	Sub Total 6		
<b>7.</b>	<b>Installation &amp; Commissioning</b>		
7.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job	
7.2	....		
..	..		
	Sub Total 7		
<b>8.</b>	<b>Other Requirement</b>		
8.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job	
	Sub Total 8		

**Table 4: Bill of Materials and Services for Bandwidth Charges [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Bandwidth Charges</b>		
1.1	Communication link to Control Center MPLS-VPN broadband Link through fiber from service provider per annum	Year 1	
		Year 2	
		Year 3	
		Year 4	
		Year 5	
		Year 6	
		Year 7	
1.2	Network Connectivity Charges for FOC/3G/CDMA/ GPRS for AMI	Year 1	
		Year 2	
		Year 3	
		Year 4	
		Year 5	
		Year 6	
		Year 7	

S. No.	Item Description	Unit	Quantity
1.3	....		
..	..		
	Sub Total 1		

**Table 5: Bill of Materials and Services for Training [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
1.	<b>Training at Site</b>		
1.1	Smart Meter & Communication network	Days	
1.2	HES & MDM, Protocol , Database, User Interface, Display and Application software	Days	
1.3	Computer System Hardware & Software	Days	
1.4	....		
..	..		
	Sub Total 1		

**Table 6: Bill of Materials and Services for Operation and Maintenance [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
1.	<b>Operation and Maintenance</b>		
1.1	Operation of complete system (during warranty period)	Job	
1.2	Maintenance of complete System during FMS period	Job	
1.3	....		
..	..		
	Sub Total 1		

## **Annexure 11: Format of Submission of Financial Bid (For Reference Only)**

**[IMPORTANT NOTE: THE FINANCIAL BID SHALL ONLY BE SUBMITTED IN THE ELECTRIC FORMAT. IT SHALL NOT BE SUBMITTED IN HARD COPY OR AS A PART OF THE TECHNICAL BID. THE BIDDER SHALL ONLY SIGN AND SEAL THE BLANK FORMAT OF THE FINANCIAL BID FORMAT AS A PART OF THE TECHNICAL BID.]**

*[On the letter head of each Member of the Consortium including Lead Member]*

**[Reference No.]**

**From:**

**[Address of the Lead Consortium Member]**

**[Telephone No., Fax No., Email]**

**[Date]**

**To:**

**[Employer]**

**[Address]**

**Sub: Financial Bid for Appointment of AMI Implementing Agency for Implementation of AMI Project.**

**Ref: [Tender Details]**

Dear Sir/ Madam,

We, the undersigned ..... [Insert name of the Lead Consortium Member 'Party 1'] representing ..... [Insert name of the Lead Consortium Member 'Party 2'], ..... [Insert name of the Lead Consortium Member 'Party 3'], ..., and ..... [Insert name of the Lead Consortium Member 'Party n'], having read, examined and understood in detail the RFP for Implementation of [Employer]'s AMI hereby submit our Financial Bid. We hereby undertake and confirm that:

- A. We have submitted our Financial Bid strictly in accordance with the RFP without any deviations or condition.
- B. Our Financial Bid is consistent with all the requirements of submission as stated in the RFP and subsequent communications from the Bid Process Coordinator.
- C. Price quoted should clearly mentioned the basic cost, Goods and Services Tax, insurance cost or any other taxes/duties/levies. For any other taxes/duties/levies please specify the nature and rate of tax with proof. The rate of claimed taxes shall be mention by the bidder with the unpriced BOQ in submission of the technical bid.
- D. Under no circumstances shall escalation in prices of this Financial Bid be entertained by [Employer] whether due to factors within or beyond control or the Bidding Consortium such as change in tax structure, currency value change, etc.

E. The details quoted herein shall stand valid at least for 12 months from the date of submission of this Financial Bid and for implementation of Project, if awarded, as per the timeframe indicated in the RFP.

F. Our Quoted Prices are as per the Annexure attached herein.

Dated the ..... [Insert date of the month] day of ..... [Insert month, year] at ..... [Insert place].

Thanking you,

Sincerely yours,

[Insert Signature here]  
[Insert Name here]  
[Insert Designation here]

**Annexure: Quoted Prices for the Financial Bid.**

---

**Table: Bill of Materials and Services [To be defined by Employer/ Utility]**

*Please Note: The list is indicative only. This needs to be detailed out and customized by [Employer/ Utility] basis project requirement*

*Please Note: In case employer has not selected any particular communication technology at the time of notice of the RFP and chooses to reduce the FMS time period of 7 years, it is suggested that in case of Smart Meters based on cellular technology, the price evaluation shall consider all operational cost (such as network/ bandwidth/ data charges) for a period of 7 years.*

**Table 1: Bill of Materials and Services for Smart Meters [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity	Rate per Unit (in INR)	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
1.	<b>Meters (including Communication module/NIC card)</b>							
1.1	Single phase whole current Smart Meter	Nos.						
1.2	Three Phase whole current Smart Meter	Nos.						
1.3	Three Phase whole current Smart Meter (Net-Meter)	Nos.						
1.4	Three phase CT operated Smart Meter	Nos.						
1.5	Three phase CT operated Smart Meter (for DT)	Nos.						
1.6	Feeder Meter	Nos.						
1.7		Nos.						
1.8	....							
1.9	....							
..	..							
	Sub Total 1							

S. No.	Item Description	Unit	Quantity	Rate per Unit (in INR)	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
<b>2.</b>	<b>Mandatory Spares</b>							
2.1	X% of Sub total 1	Lot						
2.2	....							
..	..							
	Sub Total 2							
<b>3.</b>	<b>Installation &amp; Commissioning</b>							
3.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job						
3.2	....							
..	..							
	Sub Total 3							
<b>4.</b>	<b>Other Requirement</b>							
4.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job						
	Sub Total 4							
<b>5.</b>	<b>Communications Hardware</b>							
5.1	NIC/ Communication Module (price to be quoted only for sourcing additional quantity if required.)	Nos.						
5.2	Data Concentrator Units/Access points							
....	.....							
	Sub Total 5							

**Table 2: Bill of Materials and Services for Software [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
<b>1.</b>	<b>Application Software</b>							
1.1	Meter Data Acquisition Software (MDAS)/Head End System (HES)	Lot						
1.2	Meter data management (MDM)	Lot						
1.3	....							
..	..							
	Sub Total 1							
<b>2.</b>	<b>Data Archiving Software</b>							
2.1	Data Archiving and SAN management software	Lot						
2.2	....							
..	..							
	Sub Total 2							
<b>3.</b>	<b>Network Management Software</b>							
3.1	Centralized network management software along with patch management & identity management	Lot						
3.2	Antivirus software for all machines in control center	Lot						
3.3	Access control software with single sign on feature							
..	..							

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
	Sub Total 3							
<b>4.</b>	<b>Installation &amp; Commissioning</b>							
4.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job						
4.2	....							
..	..							
	Sub Total 4							
<b>5.</b>	<b>Other Requirement</b>							
5.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job						
	Sub Total 4							

**Table 3: Bill of Materials and Services for Hardware [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
1.	<b>Hardware for Application</b>							

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
1.1	Application Server	Set						
1.2	Web server	Set						
1.3	....	Set						
1.4	....							
1.5	....							
..	..							
	Sub Total 1							
<b>2.</b>	<b>Hardware for Storage</b>							
2.1	SAN based storage	Nos.						
2.2	Data Archiving Server	Nos.						
2.3	....							
..	..							
	Sub Total 2							
<b>3.</b>	<b>Hardware for Network Management</b>							
3.1	Network Management server with patch & identity management	Lot						
3.2	Centralized management console with single monitor	Lot						
3.3	....							
..	..							
	Sub Total 3							
<b>4.</b>	<b>Hardware for Network Management</b>							
4.1	Workstation consoles with dual 24" monitor along with Operating System & license	Set						
4.2	....							

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
..	..							
	Sub Total 4							
<b>5.</b>	<b>Network Hardware</b>							
5.1	Firewall with Network-based intrusion prevention system (NIPS)	Set						
5.2	Router	Set						
5.3	LAN Switch	Set						
5.4	....							
5.5	....							
..	..							
	Sub Total 5							
<b>6.</b>	<b>Mandatory Spares</b>							
6.1	X% of Sub total 1+2+3+4+5	Lot						
6.2	....							
..	..							
	Sub Total 6							
<b>7.</b>	<b>Installation &amp; Commissioning</b>							
7.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job						
7.2	....							
..	..							
	Sub Total 7							

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
<b>8.</b>	<b>Other Requirement</b>							
8.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job						
	Sub Total 8							

**Table 4: Bill of Materials and Services for Bandwidth Charges [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
<b>1.</b>	<b>Bandwidth Charges</b>							
1.1	Communication link to Control Center MPLS-VPN broadband Link through fiber from service provider per annum	Year 1						
		Year 2						
		Year 3						
		Year 4						
		Year 5						
		Year 6						
		Year 7						

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
1.2	Network Connectivity Charges for FOC/3G/CDMA/ GPRS for AMI	Year 1						
		Year 2						
		Year 3						
		Year 4						
		Year 5						
		Year 6						
		Year 7						
1.3	....							
..	..							
	Sub Total 1							

**Table 5: Bill of Materials and Services for Training [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
1.	<b>Training at Site</b>							
1.1	Smart Meter & Communication network	Days						

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
1.2	HES & MDM, Protocol , Database, User Interface, Display and Application software	Days						
1.3	Computer System Hardware & Software	Days						
1.4	....							
..	..							
	Sub Total 1							

**Table 6: Bill of Materials and Services for Operation and Maintenance [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity	Rate per Unit	GST (IGST/ CGST/ SGST/ UGST) applicable in %	Any other applicable taxes, duties, levies, etc. in %	Unit rate inclusive of all taxes, duties, levies, etc. (in INR)	Total inclusive of all taxes, duties, levies, etc. (in INR) F.O.R. destination basis
1.	<b>Operation and Maintenance</b>							
1.1	Operation of complete system (during warranty period)	Job						
1.2	Maintenance of complete System during FMS period	Job						
1.3	....							
..	..							
	Sub Total 1							

## **Annexure 12: Format of Contract between [Employer] and Project Implementing Consortium**

*[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 100/-) or appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting Bid are required to follow the applicable law in their country.]*

**THIS Contract Agreement** (hereinafter referred to as "Agreement") executed on this ..... [date] day of ..... [month], ..... [year] between:

**BETWEEN:**

[Employer] (hereinafter referred to as "Party 1" which expression shall unless repugnant to the context or meaning thereof include its successors, assigns and permitted substitutes), a company incorporated under the Companies Act, 1956, and having its registered office at [Address];

**AND**

.....[Name of the Lead Consortium Member], a company incorporated under the laws of..... [Country of incorporation of the Lead Consortium Member], with its registered office at..... [Registered address of the Company] (hereinafter referred to as the "**Lead Consortium Member**" or "**Party 2**" which expression shall unless repugnant to the context or meaning thereof include its successors, assigns and permitted substitutes).

**WHEREAS** [Employer] had invited Bids for Appointment of AMI Implementing Agency for Implementation of AMI Project (the "Project") through Tender No. [Tender Details]

**WHEREAS** various Bids were received pursuant to the RFP;

**WHEREAS** the Lead Consortium Member has formed a Consortium to Bid in response to the RFP with the following Consortium Members as per the terms of the RFP:

1. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called the "**Party 3**," which expression shall include its successors, executors and permitted assigns);
2. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called the "**Party 4**," which expression shall include its successors, executors and permitted assigns);
3. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called the "**Party 5**," which expression shall include its successors, executors and permitted assigns);  
.....
4. M/s. ...., a company incorporated under the laws of ..... and having its Registered Office at .....

(hereinafter called the "**Party n,**" which expression shall include its successors, executors and permitted assigns);

**WHEREAS** all the members of the Consortium agree to the terms of the RFP in its entirety without any deviation;

**WHEREAS** the Consortium represented by the Lead Consortium Member has been selected as the Project Implementing Consortium to implement the Project in the sum of ..... [Input the price of the Contract here] (hereinafter "**the Contract Price**").

**WHEREAS** the Lead Consortium Member is individually referred to as the "**Contractor**" and the members of the Bidding Consortium including the Lead Consortium Member are hereinafter collectively referred to as the "**Contractors.**"

**WHEREAS** [Employer] and the Bidders are hereinafter collectively referred to as the "**Parties**" and individually as a "**Party.**"

**AND WHEREAS** in pursuance of having accepted the said bid the parties have agreed to enter into this agreement.

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. The words and expressions in this Agreement shall have the same meanings as are respectively assigned to them in the RFP.
2. All contents of the RFP and subsequent Bid submitted by the Lead Consortium Member (the "Contract Documents") shall be deemed to form and be read and construed as a part of this Agreement.
3. In consideration of the payments to be made by [Employer] to the Contractor as indicated in this Agreement, the Contractor hereby covenants with [Employer] to provide the Solution and to remedy the defects therein and bring them in conformity in all respects with the provisions of the Contract Documents.
4. [Employer] hereby covenants to pay Contractor in consideration of the provision of the Solution and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract Document at the times and in the manner prescribed in the Contract Documents.

IN WITNESS WHEREOF, the Contractor and [Employer], executed these presents and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

1. Common Seal of [Employer] has been affixed in my/ our presence pursuant to Board Resolution dated .....

For [Employer]

[Signature of Authorized Representative]

.....  
[Name of the Authorized Representative]

[Designation of the Authorized Representative]

2. Common Seal of ..... [Name of the Lead Consortium Member], has been affixed in my/ our presence pursuant to Board Resolution dated .....  
For.....

[Name of the Lead Consortium Member],  
[Signature of Authorized Representative]

.....  
[Name of the Authorized Representative]

[Designation of the Authorized Representative]

**WITNESS:**

1. ..... (Signature) Name

.....  
Designation.....

2. ..... (Signature) Name

.....  
Designation.....

**Attested:**

.....  
[Signature]  
(Notary Public)

Place: .....

Date: .....

## **Annexure 13: Format of Performance Security Bank Guarantee to be provided by Selected Bidder**

*[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 100/-) or appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting Bid are required to follow the applicable law in their country]*

Reference No. .... Bank Guarantee No. .... Dated: .....

To:

[Employer]

[Address]

Dear Sir/ Madam,

WHEREAS..... *[Insert name of the Lead Consortium Member]* with address ..... [Insert address of the Lead Consortium Member] having its registered office at ..... [Insert address of the Lead Consortium Member] (hereinafter, the "Contractor"), subsequent to participation in Tender No. [Tender Details] (the "RFP") issued by [Employer] (hereinafter, the "Beneficiary") for Appointment of AMI Implementing Agency for Implementation of AMI Project, have been issued the Letter of Award as the Selected Bidder.

And WHEREAS a Bank Guarantee for Rupees ..... *[Insert amount in words equivalent to 10% of the contract value]* (.....) *[Insert amount in figures]* valid till..... *[Insert date two years from the date of Operational Acceptance of the project]* is required to be submitted by the Contractor as per the terms and conditions of the RFP.

We,.....*[Insert name of the Bank and address of the Branch giving the Bank Guarantee]* having our registered office at .....[Insert address of the registered office of the Bank] hereby give this Bank Guarantee No. ....*[Insert Bank Guarantee number]* dated .....*[Insert the date of the Bank Guarantee]*, and hereby agree unequivocally and unconditionally to pay immediately on demand in writing from the Beneficiary any officer authorized by it in this behalf any amount not exceeding Rupees ..... *[Insert amount in words]* (.....) *[Insert amount in figures]* to the said Beneficiary on behalf of the Contractor.

We ..... *[Insert name of the Bank]* also agree that withdrawal of the Bid or part thereof by the Bidder within its validity or non-submission of Performance Security by the Bidder within the stipulated time of the Letter of Award to the Bidder or any violation to the relevant terms stipulated in the RFP would constitute a default on the part of the Bidder and that this Bank Guarantee is liable to be invoked and encashed within its validity by the Beneficiary in case of any occurrence of a default on the part of the Bidder and that the encashed amount is liable to be forfeited by the Beneficiary.

This agreement shall be valid and binding on this Bank up to and inclusive of ..... *[Insert the date of validity of the Bank]* and shall not be terminable by notice or by Guarantor change in the constitution of the Bank or the firm of the Bidder Or by any reason whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or

variations or alternations made, given, conceded with or without our knowledge or consent by or between the Bidder and the Beneficiary.

NOTWITHSTANDING anything contained hereinbefore, our liability under this guarantee is restricted to Rupees ..... [*Insert amount in words equivalent to 10% of the contract value*]. Our Guarantee shall remain in force till ..... [*Insert date two years from the date of Operational Acceptance of the project*]. Unless demands or claims under this Bank Guarantee are made to us in writing on or before ..... [*Insert date two years and one month from the date of Operational Acceptance of the project*], all rights of the Beneficiary under this Bank Guarantee shall be forfeited and we shall be released and discharged from all liabilities there under.

[*Insert the address of the Bank with complete postal branch code, telephone and fax numbers, and official round seal of the Bank*]

[*Insert signature of the Bank's Authorized Signatory*]

Attested:

..... [Signature] (Notary Public)

Place: ..... Date: .....

---

#### **INSTRUCTIONS FOR SUBMITTING BANK GUARANTEE**

- 1 Bank Guarantee to be executed on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign entities submitting Bids are required to follow the applicable law in their country.
- 2 The Bank Guarantee by Bidder shall be given from Nationalized Banks including Public Sector Banks
- 3 Private Sector Banks authorized by RBI to undertake the state Government business are [Name of Banks]
- 4 The Banks shall be the recognized or notified by the Finance Department, Government of [name of state] from time to time.
- 5 The full address along with the Telex/Fax No. and e-mail address of the issuing bank to be mentioned.

## **Annexure 14: Format of Bank Guarantee to be provided by Selected Bidder for 10% of FMS cost**

*[To be on non-judicial stamp paper of Rupees One Hundred Only (INR 100/-) or appropriate value as per Stamp Act relevant to place of execution, duly signed on each page. Foreign entities submitting Bid are required to follow the applicable law in their country]*

Reference No. .... Bank Guarantee No. .... Dated: .....

To:

[Employer]

[Address]

Dear Sir/ Madam,

WHEREAS..... *[Insert name of the Lead Consortium Member]* with address ..... [Insert address of the Lead Consortium Member] having its registered office at ..... [Insert address of the Lead Consortium Member] (hereinafter, the "Contractor"), subsequent to participation in Tender No. [Tender Details] (the "RFP") issued by [Employer] (hereinafter, the "Beneficiary") for Appointment of AMI Implementing Agency for Implementation of AMI Project, have been issued the Letter of Award as the Selected Bidder.

And WHEREAS a Bank Guarantee for Rupees ..... *[Insert amount in words equivalent to 10% of the FMS cost]* (.....) *[Insert amount in figures]* valid till..... *[Insert date 6 months from the date of completion of six year FMS period]* is required to be submitted by the Contractor as per the terms and conditions of the RFP.

We,.....*[Insert name of the Bank and address of the Branch giving the Bank Guarantee]* having our registered office at .....[Insert address of the registered office of the Bank] hereby give this Bank Guarantee No. ....*[Insert Bank Guarantee number]* dated .....*[Insert the date of the Bank Guarantee]*, and hereby agree unequivocally and unconditionally to pay immediately on demand in writing from the Beneficiary any officer authorized by it in this behalf any amount not exceeding Rupees ..... *[Insert amount in words]* (.....) *[Insert amount in figures]* to the said Beneficiary on behalf of the Contractor.

We ..... *[Insert name of the Bank]* also agree that withdrawal of the Bid or part thereof by the Bidder within its validity or non-submission of FMS Security by the Bidder within the stipulated time of the Letter of Award to the Bidder or any violation to the relevant terms stipulated in the RFP would constitute a default on the part of the Bidder and that this Bank Guarantee is liable to be invoked and encashed within its validity by the Beneficiary in case of any occurrence of a default on the part of the Bidder and that the encashed amount is liable to be forfeited by the Beneficiary.

This agreement shall be valid and binding on this Bank up to and inclusive of ..... *[Insert the date of validity of the Bank]* and shall not be terminable by notice or by Guarantor change in the constitution of the Bank or the firm of the Bidder Or by any reason whatsoever and our liability hereunder shall not be impaired or discharged by any extension of time or

variations or alternations made, given, conceded with or without our knowledge or consent by or between the Bidder and the Beneficiary.

NOTWITHSTANDING anything contained hereinbefore, our liability under this guarantee is restricted to Rupees ..... [*Insert amount in words equivalent to 10% of the FMS cost*]. Our Guarantee shall remain in force till ..... [*Insert date 6 months from the date of completion of six year FMS period*]. Unless demands or claims under this Bank Guarantee are made to us in writing on or before..... [*Insert date 7 months from the date of completion of six year FMS period*], all rights of the Beneficiary under this Bank Guarantee shall be forfeited and we shall be released and discharged from all liabilities there under.

[*Insert the address of the Bank with complete postal branch code, telephone and fax numbers, and official round seal of the Bank*]

[*Insert signature of the Bank's Authorized Signatory*]

Attested:

..... [Signature] (Notary Public)

Place: .....

Date: .....

---

#### **INSTRUCTIONS FOR SUBMITTING BANK GUARANTEE**

- 1 Bank Guarantee to be executed on non-judicial stamp paper of appropriate value as per Stamp Act relevant to place of execution. Foreign entities submitting Bids are required to follow the applicable law in their country.
- 2 The Bank Guarantee by Bidder shall be given from Nationalized Banks including Public Sector Banks
- 3 Private Sector Banks authorized by RBI to undertake the state Government business are [Name of Banks]
- 4 The Banks shall be the recognized or notified by the Finance Department, Government of [name of state] from time to time.
- 5 The full address along with the Telex/Fax No. and e-mail address of the issuing bank to be mentioned.



National Smart Grid Mission  
Ministry of Power  
Government of India



## MODEL REQUEST FOR PROPOSAL (RfP)

### FOR THE APPOINTMENT OF AMI IMPLEMENTATION AGENCY FOR AMI PROJECTS IN INDIA

#### Volume 2 – Technical Requirement and Scope of Work

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## Definitions

1. “AMI Implementing Agency” or “AMI-IA”	: Same as “Project Implementing Consortium”
2. “Bid(s)”	: The bid submitted by the Bidder(s) in response to this RFP
3. “Bidder(s)”	: Firms including Company(s) registered or Consortium of Companies/Firms bidding in response to this RFP
4. “Bidding Consortium”	: The Consortium of Bidders legally bound as per the terms and formats of this RFP to bid for the Project.
5. “Consortium Member”	: Any Member of the Bidding Consortium other than the Lead Consortium Member.
6. “Contract”	: The Agreement between [Employer] and the Successful Bidder upon receiving the Letter of Award from [Employer] for implementation of the Project.
7. “Contractor”	: Same as “Project Implementing Consortium”
8. “Employer”	: Same as the “Project Management Agency” or PMA
9. “Financial Year” or “FY”	: Period starting from 1 April of the first calendar year to 31 March of the consecutive calendar year.
10. “Lead Consortium Member”	: The Consortium Member taking the lead in submitting this RFP with eligibility, roles and responsibilities outlined in Volume 1 Clause 4.3.2 of this RFP and duly supported by the legal agreements as per formats in this RFP.
11. “MTS”	: Minimum Technical Standards as defined in Volume 2 of this RFP.
12. “Party” or “Parties”	: [Employer/PMA], [Utility], the Bidder, and the Project Implementing Consortium, individually or collectively, respectively.
13. “Project”	: [Utility]’s AMI Project defined in Section 1.

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14. “Project Implementing Consortium” or “Contractor” or “AMI-IA”	: The Consortium or the Contractor with the highest score of the Evaluated Bid Value appointed by [Employer] upon signing of the Contract subsequent to the Letter of Award.
15. “Project Management Agency” or “PMA”	: Project Management Agency is a specialized entity, [Provide Name] which has been appointed by [utility] for designing, financing, implementing, operating and transferring the AMI project in its area of operation.
16. “Request for Proposal” or “RFP”	: This Tender No. [Tender Name and Details] including all its Volumes for Appointment of AMI Implementing Agency (including all clarification/ addendum/ amendment/ corrigendum/ etc. issued from time to time)
17. “Rupees” or “Rs.” Or “INR” or “₹”	: Indian Rupees
18. “Service(s)” or “Related Service(s)”	: Any service(s) performed or to be performed as a part of the Solution by the Contractor.
19. “Solution”	: The system within the Scope of Work of the Project as defined by this RFP, and implemented in its entirety including but not limited to the supply of hardware, transportation, software, installation, integration, testing, commissioning, training operation, maintenance and other services by the Project Implementing Consortium.
20. “Successful Bidder”	: Successful Qualifying Consortium with the highest score of the Evaluated Bid Value.
21. “Tender”	: Same as “RFP”

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## Abbreviations

<b>ACL</b>	Access Control List
<b>AMC</b>	Annual Maintenance Charges
<b>AMI</b>	Advanced Metering Infrastructure
<b>ANSI</b>	American National Standards Institute
<b>BCS</b>	Base Computing System
<b>BIS</b>	Bureau of Indian Standards
<b>BOQ</b>	Bill of Quantity
<b>CAIDI</b>	Customer Average Interruption Duration Index
<b>CAIFI</b>	Customer Average Interruption Frequency Index
<b>CEA</b>	Central Electricity Authority
<b>CEN</b>	European Committee for Standardization
<b>CENELEC</b>	European Committee for Electrotechnical Standardization
<b>CERT-In</b>	Indian Computer Emergency Response Team
<b>CIM</b>	Common Information Model
<b>CIS</b>	Consumer Information System
<b>CISPR</b>	International Special Committee on Radio Interference
<b>CPU</b>	Central Processing Unit
<b>CRM</b>	Customer Relationship Management
<b>CT</b>	Current Transformer
<b>DBMS</b>	Database Management System
<b>CUM</b>	Cumulative
<b>DMZ</b>	Demilitarized Zone
<b>DCU</b>	Data Concentrator Unit
<b>DXF</b>	Drawing Exchange Format
<b>DT</b>	Distribution Transformer
<b>ESB</b>	Enterprise Service Bus
<b>ETSI</b>	European Telecommunications Standards Institute
<b>FAT</b>	Factory Acceptance Test
<b>GPRS</b>	General Packet Radio Service
<b>GIS</b>	Geographic Information System

<b>HDD</b>	Hard Disk Drive
<b>GPS</b>	Global Positioning System
<b>GUI</b>	Graphical User Interface
<b>HIDS</b>	Host-based Intrusion Detection System
<b>HES</b>	Head End System
<b>HHU</b>	Hand Held Unit
<b>IBMS</b>	Integrated Building Management Systems
<b>IDS</b>	Intrusion Detection Systems
<b>IEC</b>	International Electrotechnical Commission
<b>ISO</b>	International Organization for Standardization
<b>IP</b>	Internet Protocol
<b>IS</b>	Indian Standard
<b>ITU</b>	International Telecommunication Union
<b>ISP</b>	Internet Service Provider
<b>IVRS</b>	Interactive Voice Response System
<b>LCD</b>	Liquid Crystal Display
<b>kVA</b>	kilo Volt-Ampere
<b>kW</b>	kilo Watt
<b>LAN</b>	Local Area Network
<b>LED</b>	Light Emitting Diode
<b>MCB</b>	Miniature Circuit Breaker
<b>LT</b>	Low Tension
<b>MICC</b>	Mineral-Insulated Copper-Clad Cable
<b>MD</b>	Maximum Demand
<b>MDAS</b>	Meter Data Acquisition System
<b>MDMS</b>	Meter Data Management System
<b>NABL</b>	National Accreditation Board for Testing and Calibration Laboratories
<b>NCIIPC</b>	National Critical Information Infrastructure Protection Centre
<b>NAN</b>	Neighbourhood Area Network
<b>NIC</b>	Network Interface Card
<b>NIPS</b>	Network based Intrusion Prevention System

<b>NTP</b>	Network Time Protocol
<b>NMS</b>	Network Management System
<b>OEM</b>	Original Equipment Manufacturer
<b>OSF</b>	Open Software Foundation
<b>OS</b>	Operating System
<b>PT</b>	Potential Transformer
<b>PLCC</b>	Power Line Carrier Communication
<b>PV</b>	Photovoltaic System
<b>QA</b>	Quality Assurance
<b>QC</b>	Quality Control
<b>QR</b>	Qualification Requirement
<b>RAM</b>	Random Access Memory
<b>R-APDRP</b>	Restructured Accelerated Power Development and Reforms Programme
<b>RDBMS</b>	Relational Database Management System
<b>RF</b>	Radio Frequency
<b>RFP</b>	Request for Proposal
<b>RPO</b>	Recovery Point Objective
<b>RTC</b>	Real Time Clock
<b>RTO</b>	Recovery Time Objective
<b>SAIDI</b>	System Average Interruption Duration Index
<b>SAIFI</b>	System Average Interruption Frequency Index
<b>SAN</b>	Storage Area Network
<b>SAT</b>	Site Acceptance Test
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>SLA</b>	Service Level Agreement
<b>SNMP</b>	Simple Network Management Protocol
<b>SOA</b>	Service Oriented Architecture
<b>SQL</b>	Structured Queried Language
<b>TCP</b>	Transmission Control Protocol
<b>TOD</b>	Time of Day
<b>TOU</b>	Time of Use

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<b>UDP</b>	User Datagram Protocol
<b>UPS</b>	Uninterrupted Power Supply
<b>VEE</b>	Validation Estimation and Editing
<b>WAN</b>	Wide Area Network
<b>WPC</b>	Wireless Planning & Coordination Wing
<b>XML</b>	Extensible Markup Language

---

# 1. Introduction and General Information

## 1.1 Background

[Utility] has appointed [Name of Employer] as the “Project Management Agency (PMA)” or the “Employer” for designing, financing, implementing, operating and transferring the AMI project in its area of operation. PMA will appoint the AMI Implementation Agency (on behalf of [Utility]) , finance the project and manage the entire project deployment and its operations. The project will be transferred to the utility at no cost at the end of the project period. The PMA will interface with both the utility and Contractor. As such, the Contractor will be interfaced with the PMA from both project implementation and contractual purposes. The roles and responsibilities of the Contractor and payment thereof are governed by the Terms and Conditions of this RFP.

<The Terms and Conditions of this RFP have been defined considering a large scale implementation of AMI project. It is therefore preferred, that this RFP be applicable for installation size of minimum 10 lakh Smart Meters>

### < Instructions for Bidders:

- Note 1: The provisions in angle brackets ( <> ) are for guidance and should be omitted from the RFP before it is issued to prospective Bidders.
- Note II: All project-specific provisions in this RFP have been enclosed in square parenthesis and may be modified, as necessary, before issuing the RFP to prospective Bidders. The square parenthesis should be removed after carrying out the required modification>

## 1.2 Project Objective

The objective of the RFP is to select contractor for supply, installation, testing, commissioning and maintenance of Advanced Metering Infrastructure, including smart meters [with/without net-metering], communication infrastructure along with applications for Head End System (HES), Meter Data Management (MDM) System<sup>1</sup>. The project shall also include integration of HES with MDMS and MDMS with existing Utility applications as defined in this specification document<sup>1</sup>.

The key strategic objectives for AMI implementation include:

- **Achieve Operational Efficiencies:** Reduced operating costs in areas such as meter reading and punching, connection/disconnection, consumer complaints, reduced float between meter reading and bill generation
- **Revenue Protection:** Reduced commercial loss with accurate energy accounting, detection of meter tampering and improved meter reading accuracy
- **Improved Load and Power Quality Management:** Better visibility of loading and power quality factors on the transformers to enable accurate capacity planning and prevention of failure/under-utilization of asset
- **Faster Outage Detection:** Near real time notification outages to enable faster detection and restoration

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<sup>1</sup> 1 Utility to define if the AMI system will be integrating to any existing MDMS or a new MDMS shall be supplied within the scope of the present AMI RFP.

- **Keep Customer Bills Low:** achieving the conservation benefits, operational efficiencies, and revenue protection lead to utility rate reductions which translate directly into customer savings.
- **Improved Customer Service:** Provide near real-time, accurate and detailed information on consumption, cost and outages
- **Achieve Energy Efficiency:** Ability to monitor electricity consumption in near real time, consumers can manage consumption to achieve energy efficiency and save money
- **Achieve Environment and Social Benefits:** Facilitating energy efficiency, improved load management and reduced commercial losses to enable reduced greenhouse gas emissions
- **Support Advanced Customer Applications:** provide a substantial portion of the foundational infrastructure required to modernize the grid in support of advanced customer applications such as distributed generation, electric vehicles, demand response, micro-grids, and future applications.

These additional features should also be considered

- ✓ Energy audits can be done at distribution transformer level as per desired frequency to check leakage and pilferage
- ✓ Load pattern of individual consumer can be observed
- ✓ Withdrawal of power above sanctioned load may be monitored and controlled
- ✓ Tampering may be checked in near real time
- ✓ Control actions from control centre for load curtailment may be taken
- ✓ Sending alert to consumer for higher load withdrawal, bill non-payment etc.
- ✓ Signal transmission for variable pricing,
- ✓ Customer participation in demand response programmes

### 1.3 About [Utility]

[Write-up of Utility detailing the Background of the Utility and Context and Situation of the Utility with regard to the present project]

[Project Area Details:

- i. Existing Network Details: No of consumer, consumer type, feeders/DT/ substation details, etc.
- ii. Demand Supply Scenario : Peak Load and Select Load Profiles
- iii. Existing Project Energy Profile: Feeder/ DT wise AT&C losses (Energy Input, output), expected load growth, reliability indices, etc.
- iv. Manpower and Assets
- v. Existing Power System Communication Systems
- vi. Existing IT systems/SCADA systems
- vii. Existing Business Process and Systems including: Outage Management, Asset Management, Billing, Customer Service, Geographic Information System]

<Utility to enter brief details on the above areas in this section with details added as an annexure to this document>

## **1.4 Scope of Work**

The bidder scope of work shall include, in complete conformity with subsequent sections of the specifications, site survey, planning, design, engineering, manufacturing, supply, transportation & insurance, delivery at site, unloading, handling, storage, installation, integration, testing, commissioning, demonstration for acceptance, training, maintenance and documentation of:

- (i) Single phase whole current smart meter [with/without net-metering] with suitable communication technology
- (ii) Three phase whole current smart meter [with/without net-metering] with suitable communication technology
- (iii) CT operated three phase smart meter [with/without net-metering] with suitable communication technology
- (iv) Communication Infrastructure (Shall be provided based on Radio Frequency (RF) mesh Licensed frequency band as permitted by Wireless Planning & Coordination Wing (WPC) or in Unlicensed frequency band / Power Line Carrier Communication (PLCC) or GPRS/3G/4G communication technology or combination of these technologies as per the specifications mentioned in this document and to ensure the performance level given in this document)
- (v) Integration of Network Integration Card (NIC)/ Communication Module with meters of at least 3 manufacturers in India, to enable the respective meters to seamlessly integrate with proposed HES and/or MDMS thus enabling interoperability of the system. In future, it would be bidders' responsibility to integrate new meter or any other application/equipment as decided by [utility].
- (vi) Head End System (HES) / Meter Data Acquisition System (MDAS)
- (vii) Meter Data Management (MDM) System<sup>2</sup> (shall be developed on a COTS product platform and must have been deployed and functional in at least two utilities.)
- (viii) Mobile app (Android and iOS based) for consumers
- (ix) Other necessary software with valid licenses.
- (x) Integration of different devices/equipment/software covered in scope of this project with each other as per functional requirements
- (xi) Integration with external interface as defined in this specification.
- (xii) Planning, deployment & tuning of communication systems to meet the performance requirements as specified in the bidding document
- (xiii) AMI Control Centre hardware such as server, workstation, storage, network & cyber security devices, printer, display system etc. as per vendor requirement to meet performance criteria specified in this document (Minimum specifications for hardware and software have been defined in Section 6 and Section 7)<sup>3</sup>
- (xiv) All cabling associated with control centre hardware, communication systems and power supply source

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<sup>2</sup> Utility to define if the AMI system will be integrating to any existing MDMS or a new MDMS shall be supplied within the scope of the present AMI RFP. For a new MDMS to be supplied, Section 3.7 would be applicable.

<sup>3</sup> Setting up the control centre shall be limited to creating the essential infra that are required to host the incoming UPS, Servers, Work Stations, Displays, LAN/DMZ and access points as part of an existing or a new control centre. The utility to clearly spell out what exists.

- (xv) Deployment of suitable backend communication technology (GPRS, Radio, Leased Line etc.) may be considered for data communication to control centre. However, cellular connectivity may be checked before deployment. GPRS SIM cards shall be provided by the contractor in the name of utility for which necessary support shall be provided by utility. Service Level Agreement with service providers shall be done by contractor and it is the responsibility of the contractor to ensure the SLAs defined in section 4 are met.
- (xvi) Generation of analytics reports as detailed in section 3.7.11 to aid in decision making at various levels of utility

The detailed BOQ is given in Annexure E. The Bidder has to carry out the detailed survey and collect the required data. All other associated works/items described in the Technical Specifications for a viable and fully functional system is the responsibility of Bidders.

The contractor shall have to maintain the system for Seven (7) years after operational acceptance by [employer/utility]. During the seven years of maintenance, Contractor shall maintain system availability as mentioned in this document. Contractor shall also maintain necessary spares such as smart meters, routers, etc. to attend problems during maintenance of the system. During maintenance period, contractor shall maintain the service level as explained in this Technical Specifications. The Contractor shall also bear the cost of recurring charges for GPRS/3G/4G, static ISP connection and any license fee for operating RF in licensed frequency band till completion of maintenance period.

Comprehensive warranty should be provided for the system, by the contractor(s), for one (1) year after operational acceptance by [employer/utility].

Scope also includes

- 1) Consumer Indexing
- 2) Capturing the baseline parameters/KPIs that are proposed for improvement (as defined in section 3.7.11)
- 3) Develop an overall AMI Architecture capable of upgrades and scaling out as per future requirements.
- 4) Installation of additional equipments to account for area load growth during maintenance period as defined in Volume 1 section 5.10 of this RFP
- 5) System Security and access with due consideration of data privacy, confidentiality cyber security guidelines.
- 6) Preparation of an approach paper describing overall architecture and operational philosophy of the proposed AMI solution and methodology for achieving different functionalities, specified in this document and also highlight additional features, if any

This RFP is being floated by [employer] on behalf of [utility] to appoint a contractor for Supply, Implementation Testing, Commissioning & Maintenance of AMI system at [utility].

## **2. General Requirements**

### **2.1 General Responsibilities and Obligations**

The Bidders must conform to the requirements and provide a list of equipment (including any special equipment) necessary to meet the functional & performance requirements stated herein. It should be noted that preliminary design information and Bill of Quantity (BoQ) specified in this specifications are indicative only except the quantities of smart meters. The Bidders shall verify the design data during the site surveys & detail engineering and finalize the BOQ as required for ultimate system design & development to meet performance requirements.

**Bidder shall submit Clause by Clause compliance to the Technical Specifications (forming part of RFP Document read in conjunction with amendments, if any. Deviation if any shall be clearly mentioned.**

The bidder's proposal shall address all functional and performance requirements within this specification and shall include sufficient information and supporting documentation in order to determine compliance with this specification without further necessity for inquiries.

Bidder may provide all applications in one suite or multiple modules to meet all the Technical Specification requirements. The bidder's proposal shall clearly identify all features described in the specifications or in any supporting reference material that will not be implemented; otherwise, those features shall become binding as part of the final contract.

An analysis of the functional and performance requirements of this specification and/ or site surveys, design, and engineering may lead the Bidders to conclude that additional items (for example communication repeater, router etc.) are required that are not specifically mentioned in this specification. The Bidders shall be responsible for providing at no added cost to the Employer, all such additional items such that a viable and fully functional AMI system is implemented that meets or exceed the capacity and performance requirements specified. Such materials shall be considered to be within the scope of the contract. To the extent possible, the bidder shall identify and include all such additional items in their proposal.

The offered items shall be designed to operate in varying environments. Adequate measures shall be taken to provide protection against contaminants, pollutants, rain water & moisture, lightning & short circuit, vibration and electro-magnetic interference etc. The Bidders shall demonstrate a specified level of performance of the offered items during well- structured factory and field tests.

All equipment provided shall be designed to interface with other equipment and shall be supporting all present requirements and spare capacity requirement identified in the Technical Specifications.

The Bidders are advised to visit sites (at their own expense), prior to the submission of the proposal, and make surveys and assessments as deemed necessary for proposal submission. The successful Bidder (Contractor) shall be required to visit project area for detailed site surveys for performing the design and implementation functions.

After the site survey the Contractor shall submit a survey report. This report shall include at least the following items (however, the exact parameter for survey & format of the survey report shall be finalized by the Contractor with the approval of [employer/utility]):

- Proposed routing of power, earthing, communication signal cables including trenches etc.
- Tentative location of devices/equipment for setting up communication network.
- Consumer indexing of the project area (mapping of consumers (including their GPS coordinates) with DTs and Feeder)
- Confirmation of adequacy of space and AC power supply requirements.
- Identify all additional items required for interconnection with the existing/owner provided equipment/facilities
- Verification of all integrations with external systems as mentioned in the RFP
- Requirement of modification to existing earthing arrangement of control centre and locations where communication equipment / devices etc. are to be installed, if any

## 2.2 Access to Utility Facilities

[employer] to facilitate through the [utility] management, safe and reasonable access to utility premises for contractor's personnel and third party vendors. This facilitation shall include, space for data centers, working space including air conditioning, light, ventilation, electric power and outlets. The contractor's personnel shall comply with all applicable rules, regulations and requirements relating to visitors on the premises of [utility].

## 2.3 Responsibilities for the Implementation Plan

The bidder's technical proposal shall include a project implementation plan and schedule spread over [x] months from date of commencement that is consistent with the implementation plan detailed in this specification. The Implementation plan shall include the activities of both the Bidders and the [employer/utility], showing all key milestones and clearly identifying the nature of all information and project support expected from the [employer/utility]. The [employer/utility] and Bidders together shall finalize the detailed implementation plan following award of the contract.

## 2.4 Contractor's Responsibilities and Obligations

Contractor's obligations include, but are not limited to, the following:

- 1) To provide a working system that meets or exceeds the functional and performance requirements of this specification without affecting the operation of the existing systems.
- 2) To perform equipment engineering and design specific to each location including review of, and conformance with local environmental and earthing considerations.
- 3) Installation of field devices, hardware, software and communication system.
- 4) To develop O&M guidelines.
- 5) Overall integration of equipment/subsystem as defined in this RFP document
- 6) Integration of new Meters
- 7) Sharing of relevant interface details at DCU, HES and MDM layers

- 8) Achieving interoperability for AMI through incorporation of the communication modules (NICs) inside the Smart meters of any make of Smart meters as short listed by utility for this project area in the future.
- 9) Identifying, buying and maintenance of spares under AMC along with main items to ensure system availability during installation and maintenance period.
- 10) Project management, project scheduling, including periodic project reports (weekly/monthly basis) documenting progress during the contract period.
- 11) To provide engineering and technical assistance during the contract warranty and maintenance period.
- 12) Updation of consumer indexing in the AMI system during the installation and maintenance period
- 13) To identify all additional Equipment and services necessary to ensure compatibility between new and existing equipment.
- 14) To implement all minor civil works necessary for installation of proposed equipment and provide the details of such work to the [employer/utility].
- 15) To define source power requirements for each cabinet/ rack of equipment provided and the total power requirements to run the system
- 16) To ensure that all the required hardware, software, and firmware satisfy the requirements of this specification and are suitable for future scaling, optionally with upgrades.
- 17) To conduct factory and site acceptance testing of all hardware, software and firmware provided
- 18) Conduct type tests or provide documented evidence of type testing and BIS certification to the [employer/utility] as sought in specifications.
- 19) To provide a Quality Assurance Plan and access to the manufacturing process, as required.
- 20) Shipment of all equipment to designated locations and/or storing areas.
- 21) To provide storing, maintenance of storing area and security including full responsibility for protection from theft and fire for all the items to be supplied. The warehouse may be a temporary storage area to be constructed by contractor or the same may be taken on rent in [utility's] premises.
- 22) Prepare and submit all documentation and drawings in hard copy as well as soft copy.
- 23) Supply all required spare parts, maintenance aids, and test equipment, software maintenance and testing tools
- 24) Training of the [Employer/Utility's] personnel.
- 25) Hardware, software, and firmware maintenance, debugging, and support of the software applications, and maintenance of all supplied equipment.
- 26) To provide full backup of all installed software applications and data.
- 27) To test restoration of the system from the backup provided.
- 28) Availability of service, spare and expansion parts for the supplied items for the complete design life i.e. 7 years from the operational acceptance of the system as per details in various parts of this specification.
- 29) Auxiliary Power Supply comprising of UPS for 8 hours battery backup along with all necessary distribution.
- 30) Assistance in development & implementation of consumer engagement plan

Detailed descriptions of the Contractor's obligations, in relation to individual items and services offered, are delineated in other sections of this specification.

## **2.5 Exclusion from Contractor's Scope**

Following shall be excluded from Contractor's scope:

- Construction of building for AMI Control Centre
- Lighting system for AMI Control Centre
- Interior and IBMS(Integrated Building Management System) of building for AMI Control Centre
- Air conditioning and ventilation for AMI Control Centre
- Firefighting system for AMI Control Centre
- A.C. input power supply for AMI Control Centre

## **2.6 Employer/ Utility's Responsibilities and Obligations**

The [employer] in coordination with [utility] will provide the following items and services as part of this Project:

- 1) Review and approval of the Contractor's designs, drawings, survey reports and recommendations.
- 2) Review and approval of test procedures.
- 3) Participation in and approval of "Type", factory and site acceptance tests.
- 4) Review and approval of training plans & reading material
- 5) Providing support and access to facilities at the sites, including consumer premises.
- 6) Arranging necessary shutdowns and work permits.
- 7) Implement the major civil works such as expansions or construction of rooms, trenches etc. as required for the equipment to be provided by the Contractor.
- 8) Provide to the extent possible drawings for AMI Control Centre building where equipment installations are planned.
- 9) Obtaining requisite statutory clearances and/or approvals as required to be taken by [utility] for project work.
- 10) Providing available details of the consumer indexing and informing the contractor of any changes in the area network during the project installation and maintenance period
- 11) Providing A.C. power supply inputs as defined in this specification
- 12) Provide equipment storage space
- 13) All required documents for delivery of material at site
- 14) Travel expenses of employer's representative during training & testing
- 15) Regulatory support/changes as required
- 16) Approvals/Suggestions for change in submitted documents/ reports to be given to contractor in time bound manner.
- 17) Development & implementation of consumer engagement plan
- 18) Overall project management
- 19) Organize project review meetings
- 20) Releasing funds to contractor as per agreed terms of Payment.

## 2.7 General Bidding Requirements

The Bidder shall be responsive to the technical requirements as set forth in this specification. The bidder's proposal shall include the compliance for Technical Proposal including the documents listed in the Table below shall be provided in the bid.

S. No.	Description	Enclosure Reference	
1.	Details of the supplied hardware		
2.	System Sizing Requirements Annexure-G	Page no. Ref no.	
3.	Quality Assurance Program  (As per Quality Assurance of <b>Technical Specification Volume II</b> )	Page no. Ref no.	
4.	Detailed project implementation plan (As per <b>Technical Specification Volume II</b> ).	Page no. Ref no.	
5.	Approach paper for implementation	Page no. Ref no.	
6.	Schematic Diagram of Proposed System Configuration	Page no. Ref no.	
7.	Overall system architecture capable of scaling out	Page no. Ref no.	
8	Table of Compliance (As per Annexure-D)	Page no. Ref no.	

A detailed project implementation plan and schedule that is consistent with the scope of the project and **[utility's]** specified objectives shall be provided. The plan shall include the activities of the Bidders, **[employer/utility]**, show all key milestones and clearly identify the nature of all information and project support to be provided by **[employer/utility]**.

A commitment and a clearly defined plan to develop a system support organization, **based in India** and capable of providing a full range of local services (including software and hardware maintenance and upgrade support) for the life of the delivered systems.

The bidder may offer the bought-out items from more than one manufacturer.

## 2.8 Applicable Standards

Specifications and codes shall be the latest version, inclusive of revisions, which are in force at the date of the contract award. Where new specifications, codes and revisions are issued during the period of the contract, the Bidders shall attempt to comply with such, provided that no additional expenses are charged to the Employer without Employer's written consent.

In the event the bidder offers to supply material and/or equipment in compliance to any other international standard other than Standards listed in the document, the Bidders shall include with their proposal, full salient features of the new standard for comparison.

In case values indicated for certain parameters in the specifications are more stringent than those specified by the standards, the specification shall override the standards.

## **2.9 Technical Obsolescence**

The systems which are at a risk of technical obsolescence over the operating life of the system should be identified; this should include end-of-sale and end-of-support policies governing the proposed technologies. Forward and backward compatibility need to be considered and mitigation option shall be indicated in detail and shall not be limited to periodic update from OEM/System supplier

### **3. AMI Specifications**

#### **3.1 AMI Functional Requirement**

The main objective of AMI is to enable two way communication between smart energy meter and Head End System (HES) to enable remote reading, monitoring & control of electrical energy meters (consumer, feeder, DT meters etc.) to serve as repository of record for all raw, validated and edited data. The sanitized data may be subscribed by other utility function for higher order analysis and billing and collection engine etc.

The AMI system shall help utility to manage their resource and business process efficiently. AMI system shall support the following minimum functionalities:

- (i) Remote Meter data reading at configurable intervals(push/pull)
- (ii) Time of day (TOD)/TOU metering
- (iii) Pre-paid functionality
- (iv) Net Metering/Billing
- (v) Alarm/Event detection, notification and reporting
- (vi) Remote Load Limiter and connection/ disconnection at defined/on demand conditions
- (vii) Remote firmware upgrade
- (viii) Integration with other existing systems as defined in this document
- (ix) Import of legacy data from existing modules/ MDAS of RAPDRP where ever possible. The extent and modalities of integration with the existing system including RAPDRP has to be worked out by the bidder.
- (x) Security features to prevent unauthorized access to the AMI including Smart meter & meter data etc. and to ensure authentication of all AMI elements by third party.

<This is only an indicative but not exhaustive list. The system should be capable to support the other functionalities as per the requirement of utilities.>

The System should accurately maintain system time synchronization across all devices to ensure accuracy of data. [The system should support the interfacing with the future Smart Grid functionalities like peak load management, outage management system, distribution automation including self-healing system, GIS, distribution transformer monitoring units, Electric vehicle, distributed energy resources etc.] The communication network shall preferably be able to support multiple applications.

The Bidder shall submit an approach paper describing overall architecture and operational philosophy of the proposed AMI solution and methodology for achieving different functionalities, specified in this document and also highlight additional features, if any.

#### **3.2 General AMI System Requirement**

Smart Meter (Single phase whole current, Three phase whole current, CT & PT operated three phase meters and CT operated three phase meters) for consumers/ system shall be provided based on Radio Frequency (RF) mesh in Licensed frequency band as permitted by WPC or in Unlicensed

frequency band / Power Line Carrier Communication (PLCC) or GPRS/3G/4G communication technology or combination of these technologies as per the site requirement and to ensure the performance level given in this document. The smart meter data using RF mesh/PLCC shall be collected by Data Concentrator Units (DCUs)/Access point and transported to HES through WAN while the data from smart meters using GPRS/3G/4G technology shall be transported directly to HES through WAN. The contractor shall ensure proper data exchange among Smart meter, DCU, MDM, HES and other operational/requisite software as part of fully functional AMI system.

Contractor shall adhere with the appropriate security algorithm for encryption and decryption. For smooth functioning of the entire system, it is essential that the details of such algorithm including the mechanism of security key generation be kept in a secured escrow account which shall be used by the utility only in case of termination of the contract for reasons whatsoever.

Contractor may design appropriate architecture for providing end to end metering solution. Contractor is free to decide upon the best solution out of all the available options. However, the entire responsibility of fully functional AMI system shall rest with the contractor in order to meet the performance levels as given in this document. The communication provider may adopt Radio Frequency (RF) mesh in licensed frequency band as permitted by WPC or in Unlicensed frequency band/ Power Line Carrier Communication (PLCC) or GPRS/3G/4G communication technology or RF based canopy system or a combination of these technologies as per the site requirement adopting best available technology in the proposed area of implementation.

The following core components of AMI system shall be provided:

- a) Smart Meters
- b) Communication infrastructure
- c) Head End System(HES)
- d) Meter Data Management System (MDM)
- e) Web application with updated on-line data of consumers (consumer data shall be integrated [into [utility's] existing consumer portal/intto a new delivered portal if the utility so desires]) etc.
- f) Network Management System
- g) Mobile app: Bidder shall provide a mobile app through which consumer shall be able to log in through android/iOS/Window based mobile app to see information related to his/her energy consumption. App shall also provide platform for implementation of peak load management functionality by providing existing tariff & incentives rates, participation options etc. Features in this app which relates to demand response should be treated as provisions for future integration. This mobile app shall be part of complete system and therefore no additional cost shall be payable for upgradation / maintenance separately.

### **3.3 Smart Meters**

Single Phase & Three Phase whole current smart meters shall comply with IS 16444 (latest version). Three Phase CT operated meter shall comply IS 16444: Part 2. The contractor has to furnish valid BIS certification before supply of meters.

After meter installation, customer identification no., meter ID, its hardware & software configuration, name plate details, make, type i.e. 1 Phase or 3 Phase shall be updated in DCU/HES/MDM. The information would also be updated on the portal/app for providing information to consumers.

The Basic Features of Smart Meter shall be:

- Measurement of electrical energy parameters
- Bidirectional Communication
- Integrated Load limiting switch
- Tamper event detection, recording and reporting
- Power event alarms such as loss of supply, low/ high voltage, out of band frequency
- Remote firmware upgrade
- Time of Use (ToU) tariff
- Net metering features (for smart meters with Net-metering feature)
- On demand reading

### **3.3.1 Whole Current A.C. Single Phase Two Wire Smart Energy Meter Of Accuracy Class 1.0 [with/ without net-metering]**

Smart Meter shall be an A.C. static-watt hour meter of accuracy class 1 for the measurement of alternating current electrical active energy of frequency 50 Hz, with time of use registers, internal connect and disconnect switches with two way communication capability. The bi- directional communication module can either be of built in type or plug-in type with suitable sealing arrangement. **<The meters with net-metering facility shall measure flow of both forward (import) and reverse (export) energies.>**

The single phase whole current Smart Meter shall conform to the standards and specification as specified in Annexure A

### **3.3.2 Whole Current A.C. Three Phase Four Wire Smart Energy Meter Of Accuracy Class 1.0 [with/ without net-metering]**

Smart Meter shall be an A.C. static-watt hour meter of accuracy class 1 for the measurement of alternating current electrical active energy of frequency 50 Hz, with time of use registers, internal connect and disconnect switches with two way communication capability. The bi- directional communication module can either be of built in type or plug-in type with suitable sealing arrangement. **[The meters with net-metering facility shall measure flow of both forward (import) and reverse (export) energies.]**

The three phase whole current Smart Meter shall conform to the standards and specification as specified in Annexure B

### **3.3.3 Three phase CT operated alternating current smart meter Of Accuracy Class 0.5S**

Three phase CT operated alternating current smart meter shall be four wire smart energy meter of accuracy class 0.5S with two way communication facility. The bi-directional communication module can either be of built in type or plug-in type with suitable sealing arrangement. [The meters with net-metering facility shall measure flow of both forward (import) and reverse (export) energies.]

The three phase CT operated Smart Meter shall conform to the standards and specification as specified in Annexure C

### **3.3.4 Tests**

#### **Type tests and test certificates**

Single phase and three phase whole current Smart meter shall be type tested for all the type tests as per IS: 16444 (latest version) and three phase CT operated Smart Meter shall be type tested for all the type tests as per IS: 16444 Part-2 (latest version) in a government approved laboratory. The number of sampling for testing of meters and criteria for conformity would be as per IS 16444 and IS 16444 Part-2. The supplier shall have to submit all type test certificates along with the bid.

Type test should not be older than 3 years. Without the above type test certificate the offer shall not be considered. Employer reserves right to select randomly one meter from the offered lots for inspection for its type test and if meter during type test is found failed then either the order placed shall be cancelled with the Contractor to collect all the meters at its cost for the supplied meters or Contractor shall have to replace all supplied meters at their cost after manufactured and successful type test within time frame given by the Employer.

#### **Routine and Acceptance Test**

The Factory Acceptance and Routine tests shall be carried out as per IS 16444 and IS 16444 Part-2. Apart from above test, meter shall be also be tested for all functional requirement through communication as part of acceptance test

### **3.3.5 General and Constructional Requirements for Meters**

- Meter shall be BIS marked as per IS 16444/ IS 16444 Part-2.
- General & construction requirement shall be as per IS 16444/ IS 13779/ IS 16444 Part-2
- <In Home Display (IHD) shall be optional and the specifications of the same would be as per agreement between the bidder and the utility>

### **3.3.5.1 Meter Base and Cover**

Meter base & cover shall be as per IS 16444/ IS 13779/ **IS 16444 Part-2**. The meter Base & cover shall be break to open design. The material for meter base and cover shall be made of high grade polycarbonate

### **3.3.5.2 Terminal Block and Cover**

As per IS 16444/IS 13779/ **IS 16444 Part-2**

### **3.3.5.3 Design**

Voltage circuit, sealing arrangement, terminal block, terminal cover and nameplate etc. shall be in accordance with IS-16444 (latest version).

The meter shall be compact and reliable in design, easy to transport and immune to vibration and shock involved in transportation and handling.

### **3.3.5.4 Circuitry**

As per IS 16444/ **IS 16444 Part-2**. The contractor shall submit the details of source/agencies from whom purchase of various components of meters have been made by them by them to the employer

### **3.3.5.5 Name Plate and Marking**

The meter should bear a name plate clearly visible, effectively secured against removal and indelibly/distinctly marked in accordance with relevant IS. In addition, in the middle of the name plate the words **[Name of the Utility]**, purchase order no. & year/month of manufacturing shall either be punched or marked indelibly. The rating plate information shall be as per relevant IS.

### **3.3.5.6 Connection Diagram**

As per IS 16444/ **IS 16444 Part-2**

### **3.3.5.7 Fixing Arrangement**

The meter shall be mounted type. The Meter should have three fixing holes, one at top and two at the bottom. The Top hole should be such that the holding screw is not accessible to the consumer after fixing the meters. The lower screws should be provided under sealable terminal cover. The requisite fixing screws shall be supplied with each meter.

### **3.3.5.8 Sealing Arrangement**

Arrangements shall be provided for proper sealing of the meter cover so that access to the working parts shall not be possible without breaking the seal.

The sealing arrangement and number of seals shall be as per **[relevant IS/ requirement of utility]**

### **3.3.5.9 Meter Box**

The Meter Box would be provided as per **<requirement of the utility>**.

### **3.3.5.10 Packing**

The meters shall be suitably packed for vertical/horizontal support to withstand handling during transportation. The meter shall be packed appropriately to ensure safe transportation, handling, identification and storage. All packing materials shall be as per environment law in force. The primary packing shall ensure protection against humidity, dust, grease and safeguard the meter's performance until its installation. The secondary packing shall provide protection during transportation. The packing case shall indicate "Fragile in nature" and direction of placement of box. Each packing shall indicate marking details like Manufacturer's name, S.No. of meters, quantity etc.

### **3.3.5.11 Transportation**

The meter shall be compact in design. The meter block unit shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter shall be convenient to transport and immune to shock and vibration during transportation and handling.

The meter should not be exposed to undue shock and mishandling during transportation. The stacking of box inside transport media should be such as to avoid their free movement. The packing should also be protected from rain and dust by transport media. The Bidder shall be responsible for any damage during transit due to inadequate or improper packing.

### **3.3.5.12 Testing and Manufacturing Facilities**

The manufacturer shall have NABL accredited laboratory to ensure accurate testing calibration as per IS 16444/ **IS 13779/ 16444 Part-2** for acceptance test.

### **3.3.5.13 Inspection**

- All meters shall be duly tested and sealed by the firm at their premises prior to inspection. Manufacturer seal may be provided on one side of meter. For the other side, the seal with engrave as **[Utility name]** may be sent in a pack for provision by **[utility]** after completion of test by the **[utility]** & after receipt of the meter.
- The **[utility/employer]** may select the meter randomly as per sampling plan for acceptance test as per IS 16444/ IS 16444 Part-2. The meters shall be tested for all functional requirements as part of acceptance test as per IS 16444/ IS 16444 Part-2. After testing, these sample meters shall be additionally sealed by the inspecting officer and one copy of the inspection report will be handed over to the manufacturer.

## **3.4 Communication Infrastructure**

The communication infrastructure should either be based on RF mesh network / PLC or cellular network or a combination of these. The communication network shall be based on suitable standards from ITU/IEC/IEEE/CEN/ CENELEC/ ETSI for NAN and WAN network. Communication network shall provide reliable medium for two-way communication between

various nodes (smart meter) & HES. RF based network should use Licensed frequency band as permitted by WPC or Unlicensed frequency band. The engagement of network service provider would be in the scope of Contractor to meet the performance level as given in the document.

### **3.4.1 General Requirements**

The bidder shall design reliable, interference free & robust communication network. It shall be flexible in terms of providing communication in variable terrain & urban density.

The bidder shall design the network architecture keeping in view the existing and planned infrastructure of the utility. During designing, suitable consideration shall be kept for future expansion as per requirement of Utility. Before designing the communication network, the bidder shall do the site survey and would provide the most efficient communication infrastructure.

The entire infrastructure & associated civil works required for installation & commissioning of equipment/devices like DCUs, repeaters, routers & access points etc. shall be in the scope of bidder. The operational testing of all the network elements has to be demonstrated by the bidder to the satisfaction of the utility.

The network solution offered by the bidder should have disaster recovery mechanism in place. The redundancy mechanism of HES and MDM and their disaster recovery plan shall also be described by the Bidder.

The quality of installation of the various equipment & power supply wiring to all field equipment shall be as per standards/ regulations/predominant practices of the utility. The supply of electricity needed for operation and maintenance of entire AMI system shall be provided by the utility free of cost.

A suitable network management system (NMS) shall be provided to monitor the performance of the communication network round the clock. The NMS shall provide viewing of all the networking elements deployed at site and enable configuration & parameterization of the networking devices and the nodes.

### **3.4.2 Network Security**

The Network shall have adequate cyber security measures not limited to the measures as described below. The network security would be extended to all the interfaces also.

- **Secure Access Controls:** The system shall include mechanisms for defining and controlling user access to the operating system environment and applications. Best practices from enterprise security including password strength, password aging, password history, reuse prevention etc. must be followed for access control.
- **Authorization Controls:** A least-privilege concept such that users are only allowed to use or access functions for which they have been given authorization shall be available.
- **Logging:** Logs must be maintained for all attempts to log on (both successful and unsuccessful), any privilege change requests (both successful and unsuccessful), user actions affecting security (such as password changes), attempts to perform actions not

authorized by the authorization controls, all configuration changes etc. Additionally, the access to such logs must be controlled in accordance to the least-privilege concept mentioned above, so that entries may not be deleted, accidentally or maliciously.

- **Hardening:** All unnecessary packages must be removed and/or disabled from the system. Additionally, all unused operating system services and unused networking ports must be disabled or blocked. Only secure maintenance access shall be permitted and all known insecure protocols shall be disabled.
- **Malicious Software Prevention:** Implementation of anti-virus software and other malicious software prevention tools shall be supported for all applications, servers, data bases etc.
- **Network Security:** The network architecture of the HES must be secure with support for firewalls and encryption. The system shall also allow host-based firewalls to be configured, as an additional layer of security if the network firewall were to fail.

### 3.4.3 Communication Network Elements

#### 3.4.3.1 Data Concentrator Unit (DCU) based Communication Network

The Data Concentrator Unit is a gateway for communication of data between the Smart Meters and the HES. The Data Concentrator Unit receives information from the Smart Meter on a scheduled / need basis and stores the data, which can be accessed by HES for onward transfer to MDM.

The DCU provides the central link between Smart Meters and HES, enabling continuous/periodic meter read and control. DCU shall exchange data from smart meters on RF / PLC communication and with HES on WAN.

**<If communication system is DCU based RF network, then requirement in section 3.4.3.1.1 to 3.4.3.1.3 shall be met and section 3.4.3.2 shall be deleted>**

##### 3.4.3.1.1 Hardware & Power Supply of DCU

- Enclosure/box of DCU shall be minimum IP55 or better compliant. A suitable mounting arrangement required for DCU installation shall also be provided.
- A suitable and optimum power supply shall be provided keeping in view that even in case of outage in one or two phases, DCU can be powered. DCU should be capable of withstanding surges & voltage spikes of 6KV as per IEC 61000-4-5 standards. Power supply shall be terminated on suitable sized MCB to facilitate isolation during on-site maintenance.
- DCU shall have battery with backup for 5 hour for normal meter reading, to push tamper event, carry out on demand reading and the network health status/ connectivity continuity & check. DCU should have the suitable feature to send power outage and restoration message to the HES. The battery shall have a guaranteed life of 5 years.
- DCU shall have built in Real Time Clock (RTC) with separate battery backup. The battery shall have a guaranteed life of 5 years. It shall have self- diagnostic feature for RTC, memory, battery, communication module, etc. Alternatively, Software driven RTC may also be used as per agreement between supplier and utility.

### **3.4.3.1.2 Configuration, Functionality & Interface of DCU**

DCU shall have following configuration functionalities:

- It shall be able to configure the communication with underlying nodes/meters.
- It shall pull data from the field devices and push the data at configured intervals to the HES. It should also support the HES in pulling data from the field devices/meters. The data acquisition (Push/Pull) frequency shall be programmable. DCU shall be capable to prioritize control commands.
- DCU shall ensure a secure communication to HES and shall have internal memory for storing interval data for at least 5 days.
- DCU shall support on demand read and ping of individual/group of meters.
- It shall support IPv4 and IPv6 network addressing.
- DCU shall push events like tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.
- The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP-55). A suitable mounting provision shall be made for the equipment.
- Enclosure: Provision for security sealing shall be provided and in case the gasket of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material.
- The list of standards followed in all the devices/equipment used in communication network shall be furnished

### **3.4.3.1.3 DCU Communication**

- The communication architecture shall be any, as defined under IS 16444.
- The DCU shall ensure the appropriate backhaul for secure transfer of data to HES either via GPRS 3G/4G or Fiber Optic communication. In case of GPRS/3G/4G backhaul, it shall support SIM card with dynamic IP from any service provider. It shall have Wide Area Network (WAN) connectivity to the HES through suitable means.
- DCU shall be able to communicate with meters either on RF mesh (Unlicensed or Licensed frequency band as permitted by WPC) or PLC.
- DCU shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.
- It shall push events like tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters. DCU shall be able to acquire and send data to HES for full capacity (as per designed for no. of meters/field devices) to ensure the performance level. Full capacity of DCU is required to be indicated in the offer.
- After Power Interruption, on restoration of power supply, DCU shall establish communication with underlying devices as well as upstream application automatically.
- DCU shall be able to communicate with the nearest meters depending on topographical features. For further communication among the meters, distance of the other meters with the DCU shall not be a constraint as communication of the nearest meters shall be established with other meters through appropriate mesh formation / other formation.

- Remote Firmware Upgrade: The DCU shall support remote firmware upgrades as well as remote configuration from the control center. Configuration of programmable parameters of smart meters shall be done through HES.
- All meters falling under one DCU shall be commissioned and checked for proper communication in presence of utility in-charge.
- DCU shall keep the records of minimum of the following events:
  - No of packet failures
  - Retry attempts
  - Missed periodic readings
  - Failure to connect
  - Tamper events

### **3.4.3.2 Router based RF Mesh Network**

**<If communication system is router based RF mesh network, then requirement in section 3.4.3.2.1 to 3.4.3.2.3 shall be met and section 3.4.3.1 shall be deleted >**

In this type of communication network, different nodes (smart meters) shall interconnect with each other using RF mesh network and they shall communicate with nearby routers to transfer the data to access points. In such communication network, if any routers/repeaters/access points fail, then nodes connected on that device shall automatically reconfigure the mesh with available nearby nodes.

#### **3.4.3.2.1 General Requirement of Router based RF Mesh Network:**

The general requirements for the Router based RF network are specified below:

- The communication network shall have dynamic & self-healing capability. If one of the communication element like router or access point fails then nodes connecting to that element shall switch to best available element for communication of data to HES.
- It shall support IPv4 and IPv6 network addressing.
- Each node shall keep a track of best available nearby nodes.
- The communication network equipment shall use Unlicensed or Licensed frequency band as permitted by WPC.
- All the communication network equipment shall be certified by WPC, Government of India for operation in license free frequency band.
- Suitable network management system (NMS) shall be available to monitor the performance of the communication network round the clock. The NMS shall provide viewing of all the networking elements deployed at site and enable configuration, parameterization of the networking devices and the nodes.
- It shall support remote firmware upgrading
- It shall be secure enough to avoid all cyber threats like DDoS, spoofing, malwares etc.
- The communication network shall ensure secure communication of data to HES.

- The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP-55). A suitable mounting provision shall be made for the equipment.
- Enclosure: Provision for security sealing shall be provided and in case the gasket of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material.
- The list of standards followed in all the devices/equipment used in communication network shall be furnished.
- Routers / Access Points shall have suitable power supply arrangements. Provision of battery backup for at least 5 hour shall be there to continue operation in case of power supply failure. The life expectancy of battery shall be 5 years or more.

### **3.4.3.2.2 Configuration, Functionality & Interface**

Access points shall have following configuration functionalities:

- It shall be able to configure the communication with underlying nodes/end points.
- It shall support on demand read and ping of individual/group of meters.
- It shall push events like tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.
- It shall have Wide Area Network (WAN) connectivity to the HES through suitable means.
- It shall communicate with routers/nodes/end points on RF mesh (Unlicensed or Licensed frequency band as permitted by WPC).
- It shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.
- After power Interruption, on restoration of power supply, it shall establish communication with underlying devices as well as upstream application (HES) automatically.
- Access point shall facilitate recording of:
  - No of packet failures
  - Retry attempts
  - Missed periodic reading
  - Failure to connect
  - Tamper events
- It shall be capable to handle interval data of suitable nos. of any type of smart meter (1ph/3ph). Access point shall be able to acquire and send data to HES for full capacity (No. of meters/field devices it is designed for) within a suitable time period to achieve the performance level. Full capacity of access point is required to be indicated in the offer.
- Access point shall support remote firmware upgrades as well as remote configuration from the control center.

### **3.4.3.2.3 Testing of the DCU /Access Point**

DCU/Access Point shall be tested for the following:

- Radio interference measurement (CIS PR 22)
- Surge test (IEC 61000-4-5)
- Fast transient burst test (IEC 61000-4-4)
- Test of immunity to electrostatic discharges (IEC 61000-4-2)
- Test of immunity to electromagnetic HF field (IEC 61000-4-3)
- Resistance to heat and fire

The bidder shall provide IP-55 compliance test certificate for DUC/Access Point.

### 3.5 Head End System (HES)

The main objective of HES is to acquire meter data automatically avoiding any human intervention and monitor parameters acquired from meters.

The bidder shall provide the HES suitable to support the collection and storage of data as per performance level for a defined no. of smart meters with facility of future expansion as per the requirement specified in this document.

**<NOTE: The no of smart meters/future expansion may be provided by utility as per their requirement>**

HES would perform all the requisite functions as per the defined functionalities of AMI and it is the responsibility of the bidder to supply the requisite software and hardware to achieve the defined functionalities of AMI. HES shall ensure data integrity checks, for example, checksum, time check, pulse, overflow, etc. on all metered data.

HES shall be developed on open platform based on distributed architecture for scalability without degradation of the performance using additional hardware. HES shall support storage of raw meter data, alarms and alerts for minimum 3 days. Adequate data base and security features for storage of data at HES need to be ensured.

The suggested functions of HES (not exhaustive) may be:

- ✓ Acquisition of meter data on demand & at user selectable periodicity
- ✓ Two way communication with meter/ DCU
- ✓ Signals for connect & disconnect of switches present in end points like meter
- ✓ Audit trail and Event & Alarm Logging
- ✓ Encryption of data for secure communication
- ✓ Maintain time sync with DCU / meter
- ✓ Store raw data for defined duration (minimum 3 days)
- ✓ Handling of Control signals / event messages on priority
- ✓ Setting of Smart meter configurable parameters
- ✓ Communication device status and history
- ✓ Network information in case more than one technology is deployed in field between the two devices
- ✓ Critical and non-critical reporting functionality. The suggestive critical events may be:
  - Alarms and event log for meter events like tamper/power failures etc.

- Data not received from DCU/Meter
- Relay not operating for connect / disconnect
- Communication link failure with DCU/Meter
- Network failure, etc.

While non critical events may be:

- Retry attempts on communication failure
- Periodic reading missing
- Failure to connect etc.

### **3.5.1 Configuration**

HES shall facilitate programming of following meter parameters:

- Load profile capture period
- Demand integration period
- Setting of parameters for time of day (TOD/TOU) billing
- Prepaid function
- Net metering
- Billing date
- Clock setting/time synchronizations
- Load curtailment limit
- Event setting for connect/disconnect
- Number of auto reconnection attempt
- Time interval between auto reconnection attempt
- Lock out period for relay
- Remote firmware upgrade
- Password setting
- Push schedule
- Setting threshold limits for monitored parameters
- Provision for adding more programming features in future  
(The bidder may suggest more parameters as per the requirement)

### **3.5.2 Communication**

- HES shall communicate with DCUs/access points using WAN technology
- HES shall be able to accept data according to IS 15959 part-I/part-II
- HES shall automatically retry for missed data; the number of retry attempts shall be configurable
- To receive confirmation on successful execution of a command
- HES shall ensure data integrity checks, for example, checksum, time check, pulse, overflow, etc. on all metered data

### **3.5.3 Monitoring and Reporting Capability**

HES shall have critical and non-critical reporting functionality. The critical & non critical information generated from this reporting functionality shall be made available to MDM at user configurable periodicity.

### **3.5.3.1 Critical Reporting**

- HES shall have alarms and event log for node's (meter) events (tamper/power failures etc.)
- If data not received from nodes/end points
- If relay does not operate for connect / disconnect
- Communication link failure with nodes/end points
- Network Failure

### **3.5.3.2 Non Critical Reporting**

HES shall report and keep record of following communication failure events:

- Retry attempts
- Missed periodic reading
- Failure to connect

HES shall support reporting of communication failure history of nodes/routers/access points etc. and give an exception report for nodes/routers/access points not communicating for last 0 – 24 hours (the reporting period shall be on user configurable period). HES shall have feature to send email/SMS notification of configured alarms & events to selected users.

### **3.5.4 Integration**

HES shall export all meter data (as per IS 15959) to MDM via CIM/XML. In addition, it should conform to IEC 61968-9 as well as MultiSpeak v3.0 standards to interface with pre-existing MDM solution. In case, utility has implemented any SOA/ ESB architecture, the data exchange to and from HES shall be through this ESB.

## **3.6 Meter Data Management System (MDMS)**

The Meter Data Management System shall support storage, archiving, retrieval & analysis of meter data and various other MIS along with validation & verification algorithms. It shall act as a central data repository with interactive dashboard. MDM shall have capability to import 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 shall provide validated data for upstream systems such as billing, analytics, reporting, etc.

MDM should also support the future requirement of utility and should support the integration of other smart grid functionalities like consumer Information system, customer care, Network planning &

analysis, load analysis/forecasting, Peak Load Management, Outage management, Distribution Transformer Health Monitoring system, self-healing system etc. as and when implemented by [utility].

The contractor shall specify and deliver an initial system that supports the collection and storage of data for meeting the performance level for [X no of consumers/ smart meters] with facility of future expansion.

The MDM shall have the ability to selectively choose which data to be maintained and which to be purged or archived [as per requirement of [utility] (user selectable)]

### **3.6.1 Asset Management**

- The MDM shall maintain information and relationships between the current installed meter location (apartment, shop, industry/ address etc.), Consumer information (Name etc.), Consumer account no, Meter ID, Type of Meter (type of consumer, 1 phase/ 3phase, with or without relay, etc.), Meter configuration (Demand integration period, Load profile capture period etc.), GIS supplied information (longitude, latitude, connection with feeder/ transformer/ pole etc.) etc.
- The software should support tracking the status of meters and communication equipment from the date when they are installed in the field. The history of in-service asset location is maintained throughout the device life with start and end dates associated with each in-service location reference.
- Ability to report and log any damage / deterioration in the meter attributable to consumer /utility.

### **3.6.2 AMI Installation Support**

- The MDM shall also support device lifecycle management from device registration, installation, provisioning, operations and maintenance to decommissioning etc. The MDM shall generate exceptions for meter or modules not delivering the correct meter data after installation.
- The MDM shall provide a reconciliation report that identifies the meters that have been installed but not communicating for a designated (configurable) period. MDM shall generate reports on the number of meters installed in comparison to the number of meters successfully communicating.

### **3.6.3 Meter Data**

- The MDM shall accept input, process, store, and analyze Meter data from HES and meter data collected through hand held meter reading instruments and manual meter reads. In case of manual reads, provision should be there to insert associated notes like assessed energy, etc.
- The MDM should accept input, process, store, and analyze non-billing meter data such voltage and power quality data (like under/over voltage, out of band frequency, etc.) as they are available from AMI Head End Systems. The MDM should also support schedule and on-demand meter reads and pinging of meter energized states by authorized users and by other utility systems.

- The MDM shall provide storage of all collected Meter Data, events and alarm. It shall have capacity of storing 5 years data or more via archiving.
- The archiving of data should be done at a frequency of **x** and all data older than **x** days/hours should be archived. Bidder's solution should describe the process of archiving and restoration from the archive.
- Correctly track & resolve energy usage across meter changes with no loss of individual meter data.
- Provide complete history and audit trail for all data collected from meters including commands sent to meters and other devices for 30 days (configurable period).
- Execute on-demand read processes.
- Handle special metering configurations like net metering/pre-paid metering/multiple meters at same premises.
- The MDM shall have the ability to manage at a minimum 15 minute interval data.
- The contractor shall ensure data integrity checks on all metered data received from data collection systems.

#### **3.6.4 Data Validation, Estimation, and Editing (VEE)**

- The validation and estimation of metered data shall be based on standard estimation methods (Like max/avg. of past three days, max/avg. of past X number of similar week days, max/avg. of similar blocks of past X numbers of similar week days etc.). The MDM should also support and maintain following data-
  - a) Registered Read Data including register reads, daily billing cycle, as well as derived billing determinants like TOU
  - b) Interval Data channels with variable intervals and variable units of measure
  - c) Calculated Data that is derived or computed such as billing determinants and aggregated loads.
  - d) Event data storage of all collected event and alarm data from meters, network equipment, and MDMS itself
- MDM shall flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in the cumulative ("CUM") register reads
  - a) CUM Decrements within a billing cycle (except net-metering)
  - b) CUM reads increments more than configurable threshold
  - c) Future or old read dates
  - d) Number of digits exceeds number of meter dials
- MDM shall detect, flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in Time of Use (TOU) register reads
  - a) Register Decrements (except net-metering)
  - b) Resets (to zero) (except net-metering)
  - c) CUM reads increments more than configurable threshold
  - d) Future or old read dates
  - e) Erratic compared to CUM read (sum of TOU reads minus CUM read)
- MDM shall detect, flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in Demand register reads
  - a) Do not reset on cycle
  - b) Do not reset coincident with customer move-out or move-in
  - c) Reset off cycle inappropriately

- d) Too high
- All data shall be transferred to billing system after meter data validation and estimation including transformer / feeder station wise energy audit.
- MDM shall estimate usage for non-metered service points such as street lights, farm lights, traffic signals, etc.
- The MDM shall maintain both the original received raw data in a non-manipulated state, in addition to VEE data.
- Notwithstanding the latency of data collection via the AMI system, once the MDM receives meter read data, the VEE process occurs in real-time and the post-VEE data is then immediately available to user or external systems.
- The MDM shall be able to automatically flag data changes from manual edits, VEE (Validating, Editing and Estimating) rules and data source corrections and electronically generate audit trail with timestamps and user-ids.

### **3.6.5 Billing Determinants Calculations**

The MDM-

- Shall allow configuring multiple TOU/TOD options (e.g. the number and duration of TOU rate periods) by customer type, tariffs and day type (weekend, weekdays, and holidays) and by season.
- Shall support the processing of interval data into billing determinants to include the following at a minimum:
  - a) Total Consumption
  - b) Consumption in different time blocks for ToU billing
  - c) Maximum Demand (in kW and kVA)
  - d) Number of tamper counts
  - e) Average power factor
- Shall process interval data and frame it into the appropriate TOU periods for consumption and demand; for example, roll up 15/30 minute data intervals into hourly data.
- Shall have the ability to properly account for special metering situations such as check metering, sub metering, prepaid metering and net metering when calculating billing determinants and sending them to billing and other systems.
- Shall have the ability to properly account for special situations including, but not limited to, curtailment requests, demand response scenarios when calculating billing determinants and sending them to billing software.

### **3.6.6 Exception Management**

- Ability to capture and log data exceptions, problems and failures and to generate management reports, provide trend analysis, automate generation of service requests and track corrective actions.
- Ability to group, prioritize, filter and send system generated alarms and events to predetermined email addresses, cellular text messages to phone numbers/SMS/customer care etc.
- Exception Generation - MDM shall generate exceptions based on configurable business rules including but not limited to the following:

- Meter tamper alerts
- Communication module health alerts for Meter/DCU
- If the consumption is less/more than pre-defined average consumption
- Negative Consumption (not for net-metering)
- Power outage indications received from the Smart meter

### **3.6.7 Service Orders**

- The MDM shall generate service orders based on configurable rules for various events and alarms such as stop meter, tampers, problem in communication networks, etc.
- MDM shall send service orders via SMS, email, etc. with the email addresses / phone numbers being configurable. MDM shall receive feedback on action taken on the service order and track the status of service orders until resolution.
- Service order tickets could be generated by MDM but processed and closed under jurisdiction of the HES-NMS combine. If the utility already has a separate Workforce Management System (WFM), then the service order tickets can be routed from the MDM and the NMS to the WFM for completion of the tasks and reporting.

### **3.6.8 Customer Service Support**

- The solution shall provide customers with access to current and historical consumption and interval data, outage flags, voltage and power quality indications. The data shall be displayed in graphical and tabular form depending on user choice. The Customer may also access data through customer portal. The solution shall integrate via a user friendly graphical interface.
- MDM shall support email/SMS notification of configured alarms & events to selected users.
- The MDM shall support the web portal or shall have the ability to interface with the 3rd party portal/utility portal to provide the consumer near real time online views of both usage and cost and helping consumers to understand electricity usage and cost information, alerts and notifications and energy savings tips with different levels of detail. The portal should support the view for past electricity usage, last week's, yesterday's, current days or other period etc. as per selection. The portal should provide user friendly access to consumer for their data via colorful graphs and charts and can download the data into a spreadsheet.
- Shall support mobile app through which consumer shall be able to log in through android/iOS/Window based mobile app to see information related to his energy consumption. App shall also provide platform for implementation of peak load management functionality by providing existing tariff & incentives rates, participation options etc.

### **3.6.9 Revenue Protection Support**

- Ability to analyze meter tampering flags, power outages, usage trends and usage profiles to identify potential energy diversion situations, and produce daily reports, monthly reports and service order requests for investigation.

- The business rules for revenue protection alerts shall be configurable via a user-friendly interface.
- The MDM shall filter out revenue protection alerts that may be caused by field activities if the field activity information is provided to the MDM.
- The MDM shall support the analytics/investigation (i.e. view current and historical usage patterns) to validate suspected revenue protection issues.

### **3.6.10 Analytics**

The MDM shall have analysis capability based on configurable business rules including but not limited to the following:

- Display consumption/load profiles by configurable period (15/30 min, hour, day, month, year etc.) day type (weekday, weekend, holiday, festival wise etc.) and by tariff, customer type (hospitals, schools, govt. offices, multiplexes, commercial, residential, industrial etc.), or any user specified collection of meters.
- Generate peak & off-peak load patterns by aggregating all loads of consumer group/consumer type/DT/Feeder over configurable period/day type.
- Perform DT/feeder wise energy audit for configurable period. These energy audit reports shall clearly bring out the technical losses at Feeder level and DT level through detailed analysis of supply side energy data and corresponding aggregated consumption data of connected consumers. In this analysis it has to factor in data of energy export from net-metered consumers
- Perform load analysis for different groups and categories of consumers.
- Ability to provide the data to load forecasting, load research or demand response applications and perform error management like: Missed reads and intermittent meter reads before sharing data with load forecasting, load research or demand response
- Ability to configure the system to effectively visualize consumption trends, identify unusual patterns, and visualize load analysis to understand which assets are being over utilized.
- Analyzing data to identify new patterns of usage, Setting fraud alert / transformer overload alerts / demand – supply gap alert etc.
- Ability to receive and store outage and restoration event data from smart meters and outage systems and to log all such events for analysis. Five reliability indices shall be calculated,
  - System Average Interruption Duration Index (SAIDI), which is sum of all customer interruption durations in a given period over total number of customers served.
  - System Average Interruption Frequency Index (SAIFI), which is the total number of sustained interruptions in a given period over total number of consumers served.
  - Consumer Average Interruption Duration Index (CAIDI), which is sum of all customer interruption durations in a given period over the total number of sustained interruptions in that given period
  - Consumer Average Interruption Frequency Index (CAIFI), which is the total number of sustained interruptions in a given period over the total number of distinct consumers interrupted in that given period

- Momentary Average Interruption Frequency Index (MAIFI), which is the total number of customer interruptions less than the defined time (1 or 5 minutes) over the total number of customers served

These reliability indices shall be calculated for each month, for individual feeders and aggregated annually for the whole utility. The source data for outage shall be last gasp and the first breath messages from DT/Feeder level meters. These computations shall be independent of similar computations made by any OMS application.

- Ability to alerts on DT/ Feeder level overvoltage & back-to-normal event and under-voltage and back-to-normal events. Based on these alerts the system should calculate the duration in which the DT/Feeder remained outside the nominal zone of defined voltage. Similar calculations should be allowed for power factor and current unbalance.
- Identify & visualize poor performing assets like feeder/DT on multiple criteria like energy losses, outage duration etc. through appropriate colour coding depending on severity thresholds.
- Analyze data of net-metering consumers to identify patterns of energy export to grid on hourly/weekly/monthly/yearly basis.

### **3.6.11 Reporting**

The Report function shall enable the Utility to deliver reports in standard digital format such as PDF, Excel, etc. All queries for report generation shall be made through user driven drop down menu in GUI. The Bidder shall provide example queries to support internal report generation needs. The GUI shall have provisions to set up or change report delivery to configurable email addresses, network file directories, ftp sites or printer systems without modifying source program code and without any proprietary language skills.

The solution shall support users modifying standard reports to better meet specific reporting requirements. The list of the standard reports that shall be provided with the MDM include but not limited to following:

- Daily data collection report
- Usage exceptions
- VEE validation failures
- Missing interval Read date and times (on hourly, daily, weekly & monthly basis)
- Physical meter events (install, remove, connect, disconnect) & meter reset report
- Meter flags
- Meter inventory
- defective meters
- AMI performance measurements
- Threshold Exception
- Ability to provide daily & weekly interface exception reports between MDM and other subsystems e.g. billing, outage, etc.

Following high level reports for Utility Management shall be generated at specified frequencies to help management with business decisions. For purpose of generating these reports, the system shall be capable of receiving data from external system through standard interfaces via CIM / XML.

**<Below is an example of reports<sup>4</sup> that may be generated. These reports should be defined and agreed between employer and utility>**

<Category	Report	Frequency
<b>Energy Audit</b>	<p>Energy Audit Report:</p> <ul style="list-style-type: none"> <li>A daily automatic feeder loss report (Feeder Head reading minus summation of all DT meters readings)</li> <li>Automatic LT Energy loss report (DT meter reading minus summation of readings of all those consumer meters served by the selected DT) would be reported</li> <li>Identify the top [X] best as well as worst performing feeders and DTs</li> </ul>	Daily, Monthly and User Selectable Time Period with configurable near real time alerts for exceeding defined loss threshold
<b>Reliability Indices</b>	SAIFI and SAIDI; CAIFI and CAIDI; MAIFI of the feeder(s) and connected consumers would be tracked to measure the improvement in the same overtime and establishing reference levels	Daily, Monthly and User Selectable Time Period
<b>Load Management</b>	DT Loading (Categorize DT as overloaded, optimally loaded, near-optimal, under loaded)	Daily, Monthly and User Selectable Time Period with configurable near real time alerts
	Load recording (Consumers): Actual consumption recorded higher than the sanctioned load identifying the top [X] consumers	Daily, Monthly and User Selectable Time Period with configurable near real time alerts
	Load Management Report (Identify top overloaded DTs)	Monthly and User Selectable Time Period
<b>Power Quality</b>	Voltage Deviation Index and Frequency Deviation Index (DT/ Feeder)	Daily, Monthly and User Selectable Time Period with configurable near real time alerts
	Low Power Factor (DT/ Feeder)	Daily, Monthly and User Selectable Time Period with configurable near real time alerts
	Meter Current Unbalance (DT/ Feeder)	Daily, Monthly and User Selectable Time Period with configurable near real time alerts

<sup>4</sup> These reports shall be generated provided the corresponding DT/ Feeder data is available as part of the AMI system being installed.

<Category	Report	Frequency
Commercial Loss Detection	Tamper Alert: as per IS 15959 Part 2	Daily, Monthly and User Selectable Time Period with configurable near real time alerts
	Comparison Consumption (system used to detect & track theft suspects)	
	Consumption lower than the expected pattern (pattern of previous year applied to the monthly average) or monthly average	
Management Summary Report (Dashboards)	Summary report on top [X] high loss DTs/ Feeders, top overloaded DTs/ Feeders, Top feeders/ DTs with most outages (number and duration), Top feeders with most power quality issues (over voltage, under voltage, current unbalance, out of band frequency), DTs with high failure rate	Monthly and User Selectable Time Period>

Further, the report function shall generate reports on the following project KPIs for a user configurable time period. This will enable tracking the progress of project benefit parameters.

<Below is a list of suggestive KPIs to be monitored. These KPIs need to be defined and agreed between employer and utility>

KPI Parameter	Baseline Scenario Value	Expected Value Post AMI Implementation
Billing Efficiency	[X]	[X]
Collection Efficiency	[X]	[X]
Peak Load	[X]	[X]
SAIFI	[X]	[X]
SAIDI	[X]	[X]
CAIFI	[X]	[X]
CAIDI	[X]	[X]
Transformer Failure Rate	[X]	[X]

### 3.6.12 Other smart grid functionality support

MDM should also support the interfacing of other smart grid functionalities like Demand Response, Outage Management System, Distribution Transformer Monitoring system, Electric vehicle charging Infrastructure, Roof Top PV Integration etc. as and when implemented by the utility.

### 3.6.13 Additional Features

#### Net-Metering

MDM shall flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur:

- CUM decrements of forward energy within a billing cycle
- Register decrements for Time of Use (ToU) of forward energy
- Power generated(exported) by any net-metering consumer more than the installed capacity of solar PV rooftop system
- Energy exported(exported) in any given day by any net-metering consumer more than the programmable threshold value

### **Prepaid functionality**

The prepaid functionality can either be availed at smart meter level or through MDM. In case of MDM, following shall apply

- The MDM should support pre-payment metering and capability to interface with pre-payment application.
- The prepayment should support the system that payment and connection parameters are stored centrally and the details are being updated to consumer portal/ app.
- The system should periodically monitor the energy consumption of prepaid consumer and decrease the available credit based on consumption.
- The system should send connect/disconnect command on the basis of available credit as per notified rules & regulations.
- The system should send low-credit notifications to the consumer when their balance approaches a threshold.

### **Utility User Interface**

User interface for utility shall have ability for at least the following functionality:

- Compare total energy costs on one rate schedule vs. one or many alternative rates.
- Enable the user to see how different options within a rate affect costs.
- Display meter data at a user defined configurable cycle through a GUI that allows authorized users to view energy usage patterns and the data behind them for selected customers.
- Allow authorized users to view metered data, initiate and view reports, modify configurations, and initiate and update service requests via a GUI.
- Display via a GUI the energy usage profile for a single meter or group of meters. The load profile shall illustrate energy consumption and peak demand in user defined intervals for a user-specified time period.
- Display via a GUI the energy usage profile for a single meter or group of meters according to Time of Use (ToU) tariff.
- The GUI shall support a configurable utility dashboard for Operations and Utility Management
- Access to a minimum of 5 years of historical energy usage and meter reads through the GUI.
- GUI to clearly and visually distinguish between metered, estimated, allocated and substituted data.
- GUI to provide role-based access based on user identity and user role. Shall have following types of users:
  - Administrator
  - Operator

- Field staff
- Viewer/Guest
- Configure the look, feel, and functionality of the MDM in accordance with business needs, business processes, and business conventions. (E.g. GUI, content, look and feel of screens, validation rules, exception handling, etc.).
- Ability for utility through user interface to set up alarm and event notifications that can be directed to a combination of configurable email addresses, cellular text messages or phone numbers.
- User interface for utility to update the credit amount of prepaid consumers to MDM. Such type of user interface before login shall require password & login ID for authentication. User interface after getting information like consumer id., mobile number & recharge amount etc. shall update the same to MDM. The details of payment information shall also update to consumer through SMS, email etc.

#### **3.6.14 Integration with other Systems**

MDM shall interface with other utility systems on standard interfaces, and the data exchange models and interfaces shall comply with CIM / XML / IEC 61968/ MultiSpeak / IS15959. MDM solution shall be Service Oriented Architecture (SOA) enabled.

The aim of the above interface standards is to ensure generic two way interfacing of the MDM with 3rd party applications. Towards this [Utility/ Employer] shall make arrangements to provide documented information on interface detail and specificity in implementation, of its existing systems, which need to interface with the MDM.

MDM integration with other systems shall include but not be limited to the following:

- Utility Administration
- HES for data exchange with AMI solutions
- Billing and collection system like Base Computing System (BCS)
- Existing other Data Collection Systems
- Support of interface with HHU or manual reading system etc.
- Consumer Portal

The supplied MDM shall be ready for integration with IVRS, CRM, GIS and CIS systems of the utility based on the standard interfaces as mentioned above.

Contractor should provide suitable number of HHUs to read and update the data in MDM to meet contingency requirement in case of communication failure between meter and HES/MDM.

#### **3.7 Customer Portal**

Customer Portal solution shall be based on Web as well as Mobile based native apps that provide on-line two-way communication between utility and its customers. The solution shall integrate via a user friendly graphical interface. It shall provide for self service capabilities like usage management, billing, service requests, participation in energy efficiency programs etc. Features shall include:

- The consumer portal solution shall provide customers with access to current and historical consumption and interval data, outage flags, voltage and power quality indications for selected period.
- The portal/MDM shall support communication preferences for notification via email/SMS of configured alarms & events to selected users.
- The web portal or 3rd party portal/utility portal to provide the consumer near real time online views of both usage and cost differentiating high energy usage periods, helping consumers to understand electricity usage and cost information, alerts and notifications and energy savings tips with different levels of detail. The portal should support the view for past electricity usage, last week's, yesterday's, current days or other period etc. as per selection. The portal should provide user friendly access to consumer for their data via colorful graphs and charts and can download the data into a spreadsheet.
- Consumer mobile app through which consumer shall be able to log in through android/iOS/Window based native mobile app to see information related to its energy consumption. App shall also provide platform for implementation of peak load management functionality by providing existing tariff & incentives rates, participation options etc.
- Provide cross-browser compliant software (compatible with Internet Explorer, Chrome, Firefox, and Safari)
- The portal shall be linked to the on-line payment facility and gateway of the utility.
- Pre-paid consumers shall be provided facility to recharge their account
- Shall support the utility and in turn its customers with a system for logging, managing, and communicating technical issues.

User interface to consumer portal to access consumer's data from MDM for all authorized consumers shall have ability for at least the following functionality:

- The UI of the Portal shall allow selection of preferred language for dialogue like English, Hindi or any Local language
- View metered data, initiate and view reports
- View data according to Time of Use(ToU) tariff
- Can make request for connection/disconnection
- User can update mobile number/email
- Can initiate service requests for maximum demand updating, meter checking etc.
- In case of net-metering consumers, user can view data for both import & export
- In case of prepaid consumers, consumers can view recharge history & present balance.
- User interface shall require consumer id., mobile number & password for secure login.

Software patches, updates, and minor version upgrades, when they become available for general release, should be part of ongoing support and maintenance services.

## 4. Service Level Agreements

- These performance levels shall apply to the complete AMI system.
- AMI system include the communications links provided by Network Provider /third parties such as telecommunications companies and bidder has to ensure the desired performance level.
- The performance levels exclude force majeure events.

The following are the required performance levels for an AMI Systems which should be met on a daily basis-

Data Type	Performance Requirement
<b>1. Scheduled Interval data readings at a fixed periodicity during the day as decided by utility</b>	
Periodic collection of the 15/30 minute interval load profile data after every 15/30/60/120 minutes	From 95% of meters within 5 minutes From 98% of meters before next periodic packet is scheduled.
<b>2. Scheduled daily meter readings (as per IS 16444/15959)</b>	
Daily collection of the previous day's interval energy data and total accumulated energy	From 95% of meters within 8 hours after midnight; and From 99.9% of meters within 24 hours after midnight
<b>3. Scheduled billing/ load profile data for bill period</b>	
Collection of billing/load profile data for the bill period for entire installed population	From 95% of meters within 24 hours after midnight; and From 99.9% of meters within 48 hours after midnight
<b>4. On-Demand Remote reads of meters</b>	
Collection of 7 days of interval energy data and the current total accumulated energy from a group of 1000 AMI meters	Action performed at 90% of meters within 1 Hour; and Action performed at 99% of meters within 2 hours; and Action performed at 99.9% of meters within 6 hours
Collection of 7 days of interval energy data and the current total accumulated energy from a selected individual meter	Action performed within 30 seconds
<b>5. Updating of data on consumer portal/ app</b>	
Updating of individual consumer data on portal/ app after receiving the data in MDM	Action performed for active consumers within 5 minutes after receiving the data in MDM Action performed at 99.5% of meters within 2 hours after receiving the data in MDM.
<b>6. Ping Response with acknowledgement/ response for selected meters</b>	
For a group of 1000 meters	Action performed at 99.9% of meters within 1 minute; and
For an individual meter	Action performed within 3 seconds

Data Type	Performance Requirement
<b>7. Remote load control commands for selected meters with acknowledgement/ response for selected meters</b>	
For a group of maximum of 5000 AMI meters	Action performed at 95% of meters within 5 minutes; and Action performed at 99% of meters within 10 Minutes
For an individual meter	Action performed within 5 seconds
<b>8. For remote connect/disconnect with acknowledgement/ response for selected meters</b>	
For a group of maximum of 5000 AMI meters	Action performed at 90% of meters within 5 minutes; and Action performed at 99% of meters within 10 minutes; and Action performed 99.9% of meters within 20 minutes
For an individual meter	Action performed within 30 seconds
<b>9. Meter loss and restoration of supply</b>	
Receiving of alert for all affected AMI meters	Alert to be received within 3 minutes for 60% of meters
<b>10. Meter Tamper Alerts</b>	
Receiving of alert for an individual meter	Alert to be received within 3 minutes
<b>11. Power Quality Alerts</b>	
Receiving of alert for an individual meter	Alert to be received within 5 minutes
<b>12. Remotely altering settings in meter/ firmware upgrade with acknowledgement/ response for selected meters</b>	
For a group of 1000 AMI meters	Action performed at 99% of meters within 30 minutes; and Action performed at 99.9% of meters within 1 hour
<b>13. Remotely read events logs</b>	
For reading the full event log for a group of 1000 AMI meters	Action performed at 90% of meters within 30 minutes; and Action performed at 99% of meters within 1 hour; and Action performed at 99.9% of meters within 6 hours.

For the above performance requirement, a designated team/ person from [employer/utility] will review the performance of Contractor against the SLA after every **30** days. Post evaluation, an audit report of the same will be submitted by the [contractor] to the [employer]

Further, for meeting SLAs as defined above (except SLA number 4), MDMS should be able to generate standard reports for these parameters. During performance evaluation, the generated reports shall be randomly checked with data by the designated team/ person from [employer/utility]

The performance level for generation of billing determinants by the MDM would be [as per requirement of the utility]. The performance levels regarding meter discovery time line after installation, etc. would be as declared by the bidder.

The user interface performance testing shall be done as per following criteria.

S.No.	User Interface Requirements	Response Time
1	Any real time display and application display on workstation console along with data values shall appear on screen.	Within 2 sec
2	Manual data entry of the new value appears on screen.	Within 2 sec
3	Display Update rate	2 sec for 4 displays together
4	Response time for display of Alarm and event after receipt in system	Within 1 sec of receipt in system
5	Requests for printing of displays (to be acknowledged with an indication of request is being processed).	Within 2 sec
6	Requests for generation of reports (to be acknowledged with an indication of request is being processed).	Within 2 sec

The user interface performance testing shall be taken by the [employer/utility] after every 30 days in presence of the contractor. A audit report of the same will be submitted by the contractor>to the [employer].

#### **Disaster Recovery Centre:**

The primary objective of the disaster recovery system is to first secure the data storage from any disaster striking the primary control centre by replicating the data at geographically separate location <to be decided by the utility>, and secondly to restore operations in the minimum possible time by activating the Disaster Recovery centre system. The goal is to design the Disaster Management in accordance with timelines in terms of defined,

- Recovery Point Objective (RPO), which is the maximum amount of time lag <typically in tens of minutes> between Primary and Secondary storages <to be decided by the utility>. and
- Recovery Time Objective (RTO), which is the maximum elapsed time <typically several hours> allowed to complete recovery of application processing at Disaster Recover site <to be defined by the utility>

The choice of design of the Disaster Recovery shall vary between a complete System including all the hardware, Software and Networking items equivalent to the items supplied at the primary data center and a backup storage, kept continuously updated and maintained at the Disaster Recovery facility, which can be used to restore operations from image backups with cold start options. A recovery option analysis shall be carried out to produce the practical options for those systems and networks, which are deemed to require recovery in the event of a disaster. The most effective option shall be chosen, taking into account the cost of recovery and the cost to the business of unavailability

of the application. <The utility needs to decide based on this analysis and procure the appropriate Disaster Recovery centre system.>

The Disaster Recovery system shall start with a complete copy of all database files of Primary site and then receive regular data updates from the primary site through a high bandwidth communication link so that it remains up-to-date. The methodology of replication will employ storage based replication in Asynchronous and Journal based Log Volume Shipping modes. The bidder's storage solution for Disaster Recovery must be compatible with the storage system installed at primary site to facilitate storage based replication. The storage system shall support Remote management of all replicated sites from the primary site.

The Storage and Backup solution offered will work along with the other systems of Disaster Recovery site as a single, complete and integrated unit to provide the agreed Disaster Recovery functionality. In order to offer compatible functionality as offered by the main control centre respecting the RTO, the Disaster Recovery system has to be architecturally equivalent to the main system. This would mean, once the operational switch over take place, the various field devices (DCUs/APs/SMs) shall have to be routed to the Disaster Recovery centre system.

## 5. Training Requirements

### 5.1 General

General requirement for training to be imparted is as follows:

- A.) Training shall be conducted by Contractor personnel who are experienced instructors and speak understandable [language name].
  - B.) The contractor shall provide training to various user groups nominated by [employer/utility]. The bidder shall provide the Training Approach in the response
  - C.) All necessary training material shall be provided by the Contractor. Each trainee shall receive individual copies of documents used for training. Training material shall be organized by functional process that will serve as the training documentation for a particular functional area.
  - D.) Training materials, including the documents provided to the trainees as well as handouts, shall become the property of [employer/utility]. [employer/utility] reserves the right to copy such materials, but for in-house use only.
  - E.) For all trainings the travel expenses will be borne by [Employer].
  - F.) The Contractor shall quote training prices individually for each of the courses.
  - G.) The schedule, location, detailed contents, for each course shall be finalized during detail engineering. The number of participants in the training program may undergo change. However, all the training courses shall preferably be conducted in single batch.
  - H.) The training will consist of a curriculum of courses to address the issues of system operation, business-wide application, changed business processes and general use of the new system.
  - I.) Representatives from the contractor, [Employer's] project management teams will be involved throughout in the development of training strategy, training material design and development, standards and training delivery to ensure that change management issues are incorporated, and that training strategies and materials are aligned to the requirements of the project and as business-specific as possible.
  - J.) The contractor is required to quote on per day basis for Training
  - K.) [employer] will have the option to cancel any or all training. In the case of cancellation, the rate quoted against the respective training will not be paid to the Contractor.
- . The training modules shall include but not limited to –
- AMI Administration & Configuration
  - AMI Installation and Trouble-Shooting
  - Application Management
  - Application Data Analysis

The contractor shall be required to organize following training for the [employer/utility] personnel: -

**Professional Training** - This is the training for the core group of implementation team of the [utility] and [utility/employer]. This team will comprise of members from all the Business Functions and IT sections. Each member would be trained in the relevant function/ module. This Training would be required to be given to approximately [X] personnel. It is the responsibility of contractor to deliver this training. Standard curriculum, designed and agreed by the [utility/employer] for hardware, software and network preferably shall be arranged by the contractor for each group. The [employer] will prefer if a portion of the training is conducted on-site.

**End User Training** - The contractor will provide training to the owner's team on a "Train the Trainer" basis. The [utility's] team so trained will then train all of the [utility's] end users. It is estimated that this training will require around [X] groups, with each group comprising of around [X] persons. These training sessions will be required to be conducted at any of the sites. The recommended training material can be in paper / electronic media with courses on Business Process Automation software fundamentals, business process overview, job activity training, and delivery options being on-line, CBTs, instructor led class rooms, etc.

In addition two Engineer's from utility and [employer] shall be stationed at the contractor's works during development/customization of solution as per tender. The deputed utility/ [employer] engineers shall be involved with the project till its completion.

## **6. System Hardware Requirements**

This section describes the technical requirements of all the hardware envisaged in the BOQ for the control centre system. The minimum hardware specifications (Processor, RAM, Aux. Memory, interfaces etc.) for all equipment are specified in Technical Specification for hardware. The contractor has to submit the details of the supplied hardware along with the bid. The Contractor shall assess the adequacy of hardware specified in the BOQ & if any additional hardware or higher end hardware configurations are required to meet all the requirements of the Technical Specifications, the same shall be included in the offer. The Bidder's proposal shall include necessary calculations to clearly establish that the proposed hardware meets the functional and performance requirements of the Technical Specification.

The Bidders are encouraged to optimize the requirement of hardware for servers and processors where one or more applications can be combined or distributed in any combination with adequate redundancy without affecting the performance requirement. However critical applications shall have redundancies in hardware.

### **6.1 Technical Requirements for Hardware**

All hardware shall be manufactured, fabricated, assembled and finished with workmanship of the highest production quality and shall conform to all applicable quality control standards of the original manufacturer and the Contractor. All hardware components shall be new and suitable for the purposes specified.

All hardware shall include self-diagnostic features. On restoration of power after interruption they shall resume operation automatically. All servers, workstations and network equipment (Switches, routers, firewall etc.) shall be compatible for remote monitoring using secure SNMP Ver. 3.0. All hardware shall support both IPv6 and IPv4 simultaneously.

The contractor shall ensure that at the time of final approval of hardware configuration and BOQ, all the hardware is as per the current industry standard models and that the equipment manufacturer has not established a date for termination of its production. Any hardware changes, except version upgrade in same series, proposed after contract agreement shall be subject to the following:-

- a) Such changes/updates shall be proposed and approval obtained from [employer/utility] along with the approval of Drawings/documents.
- b) The proposed equipment shall be equivalent or with better features than the equipment included in the Contract.
- c) Complete justification along with a comparative statement showing the original and the proposed hardware features/parameters including brochures shall be submitted to the [employer/utility] for review and approval.
- d) Changes/updates proposed will be at no additional cost to the Employer.
- e) The porting of software shall be at no additional cost in case of replacement of hardware during the AMC period.

## **6.2 Hardware Configuration**

In this Technical Specification all hardware has been broadly classified as “Server” and “Peripheral device”. The term “server” (also referred as “processor”) is defined as any general-purpose computing facility used for hosting application functions as defined in the specification. The servers typically serve as the source of data, displays and reports. The term “Peripheral Device” is used for all equipment other than servers. Peripheral device includes workstation consoles, WAN router, LAN, printer, firewalls etc.

The redundant hardware such as Servers, Firewall, and LAN etc. shall work in hot stand by manner. All the servers and networking equipment (Firewalls, LAN equipment etc.) shall be mounted in rack panel.

The minimum technical specification to be followed for hardware equipment is as per the table below.  
**<Minimum specification to be defined by the Employer as per utility requirement>**

Hardware Item	Minimum Specification
Application Server	
Web Server	
Firewall	
Router	
Host based Intrusion Detection System & Intrusion Prevention System (Network Based)	
Local Area Network (LAN) and Device Interfaces	
Local Area Network (LAN) and Device Interfaces	
Centralized Management Console	
Workstation Console	
Printers	
Panel Rack	
Switch	

## **6.3 General Device Configuration of Network Equipment**

The device configuration of all the network equipment shall be as per the latest Cyber Security guidelines given by CERT-In / NCIIPC/ Ministry of Power or any other competent authority.

### **6.3.1 Firewall**

Firewalls should be properly configured to segregate networks into different segments. The following strategies shall be followed for secure configuration of firewalls.

- a) Cleanup rule.
- b) Place a “Deny Any-Any” rule at the end of the rule base.
- c) Never create an “Allow any-any” rule.
- d) Allow rules should be created only for required services.

- e) This will result in all traffic being disallowed, unless specifically allowed.
- f) Lockdown/stealth rule
- g) All traffic destined for the firewall itself should be disallowed.
- h) Place anti-spoofing rule as per RFC 2827.
- i) Enable DoS/DDoS features on Firewall
- j) Enable application level filtering of firewall

### **6.3.2 Router**

Necessary control should be applied on the router to stop unwanted traffic and attacks at the perimeter itself. In the secure configuration of a router, the following strategies should be considered.

- Deploy proper access management and avoid remote administration.
- Enable password.
- Change default SNMP community string.
- ACLs (Access Control Lists) should include
  - Apply egress/ingress filter
  - Filter all RFC 1918, 3330 address space and special/reserved address
  - Permit the required services for the required IP addresses only
  - Deny everything else.
- Turn on logging to a central syslog server.

### **6.3.3 Intrusion Detection & Prevention System**

The required features of the Host Based Intrusion Detection Systems (HIDS) and Network based Intrusion Prevention System (NIPS) are described below:

#### **6.3.3.1 Intrusion Detection and Prevention System (Host Based)**

Host based Intrusion Detection and Prevention System module shall be provided for all machines. IDS shall be able to perform following actions:

- Capability for Detecting the intrusion attempt that may take place, intrusion in progress and the intrusion that has taken place.
- Flag and check unauthorized access
- Notify/Alarm/message of intrusion to:
  - Management console
  - Event log
  - Administrator by e-mail
- Create an audit trail for user and file access activity, including file accesses, changes to file permissions, attempts to install new executables and/or attempts to access privileged services
- In an event where user accounts are added, deleted, or modified, changes to key system files and executables is done in by unauthorized account or there is unauthorized attempt to overwrite vital system files, to install Trojan horses or backdoors suitable action should be taken such as:
  - Terminate User (intruder) Login

- Disable User (intruder) Account
- Forge a TCP FIN packet to force intruder connection to terminate
- Should provide events check for suspicious file transfers, denied login attempts, physical messages (like an Ethernet interface set to promiscuous mode) and system reboots.

### **6.3.3.2 Network based Intrusion Prevention System (NIPS)**

The NIPS shall provide complete inline protection from network-based application layer threats by scanning packet payloads for malicious traffic. It shall detect, classify and stop malicious application, viruses, worms and spyware/adware etc.

After detecting an intrusion attempt NIPS should be able to perform following actions:

- Reconfigure the firewalls provided in this package
- Send an SNMP Trap datagram to the management console.
- Send an event to the event log.
- Send e-mail to an administrator to notify of the attack.
- Save the attack information (timestamp, intruder IP address, victim IP address and port, protocol information)
- Force intruder connection to terminate.

## 7. System Software Requirements

This section describes the characteristics of system software such as operating system, database and support software (compilers, DBMS, display development, network utilities, report generation, diagnostics and backup utilities) provided by contractor and the original software manufacturer as necessary to support the functioning of AMI Applications systems. All the system software to be used for present scope of work shall have authentic license valid for life time. This section also describes the standards to be followed for all supplied software.

### 7.1 Software Standards

All software provided by the contractor under this AMI RFP, including the operating system, database and support software, shall comply with the industry-accepted software standards. In areas where these organizations have not yet set standards, the software shall comply with those widely accepted de-facto open standards put forth by industry consortiums, such as OSF and X/Open. The Contractor shall commit to meet the "open systems" objective promoted by industry standards groups.

#### 7.1.1 Design and Coding Standards for AMI Applications and Utilities

These provisions are applicable for both software applications and operating systems and would address program features that must be contained in software for the product to meet the standards.

- a) When software is designed to run on a system that has a keyboard, product functions shall be executable from a keyboard where the function itself or the result of performing a function can be distinguished textually.
- b) A well-defined on-screen indication of the present focus shall be provided that moves among interactive interface elements as the input focus changes.
- c) Applications shall not override user selected contrast and color selections and other individual display attributes.
- d) When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.
- e) Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.

#### 7.1.2 Applications

All components of AMI application system shall be maintainable by owner using the supplied software utilities and documentation. The software design and coding standards of the system shall address the followings:

- a) **Expansion:** Software shall be dimensioned to accommodate the size of AMI application system as given in BOQ and Appendix-G.(Separate sheet for Sizing)
- b) **Modularity:** Software shall be modular i.e. functionally partitioned into discrete, scalable, reusable modules consisting of isolated self-contained functional elements and designed for ease of change. The system shall make maximum use of common industry standards for interfaces.

- c) **User-Directed Termination:** Functions taking long execution times shall recognize and process user requests to abort the processing.
- d) **Portability & Interoperability:** The system shall be designed for hardware independence and operation in a network environment that facilitates interoperability and integration of third party applications. AMI applications should support multiple RDBMS systems including Oracle, Microsoft SQL Server and MySQL.
- e) **Programming Languages:** The software shall be written using high level ISO or ANSI standard programming languages.

All applications shall be designed with sufficient background logs which capture various level of errors encountered (warning, fatal, informational) while executing, so that the same can be reviewed and attended to.

### **7.1.3 Operating System**

The operating system of all the equipment of AMI application system including network equipment shall be latest version released up to six months prior to FAT. The operating system shall be hardened to provide robust security. The operating system and data file shall be placed in different disk partitions.

In order to facilitate cyber security requirements including patch management, common operating system is preferable to be used by all server nodes within the AMI application including MDM/HES servers. This is also to minimize the maintenance. All licenses for Operating System and other application software shall be supplied by the contractor and shall be valid throughout the operating life.

### **7.1.4 Time and Calendar Feature**

The AMI application & other servers shall maintain time and calendar for use by various software applications. The internal clocks of all servers and workstation consoles shall be automatically synchronized on NTP protocol. The calendar shall be customizable for working hours, holidays, weekends etc. The holidays, including type of days, shall be entered for each year at the beginning of the year and shall be recognized by all applications.

The user shall be able to alter the date and time. The alteration shall not adversely affect programs running at the beginning of the hour.

### **7.1.5 Remote Diagnostic**

Remote Diagnostic facility with necessary hardware as required shall be provided for communication between the AMI application system at control center and the Contractor's & [utility's] support office for the diagnosis of hardware & software problems. The login shall be protected by a user name & password entry. An automatic intimation shall be provided to inform authorized person from utility on such events of remote access and diagnosis.

### **7.1.6 Development System as a Test Bench**

A Development system independent of the production environment shall be defined which shall provide testing facility for integration of changes/modifications of the AMI application and new field devices before putting it online with Real-time system. This Development system shall be on a LAN separated from the production LAN and shall be self-sufficient to carryout testing of changes/modifications.

## **7.2 Network Software**

The network software system shall include software for network communication, network security, security management, patch management and network services. Network software shall include the user node software that provides the connection of that node to the network. The network node software shall be provided for each type of network node connection supplied with the initial system and shall be licensed for the quantities and types of nodes defined in the system configuration. Network software shall have scalability feature as envisaged.

### **7.2.1 Network Communication**

Users and various applications shall be able to communicate within the local area network and operate as described in this Specification. The network communications software shall use a standard network protocol such as TCP/IP, UDP etc. and shall support both IPv4 and IPv6. The software shall link dissimilar hardware nodes such as local and remote workstations, servers, and peripheral devices into a common data communication network allowing communications among these devices.

### **7.2.2 Network Services**

The following network services shall be provided for the users within the LAN:

- Network file management and transfer of files containing text, data, and graphics information
- Network printing management
- Network time synchronization
- Backup over LAN (Storage Area Network)
- Task-to-task communications to external computers
- LAN global naming facilities
- Remote procedure call
- Remote terminal session

### **7.2.3 Network Management System (NMS)**

The proposed network management system shall facilitate following activities:

- Security Management to protect systems and network from unauthorized access, manage user access, authorizing rights and privileges.
- Viewing of all network elements deployed and administer configuration changes of the network devices and nodes through toolkits to automate the following tasks :
  - Capture running configuration, Capture startup configuration, Upload configuration
  - Compare configuration

- Real-time or scheduled capture of device configurations
- Store historical device configurations captured and enable comparison of current device configuration against a previously captured configuration
- Security patch management shall be encrypted and signed.
- Inventory Management to collect information about computers in the system such as processors, memory, peripherals and processes running on computers.
- Performance Management to monitor system and network performance as specified.
- Fault Management to recognize, isolate, log and identify fault on network and connected machines, nodes, devices.

The network management software shall be based on the latest secured version of Simple Network Management Protocol ver. 3.0 (SNMPv3). The NMS system shall have a simple browser based user interface to provide all the pertinent information about the system. The NMS shall not impact the availability and performance of AMI applications and shall load not more than 3% of any host CPU, 1% of network bandwidth and shall have secure communication.

The network management system shall monitor the performance, resource usages and error statistics of all the servers, workstations, routers and LAN devices including for proposed Utility networks extension (up to 25 number of nodes) including the following:-

- a) Utilization (CPU and/or channel time being used as applicable) for
  - Servers, Workstations, Storage Devices (SAN, HDD etc.)
  - LAN, Firewalls(internal & External), Router, Switches
  - Data Links
- b) Memory utilization, auxiliary memory I/O utilization, of
  - Servers and Other Machines
  - Mass Storage Devices
- c) Bandwidth utilization for Routers/Switches
  - Various interface statistics shall be collected from network devices to measure the performance level

The Network Management Software shall have following functionality:

- a) It shall maintain performance, resource usage & error statistics and present this information via displays, periodic reports and on-demand reports.
- b) Apart from real-time monitoring of critical network devices, the above information shall be collected and stored at user configurable periodicities i.e. 5 minutes to 60 minutes. The Network Management System (NMS) shall be capable of storing the above data for a period of one (1) year at an interval of 5 minutes.
- c) It shall maintain a graphical display for connectivity and status of servers and peripheral devices in local area network. The monitored devices shall be configured to send SNMP notifications, and the graphical element representing the device shall change to a different colour depending on the severity of the notification received.
- d) It shall issue alarms when error conditions or resource usage problems occur.
- e) The period over which the statistics are gathered shall be adjustable by the user and the accumulated statistics shall be reset at the start of each period.

- f) The statistics shall be available for printout and display after each period and on demand during the period.
- g) In case more than one technology of AMI (example PLC and RF between Smart Meter & DCU) deployed in the field. It shall maintain statistics on the performance and availability of data being delivered per AMI technology.

#### **7.2.4 System Protection & Security**

Identity and access management system should be installed to control and log the access control for all users. The access management system shall be role based. Independent security management system shall be established to protect system and network from unauthorized access, manage user access, authorizing rights and privileges.

As the computer system in control centre has access to external environment the Contractor shall document and implement Cyber Security Policy/Plan in association with the [employer/utility] to secure the system. The overall policy and implementation shall account for:

- Network partition and DMZ through use of firewall as required to maximize the security of AMI application system while facilitating access for data and information to all stakeholders.
- Implement trusted, un-trusted and DMZ with clear perimeter to safeguard the HES/MDM production environment and minimise direct hits from external domain access
- Prevent unauthorized users from reading or writing data or files, executing programs or performing operations without appropriate privileges.
- Document all user sign on procedure
- Record all network traffic for detecting unauthorized activity, unusual activity and attempts to defeat system security (Contractor to propose and document what constitutes normal activity/traffic)
- A user authentication scheme consisting of at least a user identification and password shall be required for the user to request a connection to any network node.
- GUI to provide role-based access based on user identity and user role. Shall have following types of users:
  - Administrator
  - Operator
  - Field staff
  - Viewer/Guest

### **7.3 Database**

#### **7.3.1 Initial Database Generation**

The Contractor shall be responsible for the initial database generation using data available at control centre in association with the employer.

#### **7.3.2 Development Tools**

The Contractor shall provide all necessary software tools for the development and maintenance of the databases required for AMI application at Control Centre.

This tool shall be capable of managing the entire system database. The database development software tool delivered with the system shall be used to generate, integrate and test the database. The system must support export of data into XML format.

The database development tool shall facilitate exchange of both incremental and full data in standard exchange format. The product should have facility to export and import databases from different vendors applications.

### **7.3.3 Management**

The database manager shall locate order, retrieve, update, insert, and delete data; ensure database integrity; and provide backup and recovery of database files. The database manager shall generate and modify all AMI application data by interfacing with all database structures. In systems with a distributed database, the database manager shall have access to all portions of the database wherever stored. The location of database items shall be transparent to the user performing database maintenance.

Execution of the database manager in any server of the system shall not interfere with the on-line functions of AMI applications including the normal updating of each server's real-time database. In a primary server, database editing shall be limited to viewing functions, database documentation functions and functions that change the contents but not the structure of the database. Editing the on-line database shall not affect the operation of the primary/backup configuration.

The database manager shall include the mechanisms, in both interactive and batch processing modes, to perform the following functions:

- a) Add, modify and delete database items and data sources such as data links, and local I/O.
- b) Add, modify and delete application program data
- c) Create a new database attribute or new database object
- d) Resize the entire database or a subset of the database
- e) Redefine the structure of any portion of the database.

The contractor shall require to provide whether they require or impose any particular hardware and database management techniques to achieve above functionality.

### **7.3.4 Tracking Changes**

The database manager utility shall maintain Audit trail files for all changes made by all users (both online/off-line). The audit trails shall identify each change including date and time stamp for each change and identify the user making the change. An audit trail of last 10,000 edit operations shall be maintained.

### **7.3.5 Integration**

The System should support exchange of data from utility's computerized billing & collection, consumer indexing and asset mapping systems residing at different servers.

## **7.4 Display Generation, Management and Integration (Display Management and Reporting)**

The Contractor shall provide necessary software tools preferably browser based for the generation, management and Integration of AMI application displays.

The displays shall be generated and edited interactively using this display generation software delivered with the system. All displays, symbols, segments, and user interaction fields shall be maintained in libraries. The size of any library and the number of libraries shall not be constrained by software. The display generator shall support the creation, editing, and deletion of libraries, including copying of elements within a library and copying of similar elements across libraries. Execution of the display generator functions shall not interfere with the on-line AMI application functions.

Displays shall be generated in an interactive mode. The user shall be able to interactively:

- a) Develop display elements
- b) Link display elements to the database via symbolic point names
- c) Establish display element dynamics via database linkages
- d) Define linkages to other displays and programs
- e) Combine elements and linkages into display layers
- f) Combine display layers into single displays.

All workstation features and all user interface features defined in this specification shall be supported by the display generator software.

The display generator shall support the addition, deletion and modification of segments, including the merging of one segment with another to create a new segment.

Displays shall not be limited by the size of the viewable area of the screen.

The displays shall be constructed from the display elements library. The display definition shall allow displays to be sized to meet the requirements of the AMI application for which they are used. The display generation software shall allow unbroken viewing of the display image being built as the user extends the size of the display beyond the screen size limits.

The display generator shall support the integration of new and edited displays into the active display library. During an edit session, the display generation software shall allow the user to store and recall a partial display. To protect against loss of display work when a server fails, the current work shall be automatically saved every five minutes (user adjustable) to an auxiliary memory file.

The display generator shall verify that the display is complete and error-free before integrating the display into the active display library. It shall not be necessary to regenerate any display following a complete or partial system or database generation unless the database points linked to the display have been modified or deleted.

The system shall generate reports for all the modules in user-defined formats. The system will have a graphical user interface with a capability for generating customized reports, apart from the regular ones mentioned above, as per the requirement of management and operations staff. Display of statistical data shall be presented additionally in graphical formats such as bar- graph/pie diagram etc. for convenience of analysis.

## **7.5 Software Utilities**

Contractor shall supply all software utilities used to develop and maintain these software, whether or not specifically described by this Specification. The software utilities shall operate on-line (in background mode) without jeopardizing other application functions running concurrently. Utility software shall be accessible from workstations, processor terminals and servers.

### **7.5.1 Auxiliary Memory Backup Utility**

Software utility, to take back-up of auxiliary memory files of server and workstation onto a user-selected archival device such as SAN, shall be installed. Backup shall be maintained for a period of 7 years. The backup utility shall allow for user selection of the files to be saved based on:

- a) Server and workstation
- b) File names (including directory and wildcard designations)
- c) File creation or modification date and time
- d) Whether or not the file was modified since the last backup.

Further a utility for taking image backup of auxiliary memory files of the Servers and workstations shall be provided. The utility shall allow restoration of the servers/workstation from this image backup without requiring any other software. An image backup of the built system of each of the Servers and workstations shall be provided on a user-selected archival device such as SAN, which shall be used to restore the system. Automatic full or incremental back up capability of selected systems at user defined intervals shall be provided. It should be possible to restore or recover any software/system at a selected time form backup.

### **7.5.2 On-Line Monitoring Diagnostics Utility**

On-Line monitoring diagnostic programs shall be provided for verifying the availability of the backup equipment and for limited testing of devices without interfering with on-line operations of AMI application system or the failover capability of the devices.

Redundant communication line interface equipment shall be tested by periodically retrieving data over these lines and checking for the ability to communicate with the redundant channel for any errors.

Designated backup server(s) and associated auxiliary memories shall be automatically tested for proper operation to ensure they are ready if needed for a fail over contingency. Any failure to perform diagnostic functions correctly shall cause an alarm to be issued.

### **7.5.3 Data Exchange Utilities**

Facility of data export and import between this system and external systems shall be provided through web services.

#### **7.5.4 Other Utility Services**

AMI Application management shall include the following utility services:

- a) Loading and storage of information from labelled portable media storage units as dictated by the requirements of this specification.
- b) Preparation of .pdf output for the displays/reports available in the AMI Application system. It should also be possible to export all the reports to any MS-Office format.
- c) Displays and Reports for Web server -The Contractor shall provide utilities for preparing displays and reports suitable for Web publishing. These utilities shall be used to generate, all required displays and reports from the system displays and reports, automatically (without requiring rebuilding).
- d) On line access to user and system manuals for all software products (e.g., Operating System and Relational Database Software) and AMI applications shall be provided with computer system
- e) Antivirus Software - All computers and firewalls shall be provided with the latest antivirus software as on date of supply. The antivirus software shall have the capability of having its virus definitions updated from time to time. The Contractor shall be responsible for the maintenance & update of the antivirus software during AMC period.
- f) Software Upgrade-The Contractor shall be responsible for the maintenance & update of the patches and signatures of operating system, applications (AMI Applications) system and Web based System up to AMC period.
- g) Automated patch management and anti-virus tools shall be provided to expedite the distributions of patches and virus definitions to the system using an orchestration facility.

These tools should consider the possibility to use standardized configurations for IT resources.

#### **7.6 Cyber Security**

The following guidelines/strategies shall be taken care of by the Contractor for making the entire Control Centre immune to Cyber Attacks.

- All the Hardware, OS and application software shall be hardened.
- Application, scanning and hardware scanning tools shall be provided to identify vulnerability & security threats.
- Data shall be encrypted at system/device/technology level.
- Network Zoning shall be implemented as per the proposed architecture. However, the Contractor may suggest other methods of network architecture without compromising the security of the System.
- Internal user shall be allowed to access all adjacent zones. However they will not have access to remote network zone.
- While procuring cyber security items testing must be done and the system must be secure by design.
- Residual information risk shall be calculated by contractor and same shall be submitted to [employer/utility] for approval.
- All default user id & passwords shall be changed.

- All log in/out and cable plugs in/ out shall also be logged in Central Syslog server.
- Penetration & Vulnerability assessment test from certified auditors during FAT, SAT & AMC.
- Auditing by third party during FAT, SAT and annually during AMC period shall be in the scope of contractor.
- As the computer system in control centre has access to external environment the Contractor shall document and implement Cyber Security Policy/Plan in association with the [employer/utility] to secure the system.
- Latest Cyber Security Guidelines of CERT-In specified at <http://www.cert-in.org.in> / NCIIPC/ Ministry of Power or any other competent authority shall be followed.

## **8. Tests and Inspections**

### **8.1 In-Process Inspection**

#### **8.1.1 Type Testing**

Type Tests shall be defined as those tests which are to be carried out to prove the design, process of manufacture and general conformity of the materials to this Specification. Type Testing shall comply with the following:

The contractor shall submit, within scheduled period as per project plan, copies of test reports and certificates for all of the Type Tests that are specified in the specifications and that have previously been performed. These certificates may be accepted by the [employer/utility] only if they apply to materials and equipment that are essentially identical to those due to be delivered under the Contract and only if test procedures and parameter values are identical to those specified in this specifications carried out at nationally/Internationally accredited labs and witnessed by third party / customer's representatives .

Type Tests shall be performed for all equipment types for which certification is not provided as required above, or if it is determined by the [employer/utility] that the certification provided is not acceptable. If any of the type tests are required to be carried out, the same shall be carried out by the contractor. The contractor shall quote testing charges for each type test individually.

Type Tests shall be certified or performed by nationally/internationally reputed laboratories using material and equipment data sheets and test procedures that have been approved by the [employer/utility]. The test procedures shall be formatted as in the specifications and shall include a complete list of the applicable reference standards and submitted for [employer/utility] approval at least four (4) weeks before commencement of test(s). The contractor shall provide the [employer/utility] at least 30 days written notice of the planned commencement of each type test.

The contractor shall provide a detailed schedule for performing all specified type tests. These tests shall be performed in the presence of a representative of the [employer/utility].

Testing charges for all the type tests listed in the specifications shall be indicated separately for each item (excluding expenses of Inspector/ [Employer/Utility's] representative) in the prescribed schedule of the bidding document. The total amount of these charges will be considered in the bid evaluation process.

The contractor shall ensure that all type tests can be completed within the time schedule offered in its Technical Proposal.

In case of failure during any type test, the contractor is either required to manufacture a fresh sample lot and repeat all type tests successfully or repeat that particular type tests at least three times successfully on the samples selected from the already manufactured lot at its own expenses. In case a fresh lot is manufactured for testing then the lot already manufactured shall be rejected.

Documentation for all factory, field, and availability tests that apply to [Employer/Utility's] system shall be provided in accordance with the requirements defined in this section of specification.

### **8.1.2 Quality Assurance and Quality Control Program**

The contractor shall maintain a Quality Assurance/Quality Control (QA/QC) program that provides that equipment, materials and services under this specification whether manufactured, designed or performed within the contractor's plant, in the field, or at any sub-contractor's source shall be controlled at all points necessary to assure conformance to contractual requirements.

The Quality Plan shall be mutually discussed and approved by the [employer/utility] after incorporating necessary corrections by the contractor as may be required.

The program shall provide for prevention and ready detection of discrepancies and for timely and positive corrective action. The contractor shall make objective evidence of quality conformance readily available to the [employer/utility].

Instructions and records for quality assurance shall be controlled and maintained at the system levels. The contractor shall describe its QA/QC program in the Technical Proposal, (along with samples from its QA/QC manual) and shall submit its QA/QC Manual for review and acceptance by the [employer/utility].

Such QA/QC program shall be outlined by the contractor and shall be finally accepted by [employer/utility] after discussions before the award of Contract. A Quality Assurance Program of the contractor shall cover but not be limited to the following:

- a) The organization structure for the management and implementation of the proposed Quality Assurance Program.
- b) Documentation control system.
- c) Qualification data for key personnel.
- d) The procedure for purchase of materials, parts/components and selection of Sub-contractor's services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases, etc.
- e) System for shop manufacturing including process controls.
- f) Control of non-conforming items and system for corrective action.
- g) Control of calibration and testing of measuring and testing equipment.
- h) Inspection and test procedure for manufacture.
- i) System for indication and appraisal of inspection status.
- j) System for quality audits.
- k) System for authorizing release of manufactured product.
- l) System for maintenance of records.
- m) System for handling, storage and delivery.
- n) A Quality Plan detailing out the specific quality control procedure adopted for controlling the quality characteristics of the product.

Neither the enforcement of QA/QC procedures nor the correction of work mandated by those procedures shall be cause for an excusable delay. An effective Quality Assurance and Quality Control organization shall be maintained by the contractor for at least the duration of this Contract.

The personnel performing QA/QC functions shall have well-defined responsibility, authority, and organizational freedom to identify and evaluate quality problems and to initiate, recommend, or provide solutions during all phases of the Contract.

The QA/QC organization of the contractor shall be an independent administrative and functional structure reporting via its manager to the contractor's top management. The QA/QC manager(s) shall have the authority within the delegated areas of responsibility to resolve all matters pertaining to quality to the satisfaction of [employer/utility] when actual quality deviates from that stated in the Work Statement.

The contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of [Employer/Utility's] inspection of equipment/materials.

### **8.1.3 Scope of Employer for QA/QC Program**

The [employer/utility] or its duly authorized representative reserves the right to carry out Quality Audit and Quality Surveillance of the systems and procedures of the contractor's/his vendor's Quality Management and Control Activities.

The scope of the duties of the [employer/utility], pursuant to the Contract, will include but not be limited to the following:

- i) Review of all the contractor's drawings, engineering data etc.
- ii) Witness or authorize its representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the Contract.
- iii) Inspect, accept or reject any equipment, material and work under the Contract in accordance with the specifications.
- iv) Issue certificate of acceptance and/or progressive payment and final payment certificate
- v) Review and suggest modification and improvement in completion schedules from time to time; and
- vi) Monitor the Quality Assurance program implementation at all stages of the works.

### **8.1.4 Inspection Certificate**

The contractor shall give the [employer/utility] two weeks in case of domestic supplies and six weeks in case of foreign supplies written notice of any material being ready for testing. Such tests shall be to the contractor's account except for the expenses of the Inspector.

The [employer/utility], unless witnessing of the tests is waived, will attend such tests on the scheduled date for which [employer/utility] has been so notified or on a mutually agreed alternative date. If [employer/utility] fails to attend the testing on the mutually agreed date, contractor may proceed with the test which shall be deemed to have been made in the Inspector's presence and contractor shall forthwith forward to the Inspector, duly certified copies of the test results in triplicate.

The [employer/utility] shall, within fourteen (14) days from the date of inspection as defined herein, give notice in writing to the contractor of any objection to any drawings and all or any equipment and workmanship which in its opinion is not in accordance with the Contract. The contractor shall give due consideration to such objections and shall make the modifications that may be necessary to meet said objections.

When the factory tests have been completed successfully at the contractor's or Sub-contractor's works, the [employer/utility] shall issue a certificate to this effect within fourteen (14) days after completion of tests but if the tests are not witnessed by the [employer/utility], the certificate shall be issued within fourteen (14) days of receipt of the contractor's Test Certificate by the [employer/utility].

The completion of these tests or the issue of the certificates shall not bind the [employer/utility] to accept the equipment should it, on further tests after erection, be found not to comply with the Contract.

In cases where the Contract provides for tests, whether at the premises or works of the contractor or of any Sub-contractor, the contractor except where otherwise specified shall provide free of charge items such as labour, materials, electricity, fuel, water stores, apparatus and instruments, as may be reasonably demanded by the [employer/utility] or its authorized representative to carry out effectively such tests of the equipment in accordance with the Contract and shall provide facilities to the [employer/utility] or its authorized representative to accomplish testing.

The inspection by [employer/utility] and issue of Inspection Certificate thereon, shall in no way limit the liabilities and responsibilities of the contractor in respect of the agreed Quality Assurance Program forming a part of the Contract.

The contractor shall keep the [employer/utility] informed in advance of the time of starting of the progress of manufacture of material in its various stages so that arrangements can be made for inspection.

Record of routine test reports shall be maintained by the contractor at its works for periodic inspection by the [Employer/Utility's] representative.

Certificates of manufacturing tests shall be maintained by the contractor and produced for verification as and when desired by the [employer/utility]. No material shall be dispatched from its point of manufacture until it has been satisfactorily inspected and tested. Testing shall always be carried out while the inspection may be waived off by the [employer/utility] in writing only.

However, such inspection by the [Employer/Utility's] representative(s) shall not relieve the contractor from the responsibility for furnishing material, software, and equipment to conform to the requirements of the Contract; nor invalidate any claim which the [employer/utility] may make because of defective or unsatisfactory material, software or equipment.

### **8.1.5      Inspection and Test**

All materials furnished and all work performed under this Specification shall be inspected and tested. Deliverables shall not be shipped until all required inspections and tests have been

completed, all deficiencies have been corrected to [Employer/Utility's] satisfaction, and the equipment has been approved for shipment by [employer/utility]

Should any inspections or tests indicate that specific hardware, software or documentation does not meet the Specification requirements, the appropriate items shall be replaced, upgraded, or added by the contractor as necessary to correct the noted deficiencies. After correction of a deficiency, all necessary retests shall be performed to verify the effectiveness of the corrective action.

The test shall be considered complete when (a) when all variances have been resolved (b) all the test records have been submitted (c) [employer/utility] acknowledges in writing the successful completion of the test.

#### **8.1.5.1 Inspection**

Access to the contractor's facilities while manufacturing and testing are taking place, and to any facility where hardware/software is being produced for [utility] shall be available to [employer/utility] representatives. The contractor shall provide to [employer/utility] representatives sufficient facilities, equipment, and documentation necessary to complete all inspections and to verify that the equipment is being fabricated and maintained in accordance with the Specification. Inspection rights shall apply to the contractor's facilities and to Sub contractor's facilities where equipment is being manufactured.

Inspections will be performed by [employer/utility], which will include visual examination of hardware, enclosure cable dressings, and equipment and cable labeling. Contractor documentation will also be examined to verify that it adequately identifies and describes all wiring, hardware and spare parts. Access to inspect the contractor's hardware quality assurance standards, procedures, and records that are applicable to the facilities shall be provided to [employer/utility].

[employer/utility] representatives shall be allowed access to the contractor's facilities during system manufacturing and testing and to any facility where hardware or software is being produced.

[employer/utility] representatives shall be allowed to inspect the contractor's hardware and software quality assurance standards, procedures, and records. Documents identified in the approved software quality assurance plan will be inspected to verify that the contractor has performed the required quality assurance activities.

The inspection rights described above shall not apply to sub vendors supplying standard computer hardware, peripheral equipment, and third-party software products. The inspection rights shall apply to sub vendors developing new software for inclusion in the AMI system and to sub-system suppliers.

#### **8.1.5.2 Test Plans & Procedures**

Test plans and test procedures shall be provided by the contractor, for all tests to ensure that each factory and field test is comprehensive and verifies all the features of the equipment are tested.

The contractor shall prepare detail testing procedure in line to specification and submit for [Employer/Utility's] approval. The procedure shall be modular to the extent possible, which shall facilitate the completion of the testing in the least possible time.

During the development of test plans and test procedures for the system, emphasis shall be placed on testing each conditional logic statement, checking error conditions, and documenting the simulation techniques used. The test plans and test procedures shall be modular to allow individual test segments to be repeated as necessary. They shall be subject to [employer/utility] approval.

#### **8.1.5.2.1 Test Plans**

The test plans shall describe the overall test process, including the responsibilities of individuals and the documentation of the test results. The following shall be included in the test plans:

- a) Test schedule on a day-by-day basis
- b) Responsibilities of contractor and [employer/utility] personnel
- c) Record-keeping assignments, procedures, and forms
- d) Procedures for monitoring, correcting, and retesting variances
- e) Procedures for controlling and documenting all changes made to the hardware and software after the start of testing
- f) Block diagrams of the hardware test configuration, the external communication channels, and any test or simulation hardware.

#### **8.1.5.2.2 Test Procedures**

The test procedures shall describe the individual tests segments and the steps comprising each segment, particularly the methods and processes to be followed. The test procedures shall include the following items:

- a) Name of function to be tested
- b) References to the functional, design, user, and any other documents describing the function
- c) List of test segments to be performed and the purpose of each test segment
- d) Set-up conditions for each test segment, including descriptions of the test equipment
- e) Descriptions, listings, and instructions for test software tools and displays if any.
- f) Step-by-step descriptions of each test segment, including user actions for each test step
- g) Expected results for each test segment, including pass/fail criteria
- h) Descriptions of the techniques and scenarios to be used to simulate system field inputs and controlled equipment
- i) Copies of any certified test data to be used in lieu of testing.

#### **8.1.5.2.3 Test Records**

The complete record of all factory and field acceptance tests results shall be maintained by the contractor. The records shall be maintained in a logical form and shall contain all the relevant information. The test reports shall be signed by the testing engineer and the engineer witnessing the tests. The records shall be keyed to the test procedures. The following items shall be included in the test records:

- a) Reference to appropriate test procedure
- b) Date of test
- c) Description of any test conditions, input data, or user actions differing from that described in the test procedure
- d) Test results for each test segment including a pass/fail indication
- e) Identification of contractor's test engineer and [Employer/Utility's] representative if any.
- f) Provision for comments by [Employer/Utility's] representative
- g) Copies of any variance reports generated
- h) Copies of reports, display copies, and any other hardcopy generated as part of the test.

#### **8.1.5.2.4 Reporting of variances**

Starting from the dry run test period, a variance report shall be prepared by contractor personnel each time a deviation from the requirements of this Specification is detected in areas such as system functions, design parameters, performance, documentation, test plans, and test procedures. All such variances shall be closed in mutually agreed manner.

However, at any stage if [employer/utility] feels that quality of variances calls for suspension of the testing the testing shall be halted till satisfactory resolution of variances, which may involve retesting also.

The report shall include a complete description of the variance, including:

- a) Sequential identifying number assigned to the variance
- b) Date and time the variance was detected
- c) Appropriate references to the test procedures and this Specification
- d) Description of test conditions at the time the variance was detected
- e) Identification of contractor and [employer/utility] representatives
- f) Estimated date and time when variance is expected to be fixed
- g) Description of the corrective actions taken (to be completed as part of the variance resolution process)
- h) Dated signature lines for the [employer/utility] and contractor representatives to signify reporting and correction of the variance.

Each variance shall be assigned to one of three classes defining the action to be taken to resolve the variance:

- a) Class 1: Testing will immediately stop and the contractor will evaluate and correct the variance before testing is resumed
- b) Class 2: Testing will continue and the variance will be evaluated and corrected by the contractor at the end of the current session but prior to further testing
- c) Class 3: Testing will continue and the variance will be evaluated and corrected at a mutually agreed upon time.

The class shall be assigned by the contractor with [employer/utility] approval.

Variance reports shall be available to [employer/utility] for review and comment at all times and shall be submitted by the contractor to [employer/utility] at the start of the availability test. The contractor shall maintain and periodically distribute a variance summary that lists for each variance the report number, a brief description of the variance, its class, and its current status (open or resolved). A variance summary shall also be submitted with the progress report.

All actions taken to correct variances shall be documented on the variance report by the contractor. Sufficient information shall be provided to enable an [employer/utility] representative to determine the need for and extent of retesting, the need for testing interactions of the correction with any previously tested hardware or software, and the need for updating appropriate documentation. A variance shall be deemed resolved after retesting has been performed to the satisfaction of [employer/utility] and the contractor and [employer/utility] representatives have acknowledged correction of the variance on the variance report.

#### **8.1.5.3 Test Initiation**

The following conditions must be satisfied before starting any test

- a) All test plans and procedures for the test shall be approved by [employer/utility].
- b) All hardware and software engineering design change orders shall be incorporated into the system under test.
- c) All relevant documentation including drawings, lists of deliverables, and software functional and design documents, and user manuals shall be approved by [employer/utility].
- d) A complete regeneration of the software under test shall be performed immediately prior to the start of factory testing.
- e) All operating system parameters, files, and configuration information shall be saved to archive media so that the AMI systems operating environment can be recreated starting with an un-initialized system. The existence and completeness of this data shall be demonstrated to [employer/utility].
- f) All database, display, and report definitions shall be saved to archive media so that the databases, displays, and reports can be recreated if necessary.
- g) The image backup of all applications of AMI Systems shall be taken on the archive media so that AMI systems software can be regenerated if necessary.
- h) A complete dry run of each factory test (excluding the integrated system test) shall be conducted by the contractor using the approved test plans and test procedures. Written certification that the dry run has been successfully completed shall be provided to [employer/utility] at least one week prior to the start of each factory test. At [Employer/Utility's] option, [employer/utility] representatives will witness and participate in the dry run of any test.

#### **8.1.5.4 Test Completion**

A test shall be deemed to be successfully completed only when:

- a) All variances have been resolved to the satisfaction of [employer/utility]
- b) All test records have been transmitted to [employer/utility]
- c) [employer/utility] acknowledges, in writing, successful completion of the test.

#### **8.1.5.5 Test Suspension**

Any time [employer/utility] representatives believe that the quantity or severity of variances warrants suspension of any or all testing, the test shall be halted, remedial work shall be performed, and the complete test shall be repeated. The repeat of the test shall be scheduled for a date and time agreed upon by both the contractor and [employer/utility].

#### **8.1.6 Factory Acceptance Test**

The factory tests shall be conducted on all the equipment and shall include, but not be limited to the following, appropriate to the equipment being tested:

- a) Verification of all functional characteristics and requirements specified.
- b) Inspection and verification of all construction, wiring, labeling, documentation and completeness of the hardware

Before the start of factory testing, the contractor shall verify that all changes applicable to the equipment have been implemented. As a part of the factory tests, unstructured testing shall be performed to allow [employer/utility] representatives to verify proper operation of the equipment under conditions not specifically tested in the above structured performance test. The contractor's test representative shall be present and the contractor's technical staff members shall be available for consultation with [employer/utility] personnel during unstructured test periods. All special test facilities used during the structured performance test shall be made available for [Employer/Utility's] use during unstructured testing.

##### **Factory Test Requirements:**

The database, displays and the report formats developed by the contractor shall be demonstrated and verified by the [employer/utility] before factory testing.

All Field Device, AMI functions, communication & networking systems as well as performance shall be tested and demonstrated. The [employer/utility] will participate in and witness these tests.

The contractor shall also carry out testing of the standard protocol implementation for successful integration by interfacing with existing Systems before the FAT starts. The database, displays and the report formats developed by the contractor for Central System shall be verified by the [employer/utility] before factory testing.

All hardware and software associated with AMI Systems shall be staged and completely tested with simulated data at the contractor's facility.

The contractor is responsible for conducting all factory tests. [employer/utility] will witness all tests and will perform selected test procedures. Knowledgeable contractor personnel shall be present

at all times to assist [employer/utility] representatives with factory testing as needed. [employer/utility] will not accept un-witnessed test results of any hardware or software without previous written authorization.

Each of the factory tests described below (i.e. the hardware integration test, the functional performance test, and the integrated system test, unstructured tests) shall be carried out under factory test.

#### **8.1.6.1 Hardware Integration Test**

The hardware integration test shall confirm that the computer hardware conforms to this Specification and the contractor-supplied hardware documentation. The hardware integration test shall be performed when the computer hardware has been installed in the contractor's factory. The operation of each item shall be verified as an integral part of the system. Applicable hardware diagnostics shall be used to verify that each hardware component is completely operational and assembled into a configuration capable of supporting software integration and factory testing of the system. Equipment expansion capability shall also be verified during the hardware integration test.

#### **8.1.6.2 Functional Performance Test**

The functional performance test shall completely verify all features of the AMI Systems hardware and software. As a minimum, the following items shall be included in the functional performance test:

- A.) Inspection of all equipment for conformance to drawings/document and satisfactory construction and appearance
- B.) Testing of the proper functioning of all software, including test cases with normal and exception user-entered inputs and responses
- C.) Simulation of local error and failure conditions
- D.) Verification that ultimate expansion requirements are met.
- E.) Verification of data link interfaces with other Central systems
- F.) Verification of Field Device communication interfaces and data link interfaces with other central systems.
- G.) Simulation of Field Device and data link communication errors and channel failures, including incorrect check codes and random channel noise bursts
- H.) Testing of all user interface functions, including random tests to verify correct database linkages
- I.) Simulation of hardware failures and input power failures to verify the reaction of the system to server and device failure
- J.) Demonstration of all features of the database, display, and report generators and all other software maintenance features
- K.) Demonstration of the software utilities, libraries, and development tools.
- L.) Verification that the computer system meets or exceeds [Employer/Utility's] performance requirements
- M.) Verification of the accuracy of hardware and software documentation via random tests
- N.) Testing of spare parts

### **8.1.6.3 Integrated System Test**

The integrated system test shall verify the stability of the system hardware and software after the functional performance test has been successfully completed. During the integrated system test, all functions shall run concurrently and all contractor-supplied equipment shall operate for a continuous 100-hour period. This minimum level of activity may be augmented, at the discretion of [employer/utility], by other activities that represent normal day-to-day operation of the system as long as these activities are conducted in accordance with the training and documentation provided with the system. These other activities may include, but shall not be limited to, database, display, and report modifications, software development activities, configuration changes (including user-commanded server and device failovers), and the execution of any function described in this Specification.

The integrated system test shall assure [employer/utility] that the computer system is free of improper interactions between software and hardware while the system is operating as an integrated unit. In case during the 100 hour period testing uncommanded functional restart or server or device fail occurs the test shall be extended by 24 hours each time such a fail over occurs. Further the test shall not be conducted with the failed device.

### **8.1.6.4 Unstructured Testing**

Periods of unstructured testing shall be allocated to allow [employer/utility] representatives to verify proper operation of the systems under conditions not specifically included in the approved test procedures. Unstructured testing shall be conducted in compliance with the following conditions:

- a) A minimum of 25 percent of the actual test period shall be reserved for unstructured test of the system by [employer/utility] representatives
- b) The contractor's test representative shall be present and the contractor's other technical staff members shall be available for consultation with [employer/utility] personnel during unstructured test periods
- c) All simulation software, test cases, and other test facilities used during the structured portions of the factory tests shall be made available for [Employer/Utility's] use during unstructured testing
- d) Unstructured testing shall not begin prior to the start of the functional performance test
- e) Unstructured testing shall be allowed at [Employer/Utility's] discretion both at the end of a structured test segment and after completion of the functional performance test.

The MICC for all hardware shall be issued only after successful completion of FAT as per specification. At least 10 Field Devices for each protocol shall be connected with each central system and the remaining Field devices shall be simulated in the factory test environment. The data exchange between central systems shall also be simulated in the factory test environment.

## **8.2 Field Installation and Integration Test**

It is expected the deliveries to site will happen in lots of meters/DCUs etc. as per schedule of the FAT. The delivery of the production hardware for the data centre (that is servers, Work Stations,

LAN/Routers, Firewall, etc.) shall happen with the delivery of the first lot of meters/DCUs. In this phase of testing, the delivered equipment per lot shall be inspected for integration with data centre hardware.

The field installation test shall provide verification that computer system is operationally equivalent to the system that successfully completed factory testing. The responsibility for the conduct of the field installation test shall rest with the contractor. [employer/utility] will witness all tests and will perform selected test procedures. Knowledgeable contractor representatives shall be present at all times to assist [employer/utility] representatives with the testing.

The field installation test shall consist of the functional performance test to confirm operation of basic functions such as data acquisition, user interface, and the support and [employer/utility] functions. All hardware shall be tested by running diagnostics. The exact content of the field installation test shall be determined jointly by the contractor and [employer/utility]

### **8.3 Site Acceptance Test**

After all lots of equipment has been installed, the contractor shall start up and check the performance of the equipment of field locations. All hardware shall be aligned and adjusted, interfaces to all inputs and outputs installed, operation verified, and all test readings recorded in accordance with the contractor's recommended procedures. The field performance test shall exhibit generally all functions of the equipment and duplicate factory test. All variances must be corrected prior to the start of the field performance test. The list of final tests to be carried out in the field shall be listed in the site-testing document by the contractor

### **8.4 Guaranteed Performance Test**

Post installation, commissioning and integration of all AMI Hardware, Software, field material in project area and completion of site acceptance test, a 3 month guaranteed performance test shall be undertaken. A designated team/ person from [Employer/ Utility] will review the performance of AMI system after every 30 days against the SLAs defined in this document in section 4. Should AMI system fall short of meeting the defined SLAs, the contractor may continue the test by moving the starting time of the test forward and continuing the test until the consecutive 90 days AMI SLAs has been achieved.

### **8.5 Operational Acceptance**

Contractor's obligations for operational acceptance of system by [Utility/ Employer] shall be deemed to be met when the following milestones are achieved:

1. Successful completion of Guaranteed Performance Tests
2. Completion of training obligations as defined in this RFP
3. Handing over of all training, engineering and software license documents
4. Handing over of recommended spares for warranty period and
5. Successful completion of system availability test

As part of the operation acceptance the AMI system has to undergo a 1000-hour system availability test. This shall be conducted on supplied systems under normal day-to-day operating conditions. The test shall verify the reliability and integrity of the Field devices, Central Systems,

Communication & networking systems, database, displays, report and all communication interfaces.

### **8.5.1 Test Responsibilities**

[employer/utility] will be responsible for conducting the availability test. The test shall consist of normal AMI Systems operations without special test equipment or procedures.

Test records defined in the availability test plan and procedures will be maintained by [employer/utility] personnel. <Employer/Utility> will operate and maintain the system according to procedures described in the approved contractor documentation. [utility/employer] shall also raise incident reports for every incident that is encountered and closed with response time, resolution time and hold times.

AMI systems maintenance on an on-call basis shall be provided by the contractor during the availability test period. When on-site maintenance support is needed, qualified contractor personnel shall arrive at the site within maximum four (4) hours of notification and shall keep [Employer/Utility] fully informed of the progress in problem resolution. For availability purposes, this service response time and the associated on-site maintenance time shall be taken into account as defined in Sections of "Downtime" and "Hold time".

The contractor shall maintain an inventory of spare parts, which may be required to achieve the specified availability. These spares shall be in addition to the mandatory spares. All spare parts used during the availability test shall be drawn from contractor's inventory.

During the availability test period, [employer/utility] reserves the right to modify the displays and reports. Such modifications will be described to the contractor at least 48 hours in advance of implementation to allow their impact on the availability test to be assessed, except where such changes are necessary to maintain control of the power system.

### **8.5.2 Downtime**

Downtime occurs whenever the criteria for successful operation defined in Section 8.1.15 are not satisfied. Downtime shall be measured from the start of diagnostic procedures until full service is restored. In the event of multiple failures, the total elapsed time for repair of all problems (regardless of the number of maintenance personnel available) shall be counted as downtime. For onsite response the delay in response time (more than four hours) shall be added to downtime.

### **8.5.3 Hold time**

During the availability test, certain contingencies may occur that are beyond the control of either [employer/utility] or the contractor. These contingencies may prevent successful operation of the system, but are not necessarily valid for the purpose of measuring AMI systems availability. Such periods of unsuccessful operation may be declared "hold time" by mutual agreement of [employer/utility] and the contractor. Specific instances of hold time contingencies are:

- a) **Scheduled Shutdown:** During scheduled shutdowns, or if an equipment failure occurs while its backup device is scheduled out-of-service, the resulting system outage shall be hold time, provided that service can be restored according to contractor-specified procedures within 30 minutes.
- b) **Power Interruption and Environmental Excursion:** Loss of power or manual shutdown in the event of loss of environmental control shall be considered hold time. If the system is operated during periods of power or environmental conditions beyond those specified, any resultant downtime shall also be considered hold time.
- c) **Intermittent Failure:** Periods during which an intermittent, recurring software or hardware failure is experienced will be considered hold time, provided that the contractor is engaged in remedial action and normal functions can be restored by contractor-defined procedures whenever the failure occurs. Instead of accounting for the actual intermittent downtime, one hour of downtime shall be counted for each 120 hours of otherwise successful operation while the problem persists.
- d) **Failure of [Employer/Utility's] Software:** Time during which the system is down due to failure of software written and independently produced by [employer/utility] shall be considered hold time. If a failure in such software cannot be overcome by contractor-defined procedures, execution of the failed program will be suspended. Programs developed by [employer/utility] personnel under contractor supervision are specifically excluded from this provision.
- e) **Service Response Time:** A maximum four (4) hours of hold time will be allowed for the contractor to respond to each call for maintenance support. The time between detection of a failure and the start of diagnostic procedures shall also be considered hold time when performed by [Employer/Utility's] personnel.
- f) **Corrected Design Defect:** Hold time may be declared by mutual agreement to ensure against similar future occurrences if a failure occurs due to a defect in system design for which the contractor defines and implements corrective measures. In such a case, hold time shall be allowed in increments of 120 hours to allow verification of the corrective action.

#### **8.5.4 Test Duration and Criteria for Acceptance**

After the elapse of 1000 hours of cumulative test time, the availability shall be calculated. Should availability falls short of specified percentage, the contractor may either (a) Continue the test by moving the starting time of the test forward and continuing the test until the consecutive hours have been accumulated and the specified availability has been achieved subject to maximum of 75 days, Or (b) the contractor may restart the test for 1000 hours, however, more than two such restarts shall not be allowed.

To establish that all failures have been satisfactorily repaired prior to the end of the availability test, no downtime, intermittent (hold time) failures, or more than one uncommanded fail over shall have occurred within 240 hours of the test's conclusion.

##### **Criteria for successful operation**

The AMI system shall be designed to meet the system availability as defined below:

S.No.	System	Minimum System Availability Requirements
1.	Smart Meters	X%
2.	DCU/ AP	X%
3.	MDM	X%
4.	HES	X%
5.	Control Center Hardware like UPS, Server, Router, etc.	X%

The total operational time shall not include the hold time. The system shall be considered available as long as all the requirements defined under section-3 are available.

The successful completion of the availability test and completion of milestones as stated above will lead to Operational Acceptance of the system. The [employer/utility] shall issue the acceptance certificate within X days of notice served by the contractor.

## **9. Maintenance**

### **9.1 General**

The scope of work under maintenance & support services shall include a comprehensive maintenance of all the software (including licensing and annual technical support cost) and hardware along with field devices provided by the contractor under this project. The contractor shall also provide future integration and support services for meeting the future expansion requirement envisaged under this project. The maintenance practices to be followed shall be as per ISO 20000 Standard. The essence of the maintenance and support services is to provide maintenance support for the designated hardware, software and field devices, with the goal of meeting the availability as set forth herein. The contractor is to hand hold the [utility] team to take over maintenance and support services after completion of contractor's FMS period. The project/ system devices should allow their functionalities to be upgraded without disruption to the existing functionalities by downloading new software and configuration information.

### **9.2 Contractor's Maintenance Responsibility till Site Acceptance**

During this period, the contractor shall make available resident Project Manager, hardware & software specialists, who shall be available upon notification by the [Employer/Utility] about any problem(s) that may exist. The contractor's specialists shall be required to respond to the [Employer/Utility's] notification in line with the provisions of Technical Specifications. The contractor shall replace or repair all defective parts and shall have prime responsibility for keeping the system operational.

### **9.3 Maintenance Support**

The period of maintenance support shall be seven (7) years from Operational Acceptance by [employer/utility]. The period of maintenance support shall include one year Warranty (Defect Liability) period commencing from Operational Acceptance and Six (6) years thereafter. During first one year, commencing from Site Acceptance, operation of the entire system is under the scope of the contractor.

System availability requirements during the maintenance period shall be as described in the Table below:

S. No.	System	System Availability Requirements
1	Control center hardware and software	X%

S. No.	System	System Availability Requirements
2	Data Availability at Control Centre for field devices	As per Sl. No. 1,2 & 3 of Table provided in section 9.11

For all third party equipment (Hardware & Software) Contractor shall have back to back support along with supply of spare with appropriate response time from OEM/OEM Authorized representatives. Contractor shall be responsible for coordination with the OEM for all matter related to that equipment. But the Contractor shall be responsible for meeting the overall response times and availability requirements specified in the Specification.

The maintenance of the System shall be comprehensive and shall comprise of the following category of works which is further elaborated for each of the different subsystems:

- a) Preventive Maintenance Activity (performance monitoring, system backup, hardware & software maintenance and update, field & network devices firmware update, emergency response and troubleshooting etc.)
- b) Integration of new devices (Meters/nodes, networking devices, NIC, integration with existing system etc.)
- c) Maintaining adequate spares for maintenance.

#### 9.4 Preventative Maintenance Activity

The preventive maintenance activities shall be performed by the Contractor to keep the system running at optimum level by diagnosis and rectification of all hardware and software failures and would broadly include:

- Repair / replacement of defective equipment: The Contractor shall be responsible for repair/replacement of all the hardware including consumables required for the various systems. Only replacement of printer cartridge and paper rim shall be excluded from the scope of the Contractor.
- Configuration of the replaced hardware and software, periodic routine checking as part of a preventive maintenance program (as described in further detail in this document) which would include checking of functionality of hardware and software,
- Monitoring of the performance of the system and doing necessary tuning for optimum performance to accommodate any changes such as addition of new components.
- Providing all necessary assistance to [employer/utility] for addition and modification of database and user interface & consumer portal displays and Database sizing activities.
- Take Backup of the system at regular interval
- Restoration of the systems upon its failure and to restore the functioning of the various systems at the Control Centre.

Routine works like database works, and other such day-to-day operational activity would primarily be the responsibility of [employer/utility] and in case of any difficulty in this regard the same shall be referred to the contractor for support.

#### **9.4.1 Hours of Cover**

The Contractor shall provide at least one engineer who has an experience and skill to maintain the system to the desired level of availability. The contractor's on-site support for Control Centre shall be on all days from 9:00 am to 5:30 pm local time (IST), excluding public and Utility Company holidays, throughout a year. At least one Engineer having expertise in relevant field shall be available on all days at Control Centre. The timings for Emergency Support would be 24 hours a day, 7 days a week throughout the year.

The support personnel so deployed shall be qualified personnel having at least one year of experience in the relevant field. The contractor shall submit the CV's and recommendation letter from customer's for all support personnel(s) to [employer/utility] for approval before deployment at site. The [employer/utility] can ask the Contractor to replace the personnel deployed for maintenance support if its performance is not found to be satisfactory.

#### **9.4.2 Service Response Requirements**

The severity levels are defined in coming sections and the requirement of response time for various severity levels is defined below:

Emergency Support for Severity 1 issues are to be provided 24 hours a day, seven days a week. The on-call support team shall include all key technical competencies so that any aspect of a system failure can be attended. Severity 1 problems shall be reported by telephone for rapid response; target response times are defined in section below for severity 1 problems, the key objective is to restore the system to an operational state as quickly as possible, including by a temporary workaround. Resolution of the defect may be completed during standard hours.

Severity 2, 3, and 4 problems shall be reported by [employer/utility] through a call tracking system to be provided by the contractor. Resolution of problems may also be provided by an individual fix that will be installed by the contractor at no extra cost to Owner.

### **9.5 Monitoring**

The operation and performance of the various systems under AMC shall be monitored on a fortnightly basis, the contractor shall review the following, analyse the results and submit report to Employer. The contractor shall conduct at least the following monitoring at control centre:

#### **9.5.1 Log Monitoring**

- System logs for a selected day
- System history log
- Aggregate data collection
- Field & Network Device failure
- Events collection
- Availability of communication link

During monitoring if any defect/ abnormality are found, the contractor shall undertake corrective maintenance for the same. All coordination for failure & poor performance of ISP/ GPRS service provider shall be the responsibility of contractor during AMC period.

### **9.5.2 Resource Monitoring**

Resource Monitoring services comprise checking the system's major node resources, gather log data, analyze results, and advise [employer/utility] on the appropriate actions to be taken and undertake any agreed upon actions. The NMS system shall be able to continuously collect the following information:

- CPU loading (Peak and Average)
- Memory utilization (Peak and Average)
- Disk utilization (Peak and Average)
- LAN utilization (Peak and Average)
- Operating system resource utilization reports
- System error log

The bidder shall submit the procedures details to meet the above along with the offer.

### **9.5.3 Cyber Security System Monitoring**

The Contractor shall also be responsible for monitoring of the cyber security system. The logs of the system shall be analyzed for exceptions and the possible incident of intrusion/trespass shall be informed to the [employer/utility]. The monitoring shall encompass the various cyber security devices installed at Control Centre and Substations such as firewalls, Intrusion prevention system (both network based and host based), routers etc. The Centralized Monitoring Console (CMC) shall monitor and continuously collect the above logs.

The Cyber security system shall also be subjected to Annual Security Audit from CERT-In listed auditors at the cost of the Contractor during AMC period. Contractor shall implement the recommendations/remedial actions suggested by the Auditor after audit.

## **9.6 Patch Management**

The contractor shall also be responsible for providing updates/patches for the software products supplied under the project. All other patches of third party product like Operating System and Anti-virus shall be tested by the Contractor prior to installing in the Utility's network. Other products like Firewalls shall also be provided with secure patch management. A secure patch management and deployment system is to be established which shall be provided with single point of Internet connectivity. All the patches shall be downloaded through this single point of connection. Internet connection shall be provided by utility.

The Contractor shall provide a mechanism for patch management so that it is known that what patches have been applied, what all patches are pending but available with us and what is the recent release of patches for the various products. Any patch shall be applied only with express permission of the utility's representative.

## **9.7 Physical Maintenance**

The contractor shall undertake physical maintenance of all equipment/modules under the scope of this contract, in accordance with this section once in 3 months. The physical maintenance shall include cleaning, dusting, inspection of equipment for loose connections, damage to insulation, pest infections etc.

Equipment shutdown during preventive maintenance shall be deemed as available.

## **9.8 Spares inventory**

The Contractor shall maintain a spares inventory at its own cost to meet the spare availability requirements of the system. The spares shall be used as and when required and no separate charges are payable except the maintenance charges. The Contractor shall decide the items and components to be maintained as spare but a minimum number of spares as given Table below shall be kept at the respective Centers. This shall be periodically verified by the [employer/utility]. If the replenishment of the spare takes more than 30 days then it will be considered as non-availability as per Severity-2.

Sl.no	Item description	Unit	Qty
A	Servers	Lot	1*
B	Work Station	Lot	1*
C	Router and Switches	%	10
D	Communication Equipment	%	10
E	Field Devices	%	10
F	Meters	%	5

\* Note: One of each Type Supplied as part of system. Wherever one configuration can replace multiple type of elements supplied only 5% (Minimum one) such equipment shall be taken as spare

## **9.9 Integration of Equipment**

All future services, protocol emulations and configuration support for integration of smart meters/nodes, routers, access points, network devices, web services, integration with other offline applications etc. shall be the responsibility of contractor and shall be part of the maintenance charges.

## **9.10 Problem/Defect Reporting**

The bidder shall submit an appropriate problem/defect reporting procedure to meet the requirement of all severity levels to get the approval of the same from [employer/utility]. The problems will be categorized as defined in Table below.

Category	Definition
Severity 1 – Urgent	Complete system failure, severe system instability, loss or failure of any major subsystem or system component such as to cause a significant adverse impact to system availability, performance, or operational capability (as described at 11.9.1-Severity-1)
Severity 2 – Serious	Degradation of services or critical functions such as to negatively impact system operation. Failure of any redundant system component such that the normal redundancy is lost (as described at 11.9.2-Severity-2)  Non-availability of Man-power at Control Centre during working hours, non-availability of spares
Severity 3 – Minor	Any other system defect, failure, or unexpected operation (as described at 11.9.3-Serverity-3)
Severity 4 – General/Technical Help	Request for information, technical configuration assistance, “how to” guidance, and enhancement requests. (As described at 11.9.4-Severity-4)

## 9.11 Severity Levels

The detail of the systems under different severity levels is as below:

### 9.11.1 Severity-1(Urgent Support)

This support is required when there is a complete system failure, severe system instability, the loss/ failure of any major sub-system / system or its components, which may significantly impact the system availability, performance, or operational capability at Control centre. Following outages/disruptions will be considered under Serverity-1:

- Loss of data due to any problem in software /hardware.
- Loss of data due to any problem in communication network
- Outages of any application software.
- Cyber Security issues.
- Outage of both Routers and LAN Switches.
- Loss of data exchange with other computer systems of utility.

The failure of field devices shall be considered as Severity-1 level, however a maximum time of Organization and travelling time of 4/6 working hrs. shall be provided to rectify field defects.

Upon receiving intimation, the representative of the contractor would immediately attend to the problem and restore all functionalities at the earliest.

### 9.11.2 Severity-2

The support services not defined under Severity-1 are included under this category. Coverage under this severity would be outages that do not immediately cause on line data loss but subsequently could result into Severity-1 category outage, loss of an important subsystem that may affect the day-to-day works and loss of archived data.

- Failure of Storage System, stoppage of data collections for archiving and outage of other applications not covered under severity-1 are included in this category.
- Failure of any redundant system component affecting the critical redundancy like loss of any one Application Processor, Router.
- Non-availability of designated contractor's Man-power at control centre as well as required inventory of spares specified here.
- Failure of one UPS system, Failure of Battery System and failure of any other system of Auxiliary
- Power supply not covered under Severity-1 are included in this category.

#### **9.11.3 Severity-3 (Standard Support)**

The support services included under this category are when the outage or loss of functionality is neither of an emergency nor priority functionalities as indicated in severity level 1 or 2 above. Problems like database reworking, failure of any one workstation, printers etc. would be covered under this category.

#### **9.11.4 Severity-4 (General Technical Help)**

Request for information, technical configuration assistance, "how to" guidance, and enhancement requests are included under this category.

### **9.12 Response & Resolution Time**

This section describes the target times within which the contractor should respond to support requests for each category of severity. The initial response time is defined as the period from the initial receipt of the support request (through approved communications channels) and the acknowledgement of the contractor subject to the maximum time defined in Table below. The Action Resolution Time is the period from the acknowledgement of support request to the contractor delivering a solution subject to the Maximum time defined in Table below. This period includes investigation time and consideration of alternative courses of action to remedy the situation. The Action is defined as a direct solution or a workaround.

Except for Severity Level 1 all response/resolution times (hours and days) specified below are working hours only.

Severity	Initial Response Time (Working Hours)	Initial Response Time (Non-Working Hours)	Action Resolution Time	Action
1	5 minutes	30 minutes	2 hours	An urgent or emergency situation requiring continuous attention from necessary support staff until system operation is restored – may be by workaround.
2	5 minutes	2 Hours	24 Hours	Attempt to find a solution acceptable to [employer/utility] (dependent on reproducibility), as quickly as practical.
3	2 hours	1 day	2 days	Evaluation and action plan. Resolution time is dependent on reproducibility, ability to gather data, and [Utility/ Employer's] prioritization. Resolution may be by workaround.
4	2 hours	1 day	2 days	Report on the problem/query is to be furnished.

## 9.13 Availability and Maintenance Charges

The contractor shall provide guaranteed availability for various types of Systems as specified in Table below. Availability calculation methodology for Control centre hardware / software and data availability of field devices at control centre shall be as below:

### 9.13.1 Availability of System

The non-availability hours for availability calculation shall be counted from the end of the allowed Action Resolution time. A standardized preferably web based online ticket register shall be maintained at site containing full details of each outages, actions taken by [utility] to correct the problem, applicable Severity level, time of reporting to the contractor support engineer/support, allowed Response time as per the Response times defined in above section, actual Resolution time, and review of Engineer-in-charge as well as the contractor's support engineer of the site.

In the event of multiple failures at a site, due to a common cause, the first FPR (Field Problem, Report) logged shall be used for the purpose of availability calculation. However, simultaneous multiple outages due to unrelated cause would be counted separately.

Availability computation shall be done on per quarter yearly basis per site. The formula to be used for availability computation shall be as under:

$$\text{Availability per quarter (per site)} = \frac{\text{THQ} - (\text{S1} \times 1 + \text{S2} \times 0.8 + \text{S3} \times 0.5)}{\text{THQ}} \times 100\%$$

- Where THQ is total hours in the quarter
- S1 is the total non-available hours in Severity Level-1
- S2 is the total non-available hours in Severity Level-2
- S3 is the total non-available hours in Severity Level -3
- 

#### **9.13.2 Payment of Maintenance Charges**

In the event of availability below a certain level, the maintenance charges would be proportionately reduced as follows:

<b>Availability of AMI System per quarter</b>	<b>% Deduction</b>
> 99.5% (roughly 10 hrs )	NIL
Less than 99.5%	Deduction of 1% of quarterly FMS charges for every 0.5% or part thereof decrease in availability under 99.5% subject to a maximum of 50% of quarterly FMS charges.

The computation of Availability / Non-availability would be rounded up to 2 decimal on quarterly basis and any deduction in the maintenance charges thereof would be calculated on pro-rata basis.

#### **For Data Performance:**

The following data read performance should be met by the contractor during the Maintenance period. If the desired performance requirements are not met, the maintenance charges would be proportionately reduced as described below.

<b>Data Type</b>	<b>Performance Requirement</b>
<b>1. Scheduled daily meter readings (as per IS 16444/15959)</b>	
Daily collection of the previous day's interval energy data and total accumulated energy	From 99.9% of meters within 24 hours after midnight;. Average availability for the quarter will be computed
There will be a penalty of additional 1% of quarterly FMS charges for additional drop of 1% in communication availability below 99.9% as per SLA during the quarter. The deductions	

Data Type	Performance Requirement
	shall be made from the quarterly FMS payments to be made to the contractor subject to a maximum of 50% of quarterly FMS charges.

## 9.14 Contractor's Obligations and Responsibility

The contractor shall guarantee continuous availability of the system as indicated in section 9.12. In order to optimize and improve the response of the system, the contractor may re- install the program modules after making the [utility/employer] engineer aware of the consequence (like data loss, database rebuild etc.).

Any modification of software/operating system required to restore functionality due to hardware upgrades/replacement, patches, or arising out of a necessity to fix FPRs (Field problem reports), would be done by the contractor at no extra cost to Employer.

The contractor will submit FSR (Field Service Report) and the steps taken to solve the problem, along with details of code changes.

## 9.15 Responsibilities of [employer/utility]

The responsibilities of the [employer/utility] during the maintenance period are as follows:

- a) [employer/utility] shall ensure that proper environmental conditions are maintained for the system.
- b) [employer/utility] shall ensure that the system is kept and operated in a proper and prudent manner as described in the system documentation provided by the Contractor and only trained [employer/utility] representatives (or persons under their supervision) are allowed to operate the system.
- c) [employer/utility] shall provide access to the sites of installation for purposes of providing Support Services.
- d) [employer/utility] shall provide the contractor with Space for Office and storage for their maintenance staff and spares.

## 9.16 Responsibility Matrix

The table in this section provides a summary definition of the roles and responsibilities of the contractor and [employer/utility].

Legend:

- This indicates who has primary responsibility to perform this function.
- A This indicates who will provide assistance.
- F Feedback

Item	Task	[employer/utility]	Contractor
1.0	PROBLEM IDENTIFICATION		

Item	Task	[Employer/utility]	Contractor
1.1	Root cause analysis to determine whether the fault is attributable to Hardware or Software.	F	•
1.2	Resolution of problems involving third party maintainer where there is uncertainty whether the root cause is hardware or software.	---	•
2.0	SOFTWARE PROBLEM RESOLUTION		
2.1	Report problem and assist with problem identification	---	•
2.2	Provide or recommend corrections, temporary patches, workarounds or other fixes to system problems	---	•
2.3	Install and test corrections, temporary patches, workarounds or other fixes to system problems	---	•
3.0	ROUTINE SOFTWARE SUPPORT		
3.1	Build and maintain database, displays and reports	F	•
3.2	Perform system back-ups	---	•
3.3	Restore or reinstall software from back-ups	---	•
3.4	Monitor system logs (part of remote monitoring service)	---	•
3.5	Maintain system logs	---	•
3.6	Maintain user accounts	•	A
4.0	HARDWARE PROBLEM RESOLUTION		
4.1	Report problem and assist with defining problem	•	A
4.2	Troubleshoot problem to diagnose if it is software-related or hardware-related	---	•
4.3	Identify failed component, Replace failed components in the system using parts from spares inventory	---	•
4.4	Restore operation of repaired/replaced equipment	---	•
5.0	HARDWARE SPARE PARTS		
5.1	Manage local spares inventory	---	•
5.2	Replenish local spares inventory	---	•
6.0	INTEGRATION AND DATABASE WORK AT CONTROL CENTRE END		
6.1	Field Device Integration	---	•

Item	Task	[Employer/utility]	Contractor
<b>6.2</b>	Other System Integration	----	•
<b>7.0</b>	CYBER SECURITY MONITORING		
<b>7.1</b>	Patch Updates	----	•
<b>7.2</b>	Cyber Security Monitoring	•	A
<b>7.3</b>	Annual Audits	----	•
<b>7.4</b>	Implementation of Recommendations during Audit	----	•
<b>7.5</b>	Maintenance of Spares	•	--
<b>8.</b>	Manual Meter Read through HHU in case of non-communication of Smart Meters	----	•

## **10. Project Management**

### **10.1 Project Management**

The Contractor shall assign a project manager with the authority to make commitments and decisions that are binding on the Contractor. [employer] will designate a Nodal officer to coordinate all [Employer and Utility] project activities. All communications between [employer/utility] and the Contractor shall be coordinated through the project managers/ nodal officer. The project managers shall also be responsible for all communications between other members of the project staffs including subcontractor, if any.

### **10.2 Project Schedule**

The bidder shall submit a preliminary project implementation schedule along with the bid. The detail project implementation schedule shall be submitted by the Contractor after award for [Employer's and Utility's] approval, which shall include at least the following activities:

- a) Site Survey
- b) Documents, Data Requirement Sheet, Drawing submission and approval
- c) Type Testing Schedule
- d) Hardware purchases, development/manufacturing and integration
- e) Dispatch Schedule
- f) Receipt, Storage, Installation & Field update schedule
- g) Factory & Site Testing Schedule
- h) Training schedule
- i) Field trial run schedule

The project implementation schedule shall include the estimated period for completion and its linkage with other activities. The Project implementation schedule shall also contain [Employer and Utility] activities as required by the Contractor to complete the project.

### **10.3 Progress Report**

A progress report shall be prepared by the Contractor for each month against the activities listed in the project schedule. The report shall be made available to [Employer & Utility] on a monthly basis, e.g., the 10th day of each month. The progress report shall include all the completed, ongoing and scheduled activities and transmittals issued and received for the month.

### **10.4 Transmittals**

Every document, letter, progress report, change order, and any other written transmissions exchanged between the Contractor and [employer/utility] shall be assigned a unique transmittal number. The Contractor shall maintain a correspondence index and assign transmittal numbers consecutively for all Contractor documents. [employer/utility] will maintain a similar correspondence numbering scheme identifying documents and correspondence that [employer/utility] initiates.

## **10.5 Review Meeting**

Progress meetings shall be scheduled by the [employer] and attended by the Contractor each reporting period to review progress of the project. Progress meetings shall be used to review the progress report, written correspondence exchanged since the last meeting, and open action items.

The Contractor shall also attend technical meetings as and when required by [employer] to discuss technical aspects of the project and to review [Employer/ Utility] comments on documents. When appropriate, these technical meetings shall be conducted as extensions to the progress meetings.

## **10.6 Document Review and Approval Rights**

To ensure that the proposed systems conform to the specific provisions and general intent of the Specification, the Contractor shall submit documentation describing the systems to the [Employer and Utility] for review and approval.

The [employer] will respond with written comments to the Contractor within thirty (30) calendar days after receipt of the documents. Documents requiring correction must be resubmitted by the Contractor to the [employer] within thirty (30) calendar days. The [employer] will respond to resubmitted documents within fifteen (15) calendar days after receipt of the document. No implementation schedule relief is to be implied for documents requiring correction and resubmission to the [employer].

The [employer] shall have the right to require the Contractor to make any necessary documentation changes at no additional cost to the [employer] to achieve conformance with the Specification.

Any purchasing, manufacturing, or programming implementation initiated prior to written the [employer/utility] approval of the relevant documents or drawings shall be performed at the Contractor risk. Review and approval by the [employer/utility] shall not relieve the Contractor of its overall responsibilities to satisfy system functions and performance requirements in accordance with the Specification.

To help the [employer/utility] manage the review and approval of documents during any given period, the Contractor shall stagger the release of documents over the time allocated in the project schedule. The number and size of documents shall be factored into the document release schedule. At any time, no more than five (5) documents shall be submitted to the [employer/utility] for review and approval.

## **11. Document Requirements**

### **11.1 General**

To ensure that the proposed systems conform to the specific provisions and general intent of the Specification, the Contractor shall submit documentation to [employer] describing the systems for review and approval. Further the Contractor shall also submit the drawings / documents for all the hardware & software required for site installation, testing and commissioning and thereafter operation of the system. The Contractor shall obtain approval of [employer/utility] for the relevant document at each stage before proceeding for purchase, manufacturing, system deployment, factory testing, erection, site testing, training etc.

### **11.2 Instructions**

Documents shall have unique identification No. and every revision shall be mentioned. The Contractor shall submit three (3) hard copies of each document/drawing for [Employer/Utility's] review and approval along with soft copy with each submission. After approval two (2) sets of all the documents shall be submitted as final documentation. Any changes observed during field implementation shall be incorporated in the as-built drawing and two copies of same shall be submitted to [employer/utility] on electronic media in pdf format.

The Contractor shall also supply two (2) sets of Technical User manuals/guides/O&M manuals/manufacturers catalogues for all the hardware & software supplied under the contract. The user manual shall at minimum include the principle of operation, block diagrams, troubleshooting and diagnostic and maintenance procedures. Considering all the components of the system the following documents/drawings shall be required under the system.

### **11.3 Hardware Documentation Requirements**

The following document shall be submitted as applicable for the subsystem.

- 1 System description documents (Overview)
- 2 Data requirement sheets for all items
- 3 Functional description document
- 4 Database documents
- 5 Drawings/Documents for manufacturing/assembly of the equipment/system
- 6 Drawings/Documents for installation of the equipment/system at site
- 7 Installation Progress Document: Including documentation of date of installation, make and meter ID of existing replaced meter, meter ID of new meter, consumer account number, GPS coordinates, unmetered connection, existing meter status (OK, failed, meter tampering), line theft, etc. Where applicable contractor may, for recordkeeping, take photographs/ videos of installation site on approval from [utility]
- 8 Software description/design documents for each module
- 9 Factory test procedure and report
- 10 Manuals for each equipment
- 11 System configuration parameter

- 12 Site testing procedure and report
- 13 Training documents
- 14 System administrator documents
- 15 User guide
- 16 Software licenses
- 17 Type test reports
- 18 Cable sizing calculations
- 19 Inventory of the hardware
- 20 General and internal arrangement drawing of panels indicating modules, components location etc.
- 21 Installation drawing
- 22 Schematic drawing

## **11.4 Software Documentation Requirements**

The documents to be submitted shall include the following information:

### **11.4.1 Software Inventory**

An inventory of all software shall be maintained by the Contractor. The Contractor shall submit the following inventory lists: the preliminary inventory list at the time of the Functional Description document approval, an updated inventory list immediately prior to the start of the FAT, and the final inventory list at the time of system commissioning. The inventory shall include the name of each program, a cross reference to pertinent Contractor documents, language and libraries used, and an indication of whether the program is to be standard, modified, or custom.

### **11.4.2 Functional Description**

Functional description documentation shall be provided for each function described in this specification. It shall include the following information for each function:

- a) Introduction describing the purpose of the function with references to other documentation to aid the reader's understanding of the functions performed.
- b) Performance requirements that describe the execution periodicity and the tuning parameters that control or limit the capabilities of the software.
- c) Complete description of the operation, data and logic interfaces with other functions.
- d) Sample displays where applicable.

### **11.4.3 Software Design**

Software design documentation shall be provided for each function before the Factory Acceptance Test. It shall include detailed descriptions of the following items:

- a) The overall organization and architecture of the software logic such as a breakout of the software into software modules.
- b) Mathematical algorithms and formulae.
- c) Complete description of the algorithms, operation and the data and logic interfaces with other functions.

- d) Data dictionary in which the following (as applicable) information for each data item in tables, file, and array is provided: (1) Name (2) Purpose, (3) Location, (4) Length of data item, and (5) Initialization.
- e) Databases internal and external to the software, along with a description of all inputs required and the output produced by the software modules.
- f) Interfaces with other software modules.
- g) Design limitations such as field length and the maximum quantity of data items that can be processed.

#### **11.4.4 Database Documentation**

Database documentation shall describe the structure of the database. The documentation shall define the individual elements (files, records, fields, and tables) and their interrelationships. Portions of the database developed specifically for Owner's systems shall be identified.

Documentation shall also be provided that instructs the user in the preparation of data to be used for the databases, including:

- a) The overall organization of input records
- b) The format of each data record
- c) Each data field and the valid entries pertaining to the fields.

Sufficient database documentation shall be provided to enable the database to be updated or regenerated when inputs are changed and added, programs are modified, and new programs are added.

#### **11.4.5 User Documentation**

User documentation shall contain detailed operating instructions and procedures. Instructions and procedures shall be explained step-by-step with an explanation of how each step is performed, which parameters can be adjusted, and the effects obtained by varying each parameter. Additionally, the user documentation shall describe:

- a) All user guidance and error messages, along with the steps necessary to recover from errors
- b) The user interface including displays and keyboard operations used to control, review the input and output produced by the function. All displays relevant to the function shall be included along with a description of each dynamic display field.
- c) Alarms and messages issued by the function and the conditions under which they are generated
- d) Procedures to be followed for computer system restarts, failures, and failovers.

#### **11.4.6 System Administration Documentation**

System administration documentation shall be provided to guide [employer/utility] personnel in the operation and procedures required to generate and update the systems, including system software, database, application software and other elements of the systems. System administration documents shall be provided for the following items:

- e) Network communications management
- a) Processor configuration
- b) System performance monitoring
- c) System restart/failover management and diagnostic procedures
- d) System generation and management
- e) Database generation and management
- f) Display generation and management
- g) Report generation and management
- h) Diagnostic programs
- i) Software utilities
- j) Software maintenance
- k) Application software parameters and tuning guides
- l) Web administration
- m) Other Contractor supplied system software not included above.

## **11.5 Test Documentation**

Documentation for all factory, field and availability tests shall be provided.

## **11.6 Training Documentation**

Training documentation shall be provided for all courses in accordance with the requirements.

## 12. Annexures

### Annexure A Whole Current A.C. Single Phase Two Wire Smart Energy Meter Of Accuracy Class 1.0 [with/ without net-metering]

#### A.1 General Standards Applicable for Meter

Unless otherwise specified elsewhere in this specification, the performance and testing of the meters shall conform to the following standards and amendments/revisions thereof.

S. No.	Standard No.	Title
1	IS 13779 with latest amendments	AC Static Watt-hour Meter class 1& 2
2	IS 16444 with latest amendments	A.C. Static Direct Connected Watt Hour Smart Meter Class 1 and 2- Specification
3	IS 15884 with latest amendments	Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2)- Specification
4	IS 15959 Part 1 & Part 2 with latest amendments	Data Exchange for Electricity Meter Reading, Tariff and Load Control- Companion Standards

#### A.2 Communication

Meter shall have ability to communicate with DCU/Access Point/HES on any one of the technologies mentioned in IS16444 in a secure manner, as per the site conditions and as per design requirement of the contractor. In case of GPRS/3G/4G based meter, the meter shall accommodate SIM card of any service provider. In case of Plug in type communication module, the meter shall log communication module removal /non responsive event with snapshot.

#### A.3 Other Specifications

Particulars	Specification
Applicable Standards	The meters shall comply with IS 16444 for all requirements. Those parameters which are not covered in IS 16444 have been specifically mentioned in this specification.
Reference Voltage	[As per relevant IS]
Current Rating	[5-30 A/ 10-60 A (as per the requirement of the utility)]
Starting Current	As per IS 16444
Accuracy	Class 1.0 as per IS 16444
Limits of error	As per IS 16444
Operating Temperature range	As per IS 16444

<b>Particulars</b>	<b>Specification</b>
Humidity	As per IS 16444
Frequency	As per IS 16444
Influence Quantities	As per IS 16444
Power Consumption of meter	As per IS 16444
Current and Voltage Circuit	As per IS 16444
Running at No Load	As per IS 16444
Test output device	As per IS 16444
Meter Display	As per IS 16444
Name Plate & marking Meter Display	As per IS 16444
Parameters to be measured  <b>&lt;In case of net-meter both export &amp; import parameters to be measured&gt;</b>	As per IS 16444 / As per IS 15959 Part-2
Maximum Demand resetting	As per IS 15959 Part 2
Time of Use registers	As per IS 15959 part 2
Power Quality Information	As per IS 15959 part 2
LED/LCD Indicators	As per IS 16444
Load Survey/Interval Data	As per IS 15959 part 2
Tamper/ Event Recording	As per IS 15959 part 2
Measuring Elements	As per IS 16444
Alarm	As per IS 16444/ 15959 Part 2
Load Control	As per IS 16444
Connect/Disconnect and status of load switch	As per IS 16444
Programmability	As per IS 16444
Communication	As per IS 16444.
Communication Protocol	As per IS 16444
Remote Firmware upgrade	As per IS 15959 part 2
Real Time Clock(RTC)	<p>As per IS 16444/ IS 15884</p> <p>The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:</p> <ul style="list-style-type: none"> <li>• From remote server through suitable communication network.</li> <li>• Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter;</li> </ul> <p><b>&lt;The methodology for the synchronization would be as per requirement of utility&gt;</b></p>
Data Retention	As per CEA regulations
Battery Backup	Meter shall be supplied with separate battery backup

<b>Particulars</b>	<b>Specification</b>
Guarantee	for RTC. Contractor shall undertake a guarantee to replace meter up to a period of 60 months from the date of supply. The meter which are found defective/inoperative within the guarantee period, these defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters
First Breath(power on) and Last gasp (power off) condition detection and communication to HES	As per IS 16444
Data Display Facility (Manual/Automatic)	<p>Data Display shall be in three modes-</p> <ul style="list-style-type: none"> <li>• Auto Scroll</li> <li>• Scroll with Push Button</li> <li>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 3 digits after decimal in push button mode)</li> </ul> <p>The display order shall be: Auto Scroll</p> <ul style="list-style-type: none"> <li>• Cumulative Active Energy kWh along with legend.</li> <li>• Current calendar month MD in kW with legend.</li> <li>• Instantaneous voltage</li> <li>• Instantaneous current</li> </ul> <p>These parameters should be displayed on the LCD/LED continuously for a period of 15 seconds on Auto scroll. In case of power failure, the meter should display above parameters with push button.</p> <p>Scroll with Push-button</p> <ul style="list-style-type: none"> <li>• Internal diagnostics</li> <li>• Cumulative kWh</li> <li>• Date</li> <li>• Real Time</li> <li>• Voltage in (V)</li> <li>• Current (I)</li> <li>• Power (kW)</li> <li>• Current month MD in kW</li> <li>• Last month cumulative kWh</li> <li>• Last month MD in kW</li> <li>• Last month MD occurrence Date</li> </ul>

Particulars	Specification
	<ul style="list-style-type: none"> <li>• Last month MD occurrence Time</li> <li>• Meter Serial Number</li> </ul> <p>The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. &lt;The order of display may be revised as per requirement of the utility&gt;</p>
Anti-Tamper Features	<p>The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2.</p> <p>&lt;Optional test as per requirement of utility: The Meter shall be immune under external magnetic influences as per CBIP 325. Meter shall be tested for high voltage discharge (Spark) up to 35 KV as per CBIP 325. &gt;</p>

## **Annexure B Whole Current A.C. Three Phase Four Wire Smart Energy Meter Of Accuracy Class 1.0 [with/ without net-metering]**

### **B.1 General Standards Applicable for Meter**

Unless otherwise specified elsewhere in this specification, the performance and testing of the meters shall conform to the following standards and amendments/revisions thereof.

S. No.	Standard No.	Title
1	IS 13779 with latest amendments	AC Static Watt-hour Meter class 1& 2
2	IS 16444 with latest amendments	A.C. Static Direct Connected Watt Hour Smart Meter Class 1 and 2- Specification
3	IS 15884 with latest amendments	Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2)- Specification
4	IS 15959 Part 1 & Part 2 with latest amendments	Data Exchange for Electricity Meter Reading, Tariff and Load Control- Companion Standards

### **B.2 Communication**

Meter shall have ability to communicate with DCU/Access Point/HES on any one of the technologies mentioned in IS16444 in a secure manner, as per the site conditions and as per design requirement of the contractor. In case of GPRS/3G/4G based meter, the meter shall accommodate SIM card of any service provider. In case of Plug in type communication module, the meter shall log communication module removal /non responsive event with snapshot.

### **B.3 Other Specifications**

Particulars	Specification
Applicable Standards	The meters shall comply with IS 16444 for all requirements. Those parameters which are not covered in IS 16444 have been specifically mentioned in this specification.
Reference Voltage	[As per relevant IS]
Current Rating	[10-60 A /10-100 A ( as per the requirement of the utility)]
Starting Current	As per IS 16444
Accuracy	Class 1.0 as per IS 16444
Limits of error	As per IS 16444
Operating Temperature range	As per IS 16444
Humidity	As per IS 16444
Frequency	As per IS 16444

<b>Particulars</b>	<b>Specification</b>
Influence Quantities	As per IS 16444
Power Consumption of meter	As per IS 16444
Current and Voltage Circuit	As per IS 16444
Running at No Load	As per IS 16444
Test output device	As per IS 16444
Meter Display	As per IS 16444
Name Plate & marking Meter Display	As per IS 16444
Parameters to be measured  <b>&lt;In case of net-meter both export &amp; import parameters to be measured&gt;</b>	As per IS 16444 / As per IS 15959 Part-2
Maximum Demand resetting	As per IS 15959 Part 2
Time of Use registers	As per IS 15959 part 2
Power Quality Information	As per IS 15959 part 2
LED/LCD Indicators	As per IS 16444
Load Survey/Interval Data	As per IS 15959 part 2
Tamper/ Event Recording	As per IS 15959 part 2
Measuring Elements	As per IS 16444
Alarm	As per IS 16444/ 15959 Part 2
Load Control	As per IS 16444
Connect/Disconnect and status of load switch	As per IS 16444
Programmability	As per IS 16444
Communication	As per IS 16444.
Communication Protocol	As per IS 16444
Remote Firmware upgrade	As per IS 15959 part 2
Real Time Clock(RTC)	<p>As per IS 16444/ IS 15884</p> <p>The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:</p> <ul style="list-style-type: none"> <li>• From remote server through suitable communication network.</li> <li>• Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter;</li> </ul> <p><b>&lt;The methodology for the synchronization would be as per requirement of utility&gt;</b></p>
Data Retention	As per CEA regulations
Battery Backup	Meter shall be supplied with separate battery backup for RTC.
Guarantee	Contractor shall undertake a guarantee to replace

Particulars	Specification
	<p>meter up to a period of 60 months from the date of supply. The meter which are found defective/inoperative within the guarantee period, these defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters</p>
First Breath(power on) and Last gasp (power off) condition detection and communication to HES	<p>As per IS 16444</p>
Data Display Facility (Manual/Automatic)	<p>Data Display shall be in three modes-</p> <ul style="list-style-type: none"> <li>• Auto Scroll</li> <li>• Scroll with Push Button</li> <li>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 3 digits after decimal in push button mode)</li> </ul> <p>The display order shall be: Auto Scroll</p> <ul style="list-style-type: none"> <li>• Cumulative Active Energy kWh along with legend.</li> <li>• Current calendar month MD in kW with legend.</li> <li>• Instantaneous voltage <math>V_{RN}</math></li> <li>• Instantaneous voltage <math>V_{YN}</math></li> <li>• Instantaneous voltage <math>V_{BN}</math></li> <li>• Instantaneous current <math>I_R</math></li> <li>• Instantaneous current <math>I_Y</math></li> <li>• Instantaneous current <math>I_B</math></li> </ul> <p>These parameters should be displayed on the LCD/LED continuously for a period of 15 seconds on Auto scroll. In case of power failure, the meter should display above parameters with push button.</p> <p>Scroll with Push-button</p> <ul style="list-style-type: none"> <li>• Internal diagnostics</li> <li>• Cumulative kWh</li> <li>• Date</li> <li>• Real Time</li> <li>• Voltage <math>V_{RN}</math> (V)</li> <li>• Voltage <math>V_{YN}</math> (V)</li> <li>• Voltage <math>V_{BN}</math> (V)</li> <li>• Current <math>I_R</math> (I)</li> </ul>

Particulars	Specification
	<ul style="list-style-type: none"> <li>• Current <math>I_Y</math> (<math>I</math>)</li> <li>• Current <math>I_B</math> (<math>I</math>)</li> <li>• Power (kW)</li> <li>• Power (kVA)</li> <li>• Current month MD in kW</li> <li>• Current month MD in kWh</li> <li>• Last month cumulative kWh</li> <li>• Last month cumulative kVAh</li> <li>• Last month MD in kW &amp; occurrence Date</li> <li>• Last month MD in kVAh &amp; occurrence Date</li> <li>• Meter Serial Number</li> </ul> <p>The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. <b>&lt;The order of display may be revised as per requirement of the utility&gt;</b></p>
Anti-Tamper Features	<p>The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2.</p> <p><b>&lt;Optional test as per requirement of utility: The Meter shall be immune under external magnetic influences as per CBIP 325. Meter shall be tested for high voltage discharge (Spark) up to 35 KV as per CBIP 325. &gt;</b></p>

## **Annexure C Three phase CT operated alternating current smart meter Of Accuracy Class 0.5S**

### **C.1 General Standards Applicable for Meter**

Unless otherwise specified elsewhere in this specification, the performance and testing of the meters shall conform to the following standards and amendments/revisions thereof.

<b>Sl. No.</b>	<b>Standard No.</b>	<b>Title</b>
1	IS 16444: Part 2 with latest amendments	AC Static Transformer Operated Watt-hour and VAR-Hour Smart Meters, class 0.2S, 0.5S and 1S
2	CBIP- Publication 325 with latest amendments	Standardization of AC Static Electrical Energy Meters
3	CBIP Technical report no. 111 with latest amendments	Specification for Common Meter Reading Instrument
4	IEC-62052-11 with latest amendments	Electricity metering equipment (AC) - General Requirements & test conditions Part 11. metering equipment
5	IS:9000 with latest amendments	Basic Environmental Testing Procedures for Electronic & Electrical Items.
6	ANSI/IPC-A- 610 with latest amendments	Workmanship standard for Acceptability of Electronic Assemblies (A standard developed by Institute for Interconnecting and packaging Circuits)
7	IS 12063 with latest amendments	Degrees of protection provided by enclosures of electrical equipment.
8	IS 14451, Part-2: 1999 with latest amendments	Telemetering for consumption and demand. Direct digital transfer of meter values.
9	IS 4905: 1999 with latest amendments	Methods for Random sampling.
10	IS 12346 with latest amendments	Specifications for Testing Equipment for AC Energy meter.
11	IEC-61000-4-5 with latest amendments	Electromagnetic capability, Testing and measurement techniques – Surge immunity test
12	IEC 60687 with latest amendments	AC Static Transformer Operated Watt-hour and VAR-Hour Meters, class 0.2S and 0.5S
13	IS 15959 Part 1 & Part 2 with latest amendments	Data exchange for electricity meter reading, tariff and load control: Companion

Sl. No.	Standard No.	Title
		specification

## C.2 Communication

Meter shall have ability to communicate with DCU/Access Point/HES on any one of the technologies mentioned in IS 16444: Part 2 in a secure manner, as per the site conditions and as per design requirement of the contractor. In case of GPRS/3G/4G based meter, the meter shall accommodate SIM card of any service provider. In case of Plug in type communication module, the meter shall log communication module removal /non responsive event with snapshot.

## C.3 Other Specifications

Particulars	Specifications
Applicable Standards	The meters shall comply with IS 16444: Part2 for all requirements except for those parameters which have been specifically mentioned to be otherwise in this specification.
Reference Voltage	[As per relevant IS]
Current Rating	[As per utility requirement]
Starting Current	As per IS 16444: Part2
Accuracy	Class 0.5S as per IS 16444: Part2
Limits of error	As per IS 16444: Part2
Operating Temperature range	As per IS 16444: Part2
Humidity	As per IS 16444: Part2
Frequency	As per IS 16444: Part2
Influence Quantities	As per IS 16444: Part2
Power Consumption of meter excluding communication module	As per IS 16444: Part2
Current and pressure Coil	As per IS 16444: Part2
Running at No Load	As per IS 16444: Part2
Test output device	As per IS 16444: Part2
Meter Display	Minimum 7 digit backlit white light LCD Display of minimum 10 mm height with legends to identify parameters on meter. For testing purpose, high

Particulars	Specifications
	resolution display having at least 5 decimals digits shall be provided.
Time of Use (In case of net-meter both export & import parameters to be measured)	Should support at least eight (8) Time of day tariff registers with programmable time zones and storage of billing parameters (kW, kVA, kWh & kVAh)
Parameters With net-metering)	<p>Instantaneous parameters: As per category C1 meters according to IS 15959: Part-3: 2017</p> <p>Billing parameters: As per category B meters according to IS 15959: Part-3: 2017</p> <p>Load survey / Interval data parameters: As per category B meters according to IS 15959: Part-3: 2017. 35 (Power ON) days data to be recorded with 15 minutes integration period. The register shall automatically rollover the data after 35 days based on first in first out (FIFO). Instantaneous Voltage, Instantaneous Current and Instantaneous Power Factor have to read for every 15 minutes as part of Interval data. The billing parameters shall be retained in the meter for 6 months and should automatically rollover.</p>
Power Quality Information	<p>Logging of quality of supply events like power on/off, over/under voltage, over current ( 50 events)</p> <p>Setting of Under/Over Voltage and Over current shall be configurable.</p>
Maximum Demand	Should have Maximum Demand registers kW and kVA with integration period 30/15 minutes. Resets should be auto-monthly or through communication command.
Load Survey/Interval Data	35 (Power ON) days data to be recorded with 15 minutes integration period with date & time stamping for Active Energy (kWh), Apparent Energy (kVAh), Reactive Energy (kVARh), Average Voltage, Average Current, Average Power Factor and Average Demand in kW & kVA. In addition cumulative mid night kWh, kVAh, kVARh (lag/lead) (00.00 Hrs) with date & time stamp shall also be recorded for 35 (Power ON) days. The register shall automatically rollover the data after 35 days based on first in first out (FIFO). Instantaneous Voltage, Instantaneous

Particulars	Specifications
	Current and Instantaneous Power Factor have to read for every 15 minutes as part of Interval data.
LED/LCD Indicators	LED indicator for pulse/kWh. LED/LCD indicator for tamper, disconnection, current reversal (not for net-metering).
Tamper/Event recording	As per IS 15959 Part-I. 200 events shall be stored in local memory of meters.
Alarm	Alarm for power on/off (on restoration of power), Under Voltage, Over Voltage, Over Current, malfunctioning of diagnostic events shall be generated and communicated to the HES immediately
Measuring Elements	Meter should have four measuring elements - three in phases and one in neutral path.
Anti-Tamper features	The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2.  <span style="background-color: yellow;"><b>&lt;Optional test as per requirement of utility: The Meter shall be immune under external magnetic influences as per CBIP 325. Meter shall be tested for high voltage discharge (Spark) up to 35 KV as per CBIP 325. &gt;</b></span>
Programmability	It should be possible to program the parameters limits /values from remote through adequate security mechanism. Once programmed it will be possible for the programmed parameters to come into effect from a certain date & time. Meteorology under such condition must remain intact and shall not be upgradable from remote.
Communication	The port for local communication and baud rate shall be as per IS 15959. In addition to this the meter will have a provision for an Integral modular plug in type OR built in type Communication Module for NAN (Neighbourhood Area Network) i.e. from Meter to router / access points/ data collector or directly for WAN (Wide Area Network).

Particulars	Specifications
Communication Protocol	As per IS 15959/DLMS-COSEM
RTC & time synchronization	<p>Meter shall have RTC with 20 years calendar programmed in the memory and provision for time synchronization, The maximum drift shall not exceed +/- 300 Seconds per year.</p> <p>The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:</p> <ul style="list-style-type: none"> <li>• Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter</li> <li>• From remote server through suitable communication network.</li> </ul> <p>Contractor shall submit the methodology for the synchronization of RTC.</p>
Data Retention	Non Volatile Memory (non-battery backed up) with 10 years data retention in absence of power.
Battery Backup	Meter shall be supplied with separate battery backup for RTC and for display in case of power failure. The battery shall have a guaranteed life of 10 years from the date of installation of meters.
Data display facility (manual/Auto)	<p>Data Display shall have following features:</p> <ul style="list-style-type: none"> <li>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 5 digits after decimal).</li> <li>• The Push button for manual scrolling in addition to auto scrolling with a persistence time of 10 seconds for each parameter shall be provided.</li> </ul> <p style="background-color: yellow; border: 1px solid black; padding: 2px;"><b>Display of data as per Annexure-H</b></p>
Guarantee	Manufacturer shall undertake a guarantee to replace meter up to a period of 5 year from the date of operation. The meter which are found defective/inoperative at the time installation or become inoperative/defective within the guarantee period, these defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters

<b>Particulars</b>	<b>Specifications</b>
Remote Firmware Upgrade	The meter shall support remote firmware upgrades as well remote configuration in order to remotely add new features and functions to meters without having to send person to field in secure manner.

## **Annexure D Table of Compliance**

The Bidder shall annotate the Table of Contents of each section and appendix of **Volume – II (Technical Specifications)** to provide a high-level summary of compliance status. In all cases, the following symbols, and no others shall be used:

**C - Bid complies with all requirements in the adjacent paragraph.**

**A - Bid is not compliant with the requirements in the adjacent paragraph, but a functional alternative is proposed.**

**X - Bid takes exception to the requirements of the adjacent paragraph and no functional alternative is proposed.**

Only one symbol shall be assigned to paragraph and shall indicate the worst case level of compliance for that paragraph. This annotation may be hand written.

The Bidder shall also underline, on the compliance copy, all requirements to which exceptions have been taken (X) or to which alternatives have been proposed (A).

Each alternative shall be clearly and explicitly described. Such descriptions shall use the same paragraph numbering as the bid document sections addressed by the alternatives. All alternative descriptions shall be in one contiguous section of the bidder's proposal, preferably in the same volume, and titled "Alternatives." A separate section titled "Exceptions" should be provided containing any discussion or explanation chooses to provide concerning exceptions taken. Alternatives which do not substantially comply with the intent of the bid documents will be considered exceptions.

Any clause which is not included in this compliance table shall be treated as "fully complied" or C

The [employer] and [utility] will assess the merits of each alternative and exception and will be the sole judge as to their acceptance.

## Annexure E Bill of Quantities

*Please Note: The list is indicative only and has to be customized by [Employer/ Utility] basis project requirement*

**Table 1: Bill of Materials and Services for Smart Meters [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1. Meters</b>			
1.1	Single phase whole current Smart Meter	Nos.	
1.2	Three Phase whole current Smart Meter	Nos.	
1.3	Three Phase whole current Smart Meter (Net-Meter)	Nos.	
1.4	Three phase CT operated Smart Meter	Nos.	
1.5	Three phase CT operated Smart Meter (for DT)	Nos.	
1.6	Feeder Meter	Nos.	
1.7	Data Concentrator Units/ Gateway	Lot	
1.8	....		
1.9	....		
..	..		
	Sub Total 1		
<b>2. Mandatory Spares</b>			
2.1	X% of Sub total 1	Lot	
2.2	....		
..	..		
	Sub Total 2		
<b>3. Installation &amp; Commissioning</b>			
3.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job	
3.2	....		
..	..		
	Sub Total 3		
<b>4. Other Requirement</b>			
4.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job	
	Sub Total 4		
<b>5. Communications Hardware</b>			
5.1	NIC/ Communication Module	Nos.	
....	.....		

S. No.	Item Description	Unit	Quantity
	Sub Total 5		

**Table 2: Bill of Materials and Services for Software [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
1.	<b>Application Software</b>		
1.1	Meter Data Acquisition Software (MDAS)/Head End System (HES)	Lot	
1.2	Meter data management (MDM) ....	Lot	
1.3	Web Application/ Portal / Mobile App for consumers	Lot	
..	..		
	Sub Total 1		
2.	<b>Data Archiving Software</b>		
2.1	Data Archiving and SAN management software	Lot	
2.2	....		
..	..		
	Sub Total 2		
3.	<b>Network Management Software</b>		
3.1	Centralized network management software along with patch management & identity management	Lot	
3.2	Antivirus software for all machines in control center	Lot	
3.3	....		
..	..		
	Sub Total 3		
4.	<b>Installation &amp; Commissioning</b>		
4.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job	
4.2	....		
..	..		
	Sub Total 4		

S. No.	Item Description	Unit	Quantity
<b>5.</b>	<b>Other Requirement</b>		
5.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job	
	Sub Total 4		

**Table 3: Bill of Materials and Services for Hardware [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Hardware for Application</b>		
1.1	Application Server	Set	
1.2	Web server	Set	
1.3	....	Set	
1.4	....		
1.5	....		
..	..		
	Sub Total 1		
<b>2.</b>	<b>Hardware for Storage</b>		
2.1	SAN based storage (Capacity to be mentioned...)	Nos.	
2.2	Data Archiving Server	Nos.	
2.3	....		
..	..		
	Sub Total 2		
<b>3.</b>	<b>Hardware for Network Management</b>		
3.1	Network Management server with patch & identity management	Lot	
3.2	Centralized management console with single monitor	Lot	
3.3	....		
..	..		
	Sub Total 3		
<b>4.</b>	<b>Hardware for Network Management</b>		
4.1	Workstation consoles	Set	
4.2	....		

S. No.	Item Description	Unit	Quantity
..	..		
	Sub Total 4		
<b>5.</b>	<b>Network Hardware</b>		
5.1	Firewall with Network-based intrusion prevention system (NIPS)	Set	
5.2	Router	Set	
5.3	LAN Switch	Set	
5.4	....		
5.5	....		
..	..		
	Sub Total 5		
<b>6.</b>	<b>Mandatory Spares</b>		
6.1	X% of Sub total 1+2+3+4+5	Lot	
6.2	....		
..	..		
	Sub Total 6		
<b>7.</b>	<b>Installation &amp; Commissioning</b>		
7.1	Supply, Installation, Commissioning & Testing & Integration with Existing System (if any)	Job	
7.2	....		
..	..		
	Sub Total 7		
<b>8.</b>	<b>Other Requirement</b>		
8.1	Any other product/ services, if required, along with details.	Nos./ Lot/ Job	
	Sub Total 8		

**Table 4: Bill of Materials and Services for Bandwidth Charges [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Bandwidth Charges</b>		
1.1	Communication link to Control Center MPLS-VPN broadband Link through fiber from service provider per annum	Year 1	
		Year 2	
		Year 3	
		Year 4	
		Year 5	
		Year 6	
		Year 7	
1.2	Network Connectivity Charges for FOC/3G/CDMA/ GPRS for AMI	Year 1	
		Year 2	
		Year 3	
		Year 4	
		Year 5	
		Year 6	
		Year 7	
1.3	....		
..	..		
	<b>Sub Total 1</b>		

**Table 5: Bill of Materials and Services for Training [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Training at Site</b>		
1.1	Smart Meter & Communication network	Days	
1.2	HES & MDM, Protocol , Database, User Interface, Display and Application software	Days	
1.3	Computer System Hardware & Software	Days	
1.4	....		
..	..		

S. No.	Item Description	Unit	Quantity
	Sub Total 1		

**Table 6: Bill of Materials and Services for Operation and Maintenance [Indicative Only. To be defined by Employer/ Utility]**

S. No.	Item Description	Unit	Quantity
<b>1.</b>	<b>Operation and Maintenance</b>		
1.1	Operation of complete system (during warranty period)	Job	
1.2	Maintenance of complete System during FMS period	Job	
1.3	....		
..	..		
	Sub Total 1		

## Annexure F Data Requirement Sheet

### F.1 Single Phase Whole Current Smart Meter

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Applicable Standards	The meters shall comply with IS 16444 for all requirements. Those parameters which are not covered in IS 16444 have been specifically mentioned in this specification.	
	Reference Voltage	[As per relevant IS]	
	Current Rating	[5-30 A/ 10-60 A ( as per the requirement of the utility)]	
	Starting Current	As per IS 16444	
	Accuracy	Class 1.0 as per IS 16444	
	Limits of error	As per IS 16444	
	Operating Temperature range	As per IS 16444	
	Humidity	As per IS 16444	
	Frequency	As per IS 16444	
	Influence Quantities	As per IS 16444	
	Power Consumption of meter	As per IS 16444	
	Current and Voltage Circuit	As per IS 16444	
	Running at No Load	As per IS 16444	
	Test output device	As per IS 16444	
	Meter Display	As per IS 16444	
	Name Plate & marking Meter Display	As per IS 16444	
	Parameters to be measured  <b>&lt;In case of net-meter both export &amp; import parameters to be measured&gt;</b>	As per IS 16444 / As per IS 15959 Part-2	
	Maximum Demand resetting	As per IS 15959 Part 2	
	Time of Use registers	As per IS 15959 part 2	
	Power Quality Information	As per IS 15959 part 2	
	LED/LCD Indicators	As per IS 16444	
	Load	As per IS 15959 part 2	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Survey/Interval Data		
	Tamper/ Event Recording	As per IS 15959 part 2	
	Measuring Elements	As per IS 16444	
	Alarm	As per IS 16444/ 15959 Part 2	
	Load Control	As per IS 16444	
	Connect/Disconnect and status of load switch	As per IS 16444	
	Programmability	As per IS 16444	
	Communication	As per IS 16444.	
	Communication Protocol	As per IS 16444	
	Remote Firmware upgrade	As per IS 15959 part 2	
	Real Time Clock(RTC)	<p>As per IS 16444/ IS 15884</p> <p>The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:</p> <ul style="list-style-type: none"> <li>• From remote server through suitable communication network.</li> <li>• Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter;</li> </ul> <p style="background-color: yellow; border: 1px solid black; padding: 2px;"><b>&lt;The methodology for the synchronization would be as per requirement of utility&gt;</b></p>	
	Data Retention	As per CEA regulations	
	Battery Backup	Meter shall be supplied with separate battery backup for RTC.	
	Guarantee	Contractor shall undertake a guarantee to replace meter up to a period of 60 months from the date of supply. The meter which are found defective/inoperative within the guarantee period, these defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters	
	First Breath(power on) and Last gasp (power off) condition detection	As per IS 16444	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	and communication to HES		
	Data Display Facility (Manual/Automatic)	<p>Data Display shall be in three modes-</p> <ul style="list-style-type: none"> <li>• Auto Scroll</li> <li>• Scroll with Push Button</li> <li>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 3 digits after decimal in push button mode)</li> </ul> <p>The display order shall be: Auto Scroll</p> <ul style="list-style-type: none"> <li>• Cumulative Active Energy kWh along with legend.</li> <li>• Current calendar month MD in kW with legend.</li> <li>• Instantaneous voltage</li> <li>• Instantaneous current</li> </ul> <p>These parameters should be displayed on the LCD/LED continuously for a period of 15 seconds on Auto scroll. In case of power failure, the meter should display above parameters with push button.</p> <p>Scroll with Push-button</p> <ul style="list-style-type: none"> <li>• Internal diagnostics</li> <li>• Cumulative kWh</li> <li>• Date</li> <li>• Real Time</li> <li>• Voltage in (V)</li> <li>• Current (I)</li> <li>• Power (kW)</li> <li>• Current month MD in kW</li> <li>• Last month cumulative kWh</li> <li>• Last month MD in kW</li> <li>• Last month MD occurrence Date</li> <li>• Last month MD occurrence Time</li> <li>• Meter Serial Number</li> </ul> <p>The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds.</p>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		<The order of display may be revised as per requirement of the utility>	
	Anti-Tamper Features	<p>The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2.</p> <p>&lt;Optional test as per requirement of utility: The Meter shall be immune under external magnetic influences as per CBIP 325. Meter shall be tested for high voltage discharge (Spark) up to 35 KV as per CBIP 325. &gt;</p>	

## F.2 Three Phase Whole Current Smart Meter

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Applicable Standards	The meters shall comply with IS 16444 for all requirements. Those parameters which are not covered in IS 16444 have been specifically mentioned in this specification.	
	Reference Voltage	[As per relevant IS]	
	Current Rating	[10-60 A /10-100 A ( as per the requirement of the utility)]	
	Starting Current	As per IS 16444	
	Accuracy	Class 1.0 as per IS 16444	
	Limits of error	As per IS 16444	
	Operating Temperature range	As per IS 16444	
	Humidity	As per IS 16444	
	Frequency	As per IS 16444	
	Influence Quantities	As per IS 16444	
	Power Consumption of meter	As per IS 16444	
	Current and Voltage Circuit	As per IS 16444	
	Running at No Load	As per IS 16444	
	Test output device	As per IS 16444	
	Meter Display	As per IS 16444	
	Name Plate & marking Meter Display	As per IS 16444	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Parameters to be measured  <b>&lt;In case of net-meter both export &amp; import parameters to be measured&gt;</b>	As per IS 16444 / As per IS 15959 Part-2	
	Maximum Demand resetting	As per IS 15959 Part 2	
	Time of Use registers	As per IS 15959 part 2	
	Power Quality Information	As per IS 15959 part 2	
	LED/LCD Indicators	As per IS 16444	
	Load Survey/Interval Data	As per IS 15959 part 2	
	Tamper/ Event Recording	As per IS 15959 part 2	
	Measuring Elements	As per IS 16444	
	Alarm	As per IS 16444/ 15959 Part 2	
	Load Control	As per IS 16444	
	Connect/Disconnect and status of load switch	As per IS 16444	
	Programmability	As per IS 16444	
	Communication	As per IS 16444.	
	Communication Protocol	As per IS 16444	
	Remote Firmware upgrade	As per IS 15959 part 2	
	Real Time Clock(RTC)	<p>As per IS 16444/ IS 15884</p> <p>The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:</p> <ul style="list-style-type: none"> <li>• From remote server through suitable communication network.</li> <li>• Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter;</li> </ul> <p><b>&lt;The methodology for the synchronization would be as per requirement of utility&gt;</b></p>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Data Retention	As per CEA regulations	
	Battery Backup	Meter shall be supplied with separate battery backup for RTC.	
	Guarantee	Contractor shall undertake a guarantee to replace meter up to a period of 60 months from the date of supply. The meter which are found defective/inoperative within the guarantee period, these defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters	
	First Breath(power on) and Last gasp (power off) condition detection and communication to HES	As per IS 16444	
	Data Display Facility (Manual/Automatic)	<p>Data Display shall be in three modes-</p> <ul style="list-style-type: none"> <li>• Auto Scroll</li> <li>• Scroll with Push Button</li> <li>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 3 digits after decimal in push button mode)</li> </ul> <p>The display order shall be:</p> <ul style="list-style-type: none"> <li>• Auto Scroll</li> <li>• Cumulative Active Energy kWh along with legend.</li> <li>• Current calendar month MD in kW with legend.</li> <li>• Instantaneous voltage <math>V_{RN}</math></li> <li>• Instantaneous voltage <math>V_{YN}</math></li> <li>• Instantaneous voltage <math>V_{BN}</math></li> <li>• Instantaneous current <math>I_R</math></li> <li>• Instantaneous current <math>I_Y</math></li> <li>• Instantaneous current <math>I_B</math></li> </ul> <p>These parameters should be displayed on the LCD/LED continuously for a period of 15 seconds on Auto scroll. In case of power failure, the meter should display above parameters with push button.</p>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		<p>Scroll with Push-button</p> <ul style="list-style-type: none"> <li>• Internal diagnostics</li> <li>• Cumulative kWh</li> <li>• Date</li> <li>• Real Time</li> <li>• Voltage <math>V_{RN}</math> (V)</li> <li>• Voltage <math>V_{YN}</math> (V)</li> <li>• Voltage <math>V_{BN}</math> (V)</li> <li>• Current <math>I_R</math> (I)</li> <li>• Current <math>I_Y</math> (I)</li> <li>• Current <math>I_B</math> (I)</li> <li>• Power (kW)</li> <li>• Power (kVA)</li> <li>• Current month MD in kW</li> <li>• Current month MD in kVAh</li> <li>• Last month cumulative kWh</li> <li>• Last month cumulative kVAh</li> <li>• Last month MD in kW &amp; occurrence Date</li> <li>• Last month MD in kVAh &amp; occurrence Date</li> <li>• Meter Serial Number</li> </ul> <p>The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds.</p> <p><b>&lt;The order of display may be revised as per requirement of the utility&gt;</b></p>	
	Anti-Tamper Features	<p>The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2.</p> <p><b>&lt;Optional test as per requirement of utility: The Meter shall be immune under external magnetic influences as per CBIP 325. Meter shall be tested for high voltage discharge (Spark) up to 35 KV as per CBIP 325. &gt;</b></p>	

### F.3 Three Phase CT Operated Smart Meter

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Applicable Standards	The meters shall comply with IS 16444: Part2 for all requirements except for those parameters which have been specifically mentioned to be otherwise in this specification.	
	Reference Voltage	[As per relevant IS]	
	Current Rating	[As per utility requirement]	
	Starting Current	As per IS 16444: Part2	
	Accuracy	Class 0.5S as per IS 16444: Part2	
	Limits of error	As per IS 16444: Part2	
	Operating Temperature range	As per IS 16444: Part2	
	Humidity	As per IS 16444: Part2	
	Frequency	As per IS 16444: Part2	
	Influence Quantities	As per IS 16444: Part2	
	Power Consumption of meter excluding communication module	As per IS 16444: Part2	
	Current and pressure Coil	As per IS 16444: Part2	
	Running at No Load	As per IS 16444: Part2	
	Test output device	As per IS 16444: Part2	
	Meter Display	Minimum 7 digit backlit white light LCD Display of minimum 10 mm height with legends to identify parameters on meter. For testing purpose, high resolution display having at least 5 decimals digits shall be provided.	
	Time of Use (In case of net-meter both export & import parameters to be measured)	Should support at least eight (8) Time of day tariff registers with programmable time zones and storage of billing parameters (kW, kVA, kWh & kVAh)	
	Parameters With net-metering)	Instantaneous parameters: As per category C1 meters according to IS 15959: Part-3: 2017  Billing parameters: As per category B meters according to IS 15959: Part-3: 2017  Load survey / Interval data parameters: As per category B meters according to IS 15959: Part-3: 2017. 35 (Power ON) days data to be recorded with 15 minutes integration period. The register shall automatically rollover the data after 35 days based on first in first out	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		(FIFO). Instantaneous Voltage, Instantaneous Current and Instantaneous Power Factor have to read for every 15 minutes as part of Interval data. The billing parameters shall be retained in the meter for 6 months and should automatically rollover.	
	Power Quality Information	Logging of quality of supply events like power on/off, over/under voltage, over current ( 50 events) Setting of Under/Over Voltage and Over current shall be configurable.	
	Maximum Demand	Should have Maximum Demand registers kW and kVA with integration period 30/15 minutes. Resets should be auto-monthly or through communication command.	
	Load Survey/Interval Data	35 (Power ON) days data to be recorded with 15 minutes integration period with date & time stamping for Active Energy (kWh), Apparent Energy (kVAh), Reactive Energy (kVARh), Average Voltage, Average Current, Average Power Factor and Average Demand in kW & kVA. In addition cumulative mid night kWh, kVAh, kVARh (lag/lead) (00.00 Hrs) with date & time stamp shall also be recorded for 35 (Power ON) days. The register shall automatically rollover the data after 35 days based on first in first out (FIFO). Instantaneous Voltage, Instantaneous Current and Instantaneous Power Factor have to read for every 15 minutes as part of Interval data.	
	LED/LCD Indicators	LED indicator for pulse/kWh. LED/LCD indicator for tamper, disconnection, current reversal (not for net-metering).	
	Tamper/Event recording	As per IS 15959 Part-I. 200 events shall be stored in local memory of meters.	
	Alarm	Alarm for power on/off (on restoration of power), Under Voltage, Over Voltage, Over Current, malfunctioning of diagnostic events shall be generated and communicated to the HES immediately	
	Measuring Elements	Meter should have four measuring elements	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		- three in phases and one in neutral path.	
	Anti-Tamper features	<p>The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2.</p> <p><b>&lt;Optional test as per requirement of utility: The Meter shall be immune under external magnetic influences as per CBIP 325. Meter shall be tested for high voltage discharge (Spark) up to 35 KV as per CBIP 325. &gt;</b></p>	
	Programmability	<p>It should be possible to program the parameters limits /values from remote through adequate security mechanism. Once programmed it will be possible for the programmed parameters to come into effect from a certain date &amp; time. Meteorology under such condition must remain intact and shall not be upgradable from remote.</p>	
	Communication	<p>The port for local communication and baud rate shall be as per IS 15959. In addition to this the meter will have a provision for an Integral modular plug in type OR built in type Communication Module for NAN (Neighbourhood Area Network) i.e. from Meter to router / access points/ data collector or directly for WAN (Wide Area Network).</p>	
	Communication Protocol	As per IS 15959/DLMS-COSEM	
	RTC & time synchronization	<p>Meter shall have RTC with 20 years calendar programmed in the memory and provision for time synchronization, The maximum drift shall not exceed +/- 300 Seconds per year.</p> <p>The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following:</p> <ul style="list-style-type: none"> <li>• Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter</li> <li>• From remote server through suitable communication network.</li> </ul>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		Contractor shall submit the methodology for the synchronization of RTC.	
	Data Retention	Non Volatile Memory (non-battery backed up) with 10 years data retention in absence of power.	
	Battery Backup	Meter shall be supplied with separate battery backup for RTC and for display in case of power failure. The battery shall have a guaranteed life of 10 years from the date of installation of meters.	
	Data display facility (manual/Auto)	<p>Data Display shall have following features:</p> <ul style="list-style-type: none"> <li>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 5 digits after decimal).</li> <li>• The Push button for manual scrolling in addition to auto scrolling with a persistence time of 10 seconds for each parameter shall be provided.</li> </ul> <p style="background-color: #ffff00; color: black; padding: 2px;"><b>Display of data as per Annexure-H</b></p>	
	Guarantee	Manufacturer shall undertake a guarantee to replace meter up to a period of 5 year from the date of operation. The meter which are found defective/inoperative at the time installation or become inoperative/defective within the guarantee period, these defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters	
	Remote Firmware Upgrade	The meter shall support remote firmware upgrades as well remote configuration in order to remotely add new features and functions to meters without having to send person to field in secure manner.	

#### F.4 Routers for Communication Network (If Applicable)

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	<b>General Requirements</b>	<ul style="list-style-type: none"> <li>• The communication network shall have dynamic &amp; self-healing capability. If one</li> </ul>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		<p>of the communication element like router or access point fails then nodes connecting to that element shall switch to best available element for communication of data to HES.</p> <ul style="list-style-type: none"> <li>• It shall support IPv4 and IPv6 network addressing.</li> <li>• Each node shall keep a track of best available nearby nodes.</li> <li>• The communication network equipment shall use Unlicensed or Licensed frequency band as permitted by WPC.</li> <li>• All the communication network equipment shall be certified by WPC, Government of India for operation in license free frequency band.</li> <li>• Suitable network management system (NMS) shall be available to monitor the performance of the communication network round the clock. The NMS shall provide viewing of all the networking elements deployed at site and enable configuration, parameterization of the networking devices and the nodes.</li> <li>• It shall support remote firmware upgrading</li> <li>• It shall be secure enough to avoid all cyber threats like DDoS, spoofing, malwares etc.</li> <li>• The communication network shall ensure secure communication of data to HES.</li> <li>• The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP-55). A suitable mounting provision shall be made for the equipment.</li> <li>• Enclosure: Provision for security sealing shall be provided and in case the gasket of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material.</li> <li>• The list of standards followed in all the devices/equipment used in</li> </ul>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		<p>communication network shall be furnished.</p> <ul style="list-style-type: none"> <li>• Routers / Access Points shall have suitable power supply arrangements. Provision of battery backup for at least 5 hour shall be there to continue operation in case of power supply failure. The life expectancy of battery shall be 5 years or more.</li> </ul>	

## F.5 Access Points for Communication Networks (if Applicable)

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	<b>Configuration Requirement</b>	<ul style="list-style-type: none"> <li>• It shall be able to configure the communication with underlying nodes/end points.</li> <li>• It shall support on demand read and ping of individual/group of meters.</li> <li>• It shall push events like tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.</li> <li>• It shall have Wide Area Network (WAN) connectivity to the HES through suitable means.</li> <li>• It shall communicate with routers/nodes/end points on RF mesh (Unlicensed or Licensed frequency band as permitted by WPC).</li> <li>• It shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.</li> <li>• After power Interruption, on restoration of power supply, it shall establish communication with underlying devices as well as upstream application (HES) automatically.</li> <li>• Access point shall facilitate recording of: <ul style="list-style-type: none"> <li>○ No of packet failures</li> <li>○ Retry attempts</li> </ul> </li> </ul>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		<ul style="list-style-type: none"> <li>○ Missed periodic reading</li> <li>○ Failure to connect</li> <li>○ Tamper events</li> <li>● It shall be capable to handle interval data of suitable nos. of any type of smart meter (1ph/3ph). Access point shall be able to acquire and send data to HES for full capacity (No. of meters/field devices it is designed for) within a suitable time period to achieve the performance level. Full capacity of access point is required to be indicated in the offer.</li> <li>● Access point shall support remote firmware upgrades as well as remote configuration from the control center.</li> </ul>	

#### F.6 Data Concentrator Unit (DCU) (If Applicable)

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	<b>Configuration, Functionality &amp; Interface</b>	<ul style="list-style-type: none"> <li>● It shall be able to configure the communication with underlying nodes/meters.</li> <li>● It shall pull data from the field devices and push the data at configured intervals to the HES. It should also support the HES in pulling data from the field devices/meters. The data acquisition (Push/Pull) frequency shall be programmable. DCU shall be capable to prioritize control commands.</li> <li>● DCU shall ensure a secure communication to HES and shall have internal memory for storing interval data for at least 5 days.</li> <li>● DCU shall support on demand read and ping of individual/group of meters.</li> <li>● It shall support IPv4 and IPv6 network addressing.</li> <li>● DCU shall push events like tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.</li> </ul>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		<ul style="list-style-type: none"> <li>The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP-55). A suitable mounting provision shall be made for the equipment.</li> <li>Enclosure: Provision for security sealing shall be provided and in case the gasket of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material.</li> </ul>	
	<b>Communication</b>	<ul style="list-style-type: none"> <li>The communication architecture shall be any, as defined under IS 16444.</li> <li>The DCU shall ensure the appropriate backhaul for secure transfer of data to HES either via GPRS 3G/4G or Fiber Optic communication. In case of GPRS/3G/4G backhaul, it shall support SIM card with dynamic IP from any service provider. It shall have Wide Area Network (WAN) connectivity to the HES through suitable means.</li> <li>DCU shall be able to communicate with meters either on RF mesh (Unlicensed or Licensed frequency band as permitted by WPC) or PLC.</li> <li>DCU shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.</li> <li>It shall push events like tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters. DCU shall be able to acquire and send data to HES for full capacity (as per designed for no. of meters/field devices) to ensure the performance level. Full capacity of DCU is required to be indicated in the offer.</li> <li>After Power Interruption, on restoration of power supply, DCU shall establish communication with underlying devices as well as upstream application automatically.</li> </ul>	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		<ul style="list-style-type: none"> <li>• DCU shall be able to communicate with the nearest meters depending on topographical features. For further communication among the meters, distance of the other meters with the DCU shall not be a constraint as communication of the nearest meters shall be established with other meters through appropriate mesh formation / other formation.</li> <li>• Remote Firmware Upgrade: The DCU shall support remote firmware upgrades as well as remote configuration from the control center. Configuration of programmable parameters of smart meters shall be done through HES.</li> <li>• All meters falling under one DCU shall be commissioned and checked for proper communication in presence of utility in-charge.</li> <li>• DCU shall keep the records of minimum of the following events: <ul style="list-style-type: none"> <li>○ No of packet failures</li> <li>○ Retry attempts</li> <li>○ Missed periodic readings</li> <li>○ Failure to connect</li> <li>○ Tamper events</li> </ul> </li> </ul>	

**F.7 Servers <Refer section 6.2. Requirements as added in section 6.2 by [employer] shall be duplicated in the table below>**

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.8 Workstation Consoles <Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>**

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.9 Monitors**<Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.10 Firewall**<Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.11 Router**<Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.12 Switch**<Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.13 Storage Area Network (SAN) <Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>**

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.14 Printer <Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>**

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.15 Panel Rack <Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>**

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.16 Local Area Network <Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>**

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

**F.17 Host based Intrusion Detection System & Intrusion Prevention System (Network Based) <Refer section 6.2. Requirements as added in section 6.2 by Employer shall be duplicated in the table below>**

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering

## **Annexure G System Sizing Requirement**

### **G.1 Sizing Parameter**

The system shall be designed as per the technical parameters defined in this specification and as specified in this Annexure.

The system (Servers, Historian, NMS etc.) shall be suitably sized based on data to be captured from **X** nodes with **X%** expansion.

The auxiliary memory utilization of any of the Servers shall not exceed **30%** of its delivered capacity at any time even under peak loading conditions like-

- 200 alarms per minutes for 5 minutes.
- 10 display request simultaneously from 5 users.
- Restoration of 100% meter data after system failure.
- System activity alarms.

This memory utilization includes the memory used for storage of data (including expansion requirement defined in above para) for the defined duration as specified in the Technical Specification

The system architecture and the network design shall have the ability to handle the growth with respect to functions, user and geographic sites. Also, applications must evolve to support new business requirements and make use of new technologies.

### **G.2 Configuration requirement for Hardware & Software**

S. No.	Description	No of Nodes	Future requirement
1	Head End System (HES)*	<b>X</b>	<b>X%</b> Expansion
2	Meter Data Management System (MDM)*	<b>X</b>	<b>X%</b> Expansion

\*In future, **[utility]** may use same HES / MDM for entire area. Provision should be there to cover such area through procurement of additional licenses.

## Annexure H Display Parameters for 3-Phase CT Operated Smart Meters

To be provided in the following sequence:

Mode : 1 (Auto Scroll)	Parameters of this mode should display on auto scrolling as well as manually up & down scrolling using push button (as mentioned in manual scrolling i.e. except repeated parameters)	
Sequence	Parameter	Notation
1	Display check	-----
2	Sr. No. of Meters	UTP
3	CT Ratio	
4	RTC date & time	
5	R- Phase Voltage	V1
6	Y- Phase Voltage	V2
7	B- Phase Voltage	V3
8	R- Phase Line Current	I1
9	Y- Phase Line Current	I2
10	B- Phase Line Current	I3
11	Inst. Total P.F. (Avg. of 3Ph.)	Pr.PF.
12	Inst. Total active power	Pr.Kw.
13	Rising demand in KW with elapse time	
14	KW-MD of last billing period i.e. billing MD of 24hours recorded between last two resets	BMD -----Kw
15	MD KW for Present Billing Period ( After last reset)	RMD ----- Kw.
16	24hrs. apparent energy derived from Vectorial summation of total (fund+ Harm.) active energy and reactive (lag only) energy	TC Kvah
17	Cumm KWH for (Zone1)	T1C Kwh
18	Cumm. KWH for (Zone2)	T2C Kwh
19	Cumm KWH for (Zone3)	T3C Kwh
20	Cumm KWH for (Zone upto 8)	T8C Kwh
21	MD KW between last two resets – (Zone-1)	T1 BMD
22	MD KW between last two resets – (Zone-2)	T2 BMD

Mode : 1 (Auto Scroll)	Parameters of this mode should display on auto scrolling as well as manually up & down scrolling using push button (as mentioned in manual scrolling i.e. except repeated parameters)	
Sequence	Parameter	Notation
26	MD KW between last two resets – (Zone-3)	T3 BMD
27	MD KW between last two resets – (Zone-up to 8)	T8 BMD
28	MD KW for Present Billing – ( Zone -1)	T1RMD ----- Kw
29	MD KW for Present Billing - ( Zone -2)	T2RMD ----- Kw
30	MD KW for Present Billing – ( Zone -3)	T3RMD ----- Kw
31	MD KW for Present Billing – ( Zone –upto 8)	T8RMD ----- Kw
32	MD Reset Count	
33	Voltage failure count phase wise	
34	Current failure count phase wise	
35	Voltage unbalance Count	
36	Current unbalance Count	
37	Current reversal count- phase wise	
38	Magnet tamper count.	
39	Total Tamper Count	

**Note :**

- Each parameter shall be displayed for 10 seconds.
- The persistent tamper event indication/icon shall be displayed in auto mode.

Mode : 1 (Manual Scroll)	Parameters of this mode should display manually on up & down scrolling using push button	
Sequence	Parameter	Notation
1	Display check	-----
2	Sr. No. of Meters	UTP
3	CT Ratio	
4	RTC date & time	
5	R- Phase Voltage	V1
6	Y- Phase Voltage	V2

Mode : 1 (Manual Scroll)	Parameters of this mode should display manually on up & down scrolling using push button	
Sequence	Parameter	Notation
7	B- Phase Voltage	V3
8	R- Phase Line Current	I1
9	Y- Phase Line Current	I2
10	B- Phase Line Current	I3
11	Inst. P.F. (Avg. of 3Ph.)	Pr.PF.
12	Inst. Total active power	Pr.Kw.
13	Rising demand in KW with elapse time	
14	24hrs. total active energy (fundamental+ harmonics)	TC Kwh
15	24hrs. total reactive energy	TC Kvarh Ig
16	24hrs. apparent energy derived from Vectorial summation of total (fund+ Harm.) active energy and reactive (lag only) energy	TC Kvah
17	MD KW for Present Billing Period ( After last reset)	RMD ----- Kw.
18	KW-MD of last billing period i.e. billing MD of 24hours recorded between last two resets	BMD -----Kw
19	Cumulative MD	CMD -----Kw
20	Cumm KWH for (Zone1)	T1C Kwh
21	Cumm. KWH for (Zone2)	T2C Kwh
22	Cumm KWH for (Zone3)	T3C K wh
26	Cumm KWH for (Zone upto 8)	T8C K wh
27	MD KW between last two resets – (Zone-1)	T1 BMD
28	MD KW between last two resets – (Zone-2)	T2 BMD
29	MD KW between last two resets – (Zone-3)	T3 BMD
30	MD KW between last two resets – (Zone-upto 8)	T8 BMD
31	MD KW for Present Billing – ( Zone -1)	T1RMD ----- Kw
32	MD KW for Present Billing – ( Zone -2)	T2RMD ----- Kw
33	MD KW for Present Billing – ( Zone -3)	T3RMD ----- Kw
34	MD KW for Present Billing – ( Zone –upto 8)	T8RMD ----- Kw
35	MD Reset Count	
36	Voltage failure count - phase wise	
37	Current failure count - phase wise	

Mode : 1 (Manual Scroll)	Parameters of this mode should display manually on up & down scrolling using push button	
Sequence	Parameter	Notation
38	Voltage unbalance Count	
39	Current unbalance Count	
40	Current reversal count- phase wise	
41	Magnet tamper count.	
42	Total Tamper Count	

Mode : 2	Parameters of this mode should display manually up & down scrolling using push button under Mode-2	
Sequence	Parameter	Notation
1	Inst. P.F.Phase 1	P.F1
2	Inst. P.F.Phase 2	P.F2
3	Inst. P.F.Phase 3	P.F3
4	Inst. Kva	Pr Kva
5	Inst. Kvar.	Pr Kvar
6	Phase Sequence - Voltage	
7	Phase Sequence -Current	
8	Frequency	Hz
9	Cumm. KVARH ( Lead)	
10	MD Kvar after last billing – (24 Hrs)	MD Kvar
11	Cumm. KVARH-lag for (Zone-1)	Kvarh1
12	Cumm KVARH-lag for (Zone-2)	Kvarh2
13	Cumm KVARH-lag for (Zone-3)	Kvarh3
14	Cumm KVARH-lag for (Zone-upto 8)	Kvarh8
15	Cumm. KVAH for (Zone-1)	Kvah1
16	Cumm KVAH for (Zone-2)	Kvah2
17	Cumm KVAH for (Zone-3)	Kvah3
18	Cumm KVAH for (Zone-upto 8)	Kvah8
19	MD KVA after last billing – (24 Hrs)	MD Kva
20	MD KVA after last billing – (Zone-1)	MD Kva1

Mode : 2	Parameters of this mode should display manually up & down scrolling using push button under Mode-2	
Sequence	Parameter	Notation
21	MD KVA after last billing – (Zone-2)	MD Kva2
22	MD KVA after last billing – (Zone-3)	MD Kva3
23	MD KVA after last billing – (Zone- upto 8)	MD Kva8
24	MD KVA between last two resets – (Zone-1)	B Kva1
25	MD KVA between last two resets – (Zone-2)	B Kva2
26	MD KVA between last two resets – (Zone-3)	B Kva3
27	MD KVA between last two resets – (Zone- upto 8)	B Kva8
28	Fundamental Kwh	

Mode : 3	Parameters of this mode should display manually up & down scrolling using push button	
Sequence	Parameter	Notation
1	High Resolution display for Total KWH	
2	High Resolution display for KVARH-Lag	
3	High Resolution display for KVAH	
4	High Resolution display for Fundamental KWH	



National Smart Grid Mission  
Ministry of Power  
Government of India



## MODEL REQUEST FOR PROPOSAL (RfP)

### FOR THE APPOINTMENT OF AMI IMPLEMENTATION AGENCY FOR AMI PROJECTS IN INDIA

#### Model MoU between PMA and the Utility

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## Definitions and Abbreviations

### Definitions

- 
1. **“AMI Implementing Agency” or “AMI-IA”** : AMI Implementation Agency is a specialized entity which has been appointed by PMA for implementing, operating and transferring the AMI project in Utility’s area of operation
- 
2. **“Contractor”** : Same as “AMI Implementation Agency”
- 
3. **“Financial Year” or “FY”** : Period starting from 1 April of the first calendar year to 31 March of the consecutive calendar year.
- 
4. **“Memorandum of Understanding” or “MoU”** : The Agreement between [Utility] and the [PMA] for implementation of the Project.
- 
5. **“Project Management Agency” or “PMA”** : Project Management Agency is a specialized entity which has been appointed by [utility] for designing, financing, implementing, operating and transferring the AMI project in its area of operation.
- 
6. **“Party” or “Parties”** : [Name of PMA], [Name of Utility], and the AMI-IA, individually or collectively, respectively.
- 
7. **“Project”** : [Utility]’s AMI Project
- 
8. **“Rupees” or “Rs.” Or “INR” or “₹”** : Indian Rupees
- 
9. **“Service(s)” or “Related Service(s)”** : Any service(s) performed or to be performed as a part of the Solution by the [PMA].
- 
10. **“Solution”** : The system within the Scope of Work of the Project as defined by this MoU, and implemented in its entirety including but not limited to the designing, financing, implementing, operating and transferring of the AMI project and other services by the Project Management Agency.
-

## **Abbreviations**

<b>1. AMI</b>	Advanced Metering Infrastructure
<b>2. AMI-IA</b>	Advanced Metering Infrastructure - Implementation Agency
<b>3. AMC</b>	Annual Maintenance Contract
<b>4. CAIDI</b>	Customer Average Interruption Duration Index
<b>5. CAFI</b>	Customer Average Interruption Frequency Index
<b>6. FMS</b>	Facility Management Services
<b>7. GST</b>	Goods and Services Tax
<b>8. IPR</b>	Intellectual Property Rights
<b>9. KPI</b>	Key Performance Indicator
<b>10. MoU</b>	Memorandum of Understanding
<b>11. PMA</b>	Project Management Agency
<b>12. RFP</b>	Request for Proposal
<b>13. SAIDI</b>	System Average Interruption Duration Index
<b>14. SAIFI</b>	System Average Interruption Frequency Index

## **Memorandum of Understanding (MoU)**

This MoU is made and executed on the [•] day of [•], 20..., at [Insert place of execution],

### **BY AND BETWEEN:**

..... [Name of Utility], a Government of ..... undertaking and a company incorporated under the [Name of Act] with its registered office at [.....address] (hereafter referred to as Utility, which expression shall, unless repugnant to the context or meaning thereof, include its permitted assigns and substitutes) of One Part;

**AND**

[Name of PMA], a company incorporated under the provisions of [Name of Act] as ....., with its registered office at [Address] (hereinafter referred to as PMA, which expression shall, unless repugnant to the context or meaning thereof, include its successors, permitted assigns and substitutes) of the Other Part.

[Name of Utility] and [Name of PMA] are individually referred to as a Party and collectively referred to as the Parties.

### **WHEREAS:**

[Name of Utility] came into existence after unbundling of the erstwhile ....(State name) Electricity Board pursuant to the [Name of Act], and is engaged in the business of distribution of electricity in .....state Name (including in the Taluk name....). [Name of PMA] is engaged in the business of (amongst others) acting as the Project Management Agency for AMI Implementation Projects.

[Name of Utility] has appointed [Name of PMA] for designing, financing, implementing, operating and transferring of the AMI project in [Name of Utility]'s Licence Area (Project Area).

[Name of Utility] and [Name of PMA] agreed to enter into this MoU for implementation of the Project, subject to and on the terms and conditions set forth hereinafter.

**NOW THEREFORE**, in consideration of the foregoing and the respective covenants and agreements set forth in this MoU, the sufficiency and adequacy of which is hereby acknowledged, and intending to be legally bound hereby, the Parties agree as follows:

## 1. About this MoU

[Name of Utility] has appointed [Name of Project Management Agency] as the Project Management Agency or the PMA for designing, financing, implementing, operating and transferring the AMI project in its area of operation. PMA will appoint the AMI Implementation Agency (on behalf of the utility), finance the project and manage the entire AMI project deployment and its operations. The project will be transferred to the utility at no cost at the end of the MoU period. The roles and responsibilities of PMA and payments thereof will be governed by the Terms and Conditions of this MoU. PMA, in turn, will support the Utility in achieving the benefits and desired outcomes of the AMI project.

<Instructions for Utility:

- Note I: The provisions in angle brackets ( <> ) are for guidance and should be omitted from the Model MoU before it is signed.
- Note II: All project-specific provisions in this Model MoU have been enclosed in square parenthesis and may be modified, as necessary, before signing this Model MoU. The square parenthesis should be removed after carrying out the required modification>

## 2. Effectiveness and Term of MoU

### 2.1. Effectiveness and Term

- 2.1.1 This MoU shall come into force and effect on the date of execution of this MoU by both Parties (the Effective Date).
- 2.1.2 Unless terminated earlier by either Party in accordance with the terms of this MoU, this MoU shall continue in full force and effect until all obligations of the Parties in relation to the Project have been fulfilled, discharged and/or waived (Term of MoU).

## 3. Scope of the Project

### 3.1. Project Title

- 3.1.1 The Project shall be known as the Advanced Metering Infrastructure Project in ..... of ..... District in ....(State name).

### 3.2. Exclusivity, Rights, Title and Interest to AMI system and equipment

- 3.2.1 On and from the date of the execution of this MoU, utility grants to PMA for the Term of MoU, the exclusive right to implement the Project in the Project Area. Utility agrees that it shall not enter into similar arrangement(s) with any third party for implementation of AMI projects in the same Project Area.
- 3.2.2 The ownership, rights and title to the AMI system and other equipment installed by PMA for operation of the AMI system pursuant to this MoU shall vest with PMA during

the entire Term.

- 3.2.3 Unless extended by mutual consent of both parties, after a period of [seven (7)] years from the date of installation of the AMI system at the utility's premises, the ownership, rights and title of the installed AMI system and other equipment (if any) installed by PMA for operation of the AMI system pursuant to this MoU shall be transferred to the utility without any charge.

### **3.3. Project Scope**

The “Project Management Agency (PMA)” will be appointed by the utility for implementing the AMI project in its area of operation. PMA will appoint the AMI Implementation Agency on behalf of the utility as well as manage the entire project deployment and operations support. The PMA will interface with both the utility and the contractor. The broad contours of the project scope for the PMA are given below:

1. Baseline study (including area identification) and Cost Benefit Analysis to determine deemed savings from the project
2. Define and agree Measurement &Verification methodology with utility (Including Key Performance Indicators)
3. Formulation of DPR (including pre-feasibility studies, recovery of costs etc.) in consultation with utility
4. Assist the utility in obtaining the required regulatory approvals for the selected AMI Project
5. Provide funding for the AMI project
6. RFP preparation, in consultation with the utility, and selection of the AMI Implementation Agency basis approval from the Utility
7. Design and ensure implementation of the governance framework by acting as convener
8. Ensure coordination with AMI-IA and effective implementation of the conditions as agreed in the RFP for Appointment of AMI Implementation Agency
9. Provide Facility Management Services (FMS) support for all supplied, installed and commissioned AMI system and other equipment
10. Transfer of the ownership, rights and title of the installed AMI System to the Utility
11. Consumer engagement

The detailed responsibilities of the PMA have been provided in Clause 6.1 of this document.

### **3.4. Project Schedule**

- 3.4.1 Subject to provision in Clause 12, the completion of implementation of the Solution by PMA shall be in accordance with the Implementation Schedule as specified below.

S.No.	Milestone	Timeline (in months) from the date of signing of MoU
1	Formulation of DPR (including pre-feasibility studies, recovery of costs, setting of baseline, cost-benefit analysis etc.) in consultation and agreement with utility	[2]

S.No.	Milestone	Timeline (in months) from the date of signing of MoU
2	Assist utility in obtaining regulatory approval for the selected AMI Project	[3]
3	Financial closure of the AMI project on completion of financing arrangements and fund mobilization	[3]
3	RFP Preparation for the Appointment of AMI Implementation Agency (AMI-IA) and Issuance of Tender	[4]
4	Bid Evaluation, Selection of AMI-IA and Signing of Contract with the selected vendor	[6]
5	AMI Project deployment/ implementation in line with the agreed (between PMA and Utility) project implementation schedule as provided in the RFP for appointment of AMI Implementation Agency	[24]
6	Operational Acceptance of the AMI system by [Utility] on successful completion of all performance tests <sup>1</sup>	[28]
7	Warranty (Defect Liability) Period – 1 year	[40]
8	Facility Management Services (FMS) <sup>2</sup> Period – 6 Years (quarterly reports)	[112]
9	Transfer of the ownership, rights and title to the installed AMI System to the [Utility]	[113]

### 3.5. Specifications

The AMI system, including both hardware and software, provided by [PMA] must meet all the technical specification requirements provided in the RFP for appointment of AMI Implementation Agency, as agreed upon and approved by [Utility]. AMI system specifications and codes shall comply with the latest standards issued by relevant agencies such as Bureau of Indian Standards, Central Electricity Authority and others, inclusive of revisions, which are in force at the date of the signing of this MoU. Where new specifications, codes and revisions are issued during the period of the MoU, PMA shall attempt to comply with such, provided that no additional expenses are charged to the utility. In case values indicated for certain parameters in the specifications are more stringent than those specified by the standards, the specification shall override the standards.

<sup>1</sup> The terms and conditions for Operational Acceptance of the AMI system shall be in accordance with the RFP for appointment of AMI Implementation agency, as and when agreed upon and approved by the Utility

<sup>2</sup> For all equipment, PMA shall provide warranty for a period of 1 year from the date of operational acceptance of the AMI system by Utility. After the completion of warranty period, PMA shall provide 6 years of Facility Management Services (FMS) support for all supplied, installed and commissioned equipment.

## **4. Governance Framework**

Once PMA appoints the AMI Implementation Agency for deployment of the AMI project, PMA will design and implement the Governance Framework, by acting as convener, for monitoring and managing the AMI Project. The governance framework shall comprise of the steering committee and the operations committee for undertaking critical decisions, utility approvals and providing project management oversights. The steering committee and the operations committee shall comprise of members from both [PMA] and [Utility]. The Steering Committee shall provide accountability to ensure that the overall project goals are achieved. While, the Operations Committee shall be responsible for day-to-day project management activities, including, technical oversight and approving and implementing improvement measures based on data analytics.

## **5. Duties, Responsibilities and Obligations of the Parties**

### **5.1. PMA's obligations**

The stage-wise responsibilities of the PMA have been provided below:

#### **Pre-RFP Stage**

##### **5.1.1 Baseline Study and formulation of DPR**

PMA shall undertake baseline study to identify the targets and final outcomes for AMI project. PMA shall also establish key performance indicators to measure the benefits of the AMI Project. Basis the results of baseline study, PMA shall develop the DPR for the AMI Project.

Provided that the detailed project report would include, but not limited to, inter alia description of the project, objective and rationale for the project, technical feasibility, target stakeholders, detailed cost benefit analysis/ assessment of the project, proposed mechanism for cost recovery, delivery strategy, implementation mechanism, implementation schedule, performance incentives if any, monitoring, verification & evaluation plan, consumer engagement plan, governance framework, training and capacity building plan for the utility. The DPR for the AMI project shall be finalized in consultation with utility and has to be agreed upon and approved by the utility.

##### **5.1.2 Arranging for finance**

PMA will be responsible for funding (capital investment) of the AMI project deployment and its operational expenditure.

##### **5.1.3 Regulatory Approval**

PMA shall be responsible for assisting the utility in obtaining the required regulatory approvals for the selected AMI Project.

## **RFP Preparation and Vendor Selection Stage**

5.1.4 RFP preparation, in consultation with the utility, and selection of the AMI Implementation Agency basis approval from the utility

PMA shall:

- (a) PMA shall be responsible for the selection of the AMI Implementation Agency (AMI-IA) for the AMI Project through competitive bidding.
- (b) Develop the RFP for the Appointment of AMI Implementation Agency (AMI-IA) for the AMI Project, in consultation with the utility, using the model RFP as reference and customizing the same basis project context and requirement. The RFP shall be finalized in consultation with utility, and has to be agreed upon and approved by utility
- (c) Develop AMI specifications in consultation and agreement with utility during the finalization of the AMI Project scope and functionality
- (d) Issue and roll-out tender for selection of AMI-IA and provide pre-bid clarifications
- (e) Conduct the bidding process to select the AMI-IA
- (f) Evaluate the submitted bids basis the evaluation methodology, as provided in the RFP for appointment of AMI-IA, and award the AMI project in line with the RFP conditions

## **Implementation Stage**

5.1.5 Ensure coordination with AMI-IA and effective implementation of the conditions as agreed in the RFP for Appointment of AMI Implementation Agency

[PMA] shall:

- (a) Submit a Project Implementation Plan (giving an indicative time frame) to the utility for supply, installation, testing and commissioning of the new AMI system, in accordance with the RFP for appointment of AMI Implementation Agency, as agreed upon and approved by the utility ;
- (b) Submit a plan regarding requirement of regulatory interventions and assist utility in framing of proposals regarding implementation of schemes related to AMI System like dynamic pricing.
- (c) Ensure replacement of old consumer meters with new AMI system as per the agreed Project Implementation Plan;
- (d) Conduct, jointly with the utility, performance tests (FAT, SAT, etc.) and inspections of the new AMI system installed as agreed in the RFP for Appointment of AMI-IA. Ensure Operational Acceptance of the AMI system by the utility in line with the RFP;
- (e) Provide an installation record/certificate to the utility indicating the date of installation, serial number, capacity and make of the AMI system, the installation date and service dates;
- (f) Ensure implementation of the governance framework, as agreed upon and approved by the utility, and submit monthly progress reports on AMI Project implementation
- (g) Submit a checklist of all documents on which utility approvals are required
- (h) Submit all deliverables as agreed in the RFP for utility approval and incorporate suggestions/ comments provided by the utility on the same

#### 5.1.6 Training of the Utility Personnel]:

PMA shall at the time of installation of the AMI system, train the utility personnel regarding operation and maintenance of AMI system without any additional considerations/costs;

### **Operations Stage**

#### 5.1.7 Operation, Repair and Maintenance Services

For all equipment, the PMA shall provide warranty for a period of 1 year from the date of Operational Acceptance of the AMI system by the Utility. After the completion of warranty period, the PMA shall provide Facility Management Services (FMS) support (including operation, maintenance and repair services) for all supplied, installed and commissioned equipment for a period of [six (6)] years at its own cost for such installed AMI System (FMS Period).

PMA shall:

- (a) Generate analytics report basis agreed measurement & verification methodology and provide recommendations of improvement measures
- (b) Review, analyze and validate AMI Project results linked to Project KPIs (as agreed upon and approved by the utility)
- (c) Implement the consumer engagement plan and provide effective redressal to the consumer grievances and complaints related to AMI system installed as part of this project;
- (d) Provide status reports to utility on the AMI Project, problems that arise with the installed AMI System (if any) and corrective action taken by [PMA] (or any agency/contractor appointed by it);
- (e) Remain responsible for the professional and technical accuracy of all services performed, whether by PMA or others on its behalf, throughout the term of this MoU;
- (f) Transfer the ownership, rights and title to the installed AMI system to the utility post completion of the FMS period.

#### 5.1.8 Procedure for Repair and Maintenance (R&M) of installed AMI System

The procedure for repair and maintenance of installed AMI system during the R&M Period is as follows:

- (a) Utility will inform the PMA about the faulty/malfunctioning AMI system, providing details of the fault/malfunction or the reason of failure and submit a copy of the Installation Record/Certificate issued by PMA at the time of installation of such AMI system;
- (b) The fault/reason for failure of the AMI system will be verified as and when required by a third party agency or joint team of PMA and utility executives and the findings will be intimated to PMA and the utility;
- (c) The PMA shall ensure that the faulty or defective AMI System is repaired or replaced as soon as reasonably practicable and free of cost to the utility. PMA shall keep a record of the repairs/replacements to the AMI System and provide such information to utility

- on a quarterly basis;
- (d) However, notwithstanding to the contrary contained in this MoU, in case of any theft or sabotage of the AMI System or if the reason(s) for failure/malfunctioning or defect of the AMI System is attributable to normal wear and tear, or mishandling or inappropriate usage of the AMI System by the utility, or reasons attributable to the negligence of the utility, or any other reasons beyond the control of [PMA] or the AMI Implementation Agency, the utility shall be liable to replace/repair such AMI System at his own cost, and the utility shall be required to ensure that the replaced/repaired AMI System conforms to the standard and specifications set out in the RFP for appointment of AMI Implementation Agency, as agreed upon and approved by utility
  - (e) Normally based on the inputs from the AMI system the PMA shall take suo moto action regarding rectification of faults in the AMI system without any requirement of request from utility

## **5.2. Utility's Obligations**

### 5.2.1 Project initiation and development

Utility shall:

- (a) Provide database of consumers and assets as well as periodic updates of such information. Utility shall provide all required data to the PMA to the extent possible to identify all the consumers connected on the Identified Sub-stations and feeder lines of the AMI Project Area.
- (b) Review and approve the DPR (including feasibility studies, recovery of costs etc.)
- (c) Co-develop specifications for the AMI System along with the PMA
- (d) Obtain regulatory approvals from relevant government organizations/ bodies
- (e) Participate in periodic review meetings as per the project governance structure, and shall support with the required interventions requested;
- (f) Assign competent manpower to the AMI Project Team;
- (g) Cooperate with PMA for the timely implementation of the AMI Project and for its successful operation during the project period;
- (h) Support PMA to execute a successful consumer engagement plan and provide implementation support for project execution.

### 5.2.2 Field support

Utility shall provide necessary support to PMA in the Project Area, as may be required by PMA from time to time, in relation to (amongst others) access to Utility's/consumers premises, installation of AMI System, repair and maintenance services, signing of ownership and license agreements with the [utility]s/consumers. Utility shall also:

- (a) share with PMA all documents related to energy consumption of all AMI System of Project Area;
- (b) provide necessary permission and isolations to carry out civil foundation, electrical

wiring, mechanical fitment and other related activities to install and/or replace AMI System;

- (c) allow PMA supervisor or its operation & maintenance staff to work in the Project Area during the term of the MoU;
- (d) allow PMA to use existing power and water supply and other necessary equipment, required for civil construction (if applicable) as mutually agreed with the PMA;
- (e) not move, remove, modify, alter, or change the AMI system or any part thereof in the boundary of the AMI System installed by the PMA without the prior written consent of PMA. Notwithstanding Clause 5.2.2, Utility shall take reasonable steps to protect the AMI system from damage or injury and shall follow instructions for emergency action provided in advance by PMA;

#### 5.2.3 Ensuring Quality of Supply and Maintenance of Power Supply System (line, transformer, meter etc.)

Utility shall:

- (a) ensure good power supply quality and load management system in the Project area;
- (b) be responsible for operation and maintenance of power supply system, and promptly attend to any break down including repair or replacement of any equipment used/needed for maintaining electricity supply; and
- (c) provide necessary approvals for connection and disconnection required for installing the AMI System

#### 5.2.4 Payment Security Mechanism

- (a) Within 90 days of signing of this MoU, utility shall enter into a Tripartite Escrow Agreement (template provided in Annexure) to establish a payment security mechanism for ensuring prompt payment to [PMA] by way of a charge on its Current Account No. with .....Bank.....(Escrow Account) where [Utility]'s revenue from sale of power are deposited;
- (b) Bank has agreed to act as the Escrow Agent and in the event of receipt of the notice of demand from the PMA, agrees to pay forthwith a sum equal to the amount demanded by PMA from the funds available in the escrow account in accordance with terms of the escrow agreement
- (c) Utility hereby acknowledges and undertakes to deposit all receivables and revenue from sale of power in the Escrow Account during the term of this MoU.
- (d) Utility shall irrevocably and unconditionally authorize the Escrow Agent to make payments to PMA upon demand by PMA for payment due under this Escrow Agreement.
- (e) Utility agrees and confirms that at all times during the Term of this MoU it shall maintain a minimum clearing balance of Rs [X] in the Escrow Account.

#### 5.2.5 Utility's obligations include, but are not limited to, the following:

1. Review and approval of PMA's designs, drawings, survey reports and recommendations

2. Review and approval of test procedures.
3. Participation in and approval of Type, Factory and Site Acceptance Tests.
4. Review and approval of training plans & reading material
5. Providing support and access to facilities at the sites, including consumer premises.
6. Arranging for necessary shutdowns and work permits
7. Implement major civil works such as expansions or construction of rooms, trenches etc. as required for the AMI equipment to be provided by PMA.
8. Provide, to the extent possible, drawings for AMI Control Centre building where AMI system installations are planned.
9. Obtaining requisite statutory clearances and/or approvals as required to be taken for project work.
10. Providing available details of consumer indexing and informing PMA of any changes in the area network during the project installation and maintenance period
11. Provide A.C. power supply inputs as defined in this specification
12. Provide equipment storage space
13. Provide all required documents for delivery of material at site
14. Provide regulatory support/changes as required
15. Approvals/Suggestions for change in submitted documents/ reports to PMA in time bound manner.
16. Co-develop & co-implement consumer engagement plan
17. Organize and participate in regular project review meetings
18. Release funds to PMA as per agreed terms of Payment.
19. Assist PMA in obtaining any applicable permits for the Project and cooperate with PMA in order to achieve the objectives of this MoU;
20. Appoint and notify to PMA of the names and contact details of the Utility representative and its dedicated staff for the Project, which would include,
  - a) an engineer-in-charge for the Project who shall render full support to PMA for Project implementation during the Term of this MOU and shall coordinate for payment to PMA, and
  - b) a nodal officer, to co-ordinate with PMA in relation to the Project;
21. Allow PMA (and/or its implementation partner, investor(s), authorized agency) unfettered access to a covered and enclosed space to set up a storage unit and to set up its control center. Such covered and enclosed space as required by PMA shall be provided to it by Utility free of cost during the Term of this MoU;
22. Work with the PMA to ensure that PMA's FMS staff gets all required assistance in carrying out the FMS activities for the Project;
23. Provide at its expense, the electrical energy required for performance of the Project activities, and for installation, testing and operation of the AMI Systems;
24. Permit PMA to perform the Project activities with the lamps ON if required during daylight working hours, and also after daylight hours if necessary to meet the Project implementation schedule;
25. At its own cost, replace or repair existing equipment (other than AMI Systems), like

poles, cables, and transformers etc. where necessary to make the AMI System operational and/ or safe from hazards and maintain in proper working condition all portions of all facilities that are not included in the PMA's scope of maintenance;

26. Correct any irregularity, the cause of which has been brought to its attention by the PMA;
27. Promptly notify the PMA of any events or circumstances that could affect the Project outcomes, or the PMA's services and obligations under this MoU; and;
28. Cooperate with PMA in arranging financing for the Project, including by signing any relevant documents (such as substitution agreement) and providing such approvals, no-objections and waivers as may be required by investors/lenders.

## 6. Monitoring and Verification

### 6.1. Monitoring and Verification Strategy

The overall objective of implementing Measurement and Verification (M&V) is to monitor the outcomes of the AMI Project using an approach that is credible and is acceptable to all stakeholders. M&V allows the utility to determine financial feasibility of the AMI project as well as provide the basis for undertaking future AMI investment by the utility.

In this regard, PMA and Utility shall jointly formulate the M&V strategy providing a detailed approach for carrying out an assessment of the results of AMI Project and to quantify the envisaged benefits for the AMI functionality being implemented. The aim is to map various features enabled by the AMI system along with their corresponding benefits. An illustrative example of the same is presented below.

AMI Functionality	Utility Benefits								
	Reduced AT&C Losses		Metering and Billing Improvement		Optimized Asset Management	Improved Service and Reliability	Better Load Management	Peak Load Shifting	Reduced Load Violations
	Reduced	Theft	Faster Bill Generation	Reduced Maintenance & Replacement Cost	Reduced Transformer Replacement Cost	Reduced Outage Minutes	Reduced Call Centre Cost	Peak Load Shifting	Reduced Load Violations
Automatic consumption recording at specified intervals		✓	✓	✓	✓	✓	✓	✓	✓
Meter tampering event detection	✓								
Remote connect and disconnect		✓			✓		✓	✓	✓

AMI Functionality	Utility Benefits						
	Reduced AT&C Losses		Metering and Billing Improvement	Optimized Asset Management	Improved Service and Reliability	Better Load Management	Reduced Load Violations
	Faster Bill Generation	Reduced Transformer Maintenance & Replacement Cost	Reduced Call Centre Cost	Peak Load Shifting	Reduced Outage Minutes	Peak Load Shifting	Reduced Load Violations
Load curtailment, limiting provision				✓		✓	✓
Quality of supply recording			✓	✓			

Basis above, a list of suggestive KPIs (illustrative only) to be monitored for assessment of the AMI Project results is provided below. The method of determination/ calculation of such KPIs need to be defined and mutually agreed between PMA and utility

KPI Parameter	Baseline Scenario Value	Expected Value Post AMI Implementation
Billing Efficiency	[X]	[X]
Peak Load Reduction	[X]	[X]
SAIFI	[X]	[X]
SAIDI	[X]	[X]
CAIFI	[X]	[X]
CAIDI	[X]	[X]
Transformer Failure Rate	[X]	[X]

## 6.2. Monthly Progress Reports

During the Term of this MoU, PMA shall, no later than 7 (seven) days after the end of each month, furnish to Utility a monthly report on progress of the Project containing such information and in such format as mutually agreed by the Parties. PMA shall also promptly provide such other relevant information as and when required by the utility or its authorized representatives or agents under this MoU.

## 6.3. Inspection and Tests

During the Term of this MoU, Utility or its authorized representatives shall have the right to inspect the AMI System installed under Project from time to time, with prior written notice to PMA, to determine that the AMI System conform to the specifications and features of this MoU. Utility or its authorized representative shall prepare reports of such inspection and tests stating in reasonable detail the defects or deficiencies, if any, with particular reference to AMI

System and send a copy of such inspection reports to PMA within 7 (seven) days of such inspections.

Upon receipt of the inspection report, PMA shall rectify and carry out remedial measures of the defects or deficiencies, if any, stated in the inspection report and furnish a report to Utility in this behalf. Such inspection or submission of inspection report by the Utility shall not relieve or absolve the PMA of its obligations and liabilities hereunder in any manner whatsoever.

## 7. Payments to PMA

### 7.1. Payment Mechanism

The payments due to PMA from Utility shall be structured as per the Opex model over the AMI project operations period. As per this model, Utility will make monthly payments to PMA after Operational Acceptance of the AMI system by [Utility], during the FMS period. This payment shall comprise of two parts:

- a) The quoted price/ price discovered through the tendering process for the appointment of AMI-IA for the AMI Project (including FMS charges)
- b) Reasonable Cost of the PMA to finance and implement/execute the AMI project. This reasonable cost of project financing and execution shall be finalized basis mutual agreement between PMA and Utility, and shall be capped at [X%] per annum

The payment terms of PMA for AMI system establishment and related service milestones sequence are given below:

S.No.	Milestone	Payment (in INR)
1	Formulation of DPR (including pre-feasibility studies, recovery of costs, setting of baseline, cost-benefit analysis etc.) in consultation with utility	[A] (lump sum amount as agreed between utility and PMA)
2	Bid Support for RFP Preparation for the Appointment of AMI-IA and Selection of AMI-IA	[B] (lump sum amount as agreed between utility and PMA)
4.	Monthly payments <sup>3</sup> after Operational Acceptance of the AMI system and till the end of the FMS period of the AMI Project	[C]

PMA will raise and deliver the invoice to Utility for the monthly payments by 1st week of every month. The invoiced amount will be paid by Utility from escrow account to the PMA within 30 days from the date of submission of such invoice by PMA (Payment Due Date). If the Payment Due Date is a public holiday, the payment of the invoice shall be made by Utility on the next working day.

If Utility fails to make payment of any undisputed invoiced amount within the 30 days from the Payment Due Date, PMA shall have the right to serve a notice to the Escrow Agent along with a copy of the invoice and a declaration that such invoice is due and unpaid, and the Escrow Agent shall release the invoiced amount and the default interest (calculated in accordance with Clause 7.2) to PMA within 24 hours of such notice without reference to Utility.

### 7.2. Default Interest

<sup>3</sup> This monthly payment would be calculated based on actual amount disbursed by the PMA to vendor (assuming PMA contribution to project cost is 100%)

Any delay in payment of Eligible Monthly Payment after the Payment Due Date by Utility shall attract a default interest of [X%] p.a. from the payment due date till the Utility makes full payment of such invoice (and the default interest calculated in accordance with this Article 7.2) to PMA. PMA's right to claim default interest is without prejudice to any of its right to terminate this MoU in accordance with Article 12.4 or any other right or remedy available to it under this MoU or applicable laws.

### **7.3. Payment Dispute and Set-off**

**Utility** shall not be entitled to retain any amount due to **PMA** under this MoU or set-off any amount due to it from **PMA** against any monthly payment. If the payment of any amount pursuant to Clauses 7.1 is disputed, then the entire undisputed element of that amount shall be paid and the disputed element shall be dealt with in accordance with Clause 12.

### **7.4. Taxes**

7.4.1. The payment milestones is exclusive of all taxes, if applicable. Any change in law on account of the introduction of new taxes or change in the rates of existing taxes shall be to the account of and payable by **Utility**

7.4.2. **Utility** shall be entitled to make any deductions at source in accordance with applicable laws

7.4.3. **PMA** shall be responsible for all compliance related to the payment of any taxes payable by it under this MoU and shall solely be responsible for any proceedings initiated by the relevant government authorities, in respect of the non-payment, short-payment, non-compliance, penalty, interest or other such issue and for all liabilities and expenses related to such proceedings.

## **8. Covenants, Representations and Warranties**

### **8.1. Representations and Warranties of the PMA**

**PMA** represents and warrants to the **Utility** that:

- (a) It is duly organized and validly existing under the laws of India, and has full power and authority to execute and perform its obligations under this MoU and to carry out the transactions contemplated hereby;
- (b) It has taken all necessary corporate and other actions under applicable laws to authorize the execution and delivery of this MoU and to validly exercise its rights and perform its obligations under this MoU ;
- (c) It has the financial standing and capacity to undertake the Project in accordance with the terms of this MoU ;
- (d) This MoU constitutes a legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this MoU shall be legally valid, binding and enforceable against it in accordance with the terms hereof;
- (e) The execution, delivery and performance of this MoU shall not conflict with, result in

the breach of, constitute a default under, or accelerate performance required by any of the terms of its constitutional documents (including, without limitation its Memorandum and Articles of Association) or any applicable laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;

- (f) There are no actions, suits, proceedings, or investigations pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the breach of this MoU or which individually or in the aggregate may result in any material impairment of its ability to perform any of its obligations under this MoU;
- (g) It has the financial standing and resources to fund the implementation and operation of the AMI Project in accordance with this MoU;
- (h) No representation contained herein or in any other document furnished by it to **Utility** contains any untrue or misleading statement of material fact or omits or will omit to state a material fact necessary to make such representation or project; and
- (i) **PMA** acknowledges that prior to the execution of this MoU, it has, after a complete and careful examination, made an independent evaluation of the scope of the Project, specifications and standards, Project site, local conditions, and all relevant information provided by the **Utility** or obtained procured or gathered otherwise, and has determined to its satisfaction the accuracy or otherwise thereof and the nature and extent of difficulties, risks and hazards as are likely to arise or may be faced by it in the course of performance of its obligations hereunder.

However, it is clarified that **PMA** makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability and/or completeness of any assessment, assumptions, statement or information provided by it.

## **8.2. Representations and Warranties of Utility**

**Utility** represents and warrants to the PMA that:

- (a) It has full power and authority to execute, deliver and perform its obligations under this MoU and to carry out the transactions contemplated herein and that it has taken all actions necessary to execute this MoU , exercise its rights and perform its obligations, under this MoU;
- (b) It has taken all necessary actions under the applicable laws to authorize the execution, delivery and performance of this MoU;
- (c) It has the financial standing and capacity to perform its obligations under this MoU;
- (d) This MoU constitutes a legal, valid and binding obligation enforceable against it in accordance with the terms hereof;
- (e) There are no actions, suits or proceedings pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other authority, the outcome of which may result in the default or breach of this MoU or which individually or in the aggregate may result in any material impairment of its ability to perform its obligations under this MoU; and
- (f) It has no knowledge of any violation or default with respect to any order, writ, injunction or any decree of any court or any legally binding order of any government authority or

instrumentality which may result in any material adverse effect on its ability to perform its obligations under this MoU.

- (g) [Utility] makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability and/or completeness of any assessment, assumptions, statement or information provided by it.

### **8.3. Disclosure**

In the event that any occurrence or circumstance comes to the attention of either Party that renders any of its aforesaid representations or warranties untrue or incorrect, such Party shall immediately notify the other Party of the same. Such notification shall not have the effect of remedying any breach of the representation or project that has been found to be untrue or incorrect nor shall it adversely affect or waive any obligation of either Party under this MoU.

### **8.4. Indemnities**

Each Party shall release, defend, indemnify and hold harmless the other party and their respective directors, officers, agents, and employees, from and against any and all losses, claims, demands, costs, damages, liabilities (joint and several), reasonable expenses of any nature (including attorney's fees and disbursements and expenses incident to establishing the right to indemnification), judgments, fines and other amounts to the extent arising out of or related to any products, services, operations of each Party, the conduct of business or from any other activity, work, or thing done, permitted or suffered by the party under this MoU including without limitation: (i) injury to or death of any person or persons, including employees of the party , or loss, damage, or destruction of any property, and (ii) each Party's provision of any personnel, services, and facilities under this MoU; provided, that no such right of indemnification shall exist in any case where the act or failure to act giving rise to the claim to indemnification is finally adjudicated to have constituted wilful misconduct, negligence or recklessness on the part of the Party seeking indemnification and further provided that the right of indemnification shall not apply to the extent of each Party's indemnity obligations to the other Party pursuant to the provisions of this MoU.

In case of any insurance undertaken by the indemnified Party, any liability or obligation that may arise due to any loss, damage, liability, payment, obligation or expense which is insured or for which such Party can claim compensation, under any Insurance shall not be charged to or payable by the indemnifying Party.

If a Force Majeure Event renders the AMI Project no longer economically and technically viable and the insurers under the Insurances make payment on a "total loss" or equivalent basis during the Term, [Utility] shall have no claim on such proceeds of such Insurance.

## **9. Intellectual Property and Confidentiality**

### **9.1. Intellectual Property**

Each Party represents warrants and agrees to the other Party that it shall:

- (a) Not use nor represent (in any manner whatsoever) the other Party's Intellectual Property as their own;
- (b) Treat the other Party's Intellectual Property as Proprietary Information, and use and disclose it only as set forth herein; and
- (c) Not do anything which, in the opinion of either Party, may bring the interests of such Party or any of its Affiliates into disrepute or damage the interests of such Party or any of its Affiliates in any way; and
- (d) Formulate ways in which a record is maintained giving details of a Party's Intellectual Property made available to the other party.

## **9.2. Confidentiality**

- (a) Each Party shall keep confidential all information and other materials passing between it and the other Party in relation to the transaction contemplated by this MoU that is provided to the other Party that is technical information in the form of designs, concepts, requirements, specifications, software, interfaces, components, processes, or the like, as well as all the information concerning the parties (including all information concerning the business transactions and the financial arrangements ("Proprietary Information")), shall not without the prior written consent of the other Party, divulge the Information to any other Person, and shall use it only as necessary to accomplish the scope of work as set forth in this MoU.
- (b) A receiving Party shall limit access to Proprietary Information it receives to its employees who have a "need-to-know" the Proprietary Information for the purposes of this MoU, provided that such employees and affiliates are under an obligation to hold such information in confidence under confidentiality obligations at least as restrictive as those in this MoU.
- (c) Proprietary Information is and remains the property of the originating Party. Except as set forth herein, the receiving Party receives no right or license under any patents, copyrights, trade secrets, or the like of the originating Party.
- (d) A receiving Party shall satisfy its obligations to protect Proprietary Information from misuse or unauthorized disclosure. Such care will include protecting Proprietary Information using those practices the receiving Party normally uses to restrict disclosure and use of its own information of like importance. A receiving Party shall be liable if it accidentally discloses Proprietary Information while exercising reasonable care, provided that, upon discovery of such disclosure, the receiving Party attempts to retrieve the Proprietary Information and reviews its practices to attempt to prevent any further accidental disclosures.
- (e) This MoU does not restrict disclosure or use of information otherwise qualifying as Proprietary Information if the receiving Party can show that anyone of the following conditions exists:
  - i. The receiving Party knew the information and held it without restriction as to further disclosure when the originating Party disclosed the information under this MoU;
  - ii. The receiving Party develops the information independently;

- iii. Another source lawfully disclosed the information to the receiving Party and did not restrict the receiving Party in its further use or disclosure;
  - iv. The information was already in the public domain when the originating Party disclosed it to the receiving Party; entered the public domain after the originating Party disclosed it under this MoU, but through no fault of the receiving Party; or became generally known, but through no fault of the receiving Party;
  - v. The information is approved for release by written authorization of the originating Party; or
- (f) The information was disclosed in response to a subpoena or court order duly issued in a judicial or legislative process, provided that the subpoenaed Party notified the originating Party of the subpoena as soon as is reasonably possible to the disclosure, unless such notice could not reasonably be extended

## 10. Termination

### 10.1. PMA Event of Default

**PMA** Event of Default means any of the following events arising out of any acts or omission of **PMA**, its representative, sub-contracts, employees and which have not occurred solely as a result of any breach of this MoU by the **Utility** or due to Force Majeure, and where **PMA** has failed to remedy these events within a period of 90 days of issuance of a notice by **Utility** requiring **PMA** to remedy such event.

- (a) **PMA** has failed to procure and arrange requisite finances for the implementation of the project;
- (b) **PMA** abandons the implementation of the Project or repudiates this MoU or otherwise takes any action, or evidences or conveys an intention not to be bound by the MoU;
- (c) **PMA** fails to comply with any of its material obligations under this MoU.
- (d) **PM**] is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for **PMA** or for the whole or material part of its assets that has a material bearing on its ability to implement the Project;
- (e) **PMA** has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that in the reasonable opinion of **[Utility]** would adversely affect **PMA**'s ability to implement the Project;
- (f) A resolution for winding up of **PMA** is passed, or any petition for winding up of **PMA** is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 (Ninety) days of the date thereof or **PMA** is ordered to be wound up by a court of competent jurisdiction;
- (g) Any representation made by **PMA** under this MoU being false or misleading.

### 10.2. Utility Event of Default

**Utility** Event of Default means any of the following events, unless such event has occurred as a consequence of the **PMA** Event of Default or a Force Majeure Event and where **Utility** has

failed to remedy these events within a period of 90 days of issuance of a notice by **PMA** requiring **Utility** to remedy such event:

- (a) Failure of **Utility** to fund the Escrow Account in accordance with Clause 5.2.4 (b);
- (b) Failure of **Utility** to pay the Eligible Monthly Payment in accordance with Clause 8 or any other payment due from **Utility** under this MoU and more than 90 Days have elapsed since such payments became due;
- (c) The breach by **Utility** of its obligations under this MoU which has an adverse effect on the performance of **PMA**'s obligations under this MoU;
- (d) **Utility** is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for **Utility** or for the whole or material part of its assets that has a material bearing on its ability to perform its obligations under this MoU;
- (e) **Utility** has been, or is in the process of being liquidated, dissolved, wound-up, amalgamated or reconstituted in a manner that in the reasonable opinion of **PMA** would adversely affect **Utility**'s ability to perform its obligations under this MoU;
- (f) A resolution for winding up of **Utility** is passed, or any petition for winding up of **Utility** is admitted by a court of competent jurisdiction and a provisional liquidator or receiver is appointed and such order has not been set aside within 90 (Ninety) days of the date thereof or **Utility** is ordered to be wound up by a court of competent jurisdiction; or
- (g) Any representation made or warranty given by **Utility** under this MoU is found to be false or misleading.

### **10.3. Termination for [PMA] Event of Default**

- 10.3.1 Without prejudice to any other right or remedy which **Utility** may have in respect thereof under this MoU, upon the occurrence of a **PMA** Event of Default, **Utility** shall be entitled to terminate this MoU in the manner provided in Clause 10.3.2 below.
- 10.3.2 **Utility** shall issue a Preliminary Notice to **PMA** providing 90 Days to cure the underlying Event of Default. If **PMA** fails to cure the underlying Event of Default within such period allowed, **Utility** shall be entitled to terminate this MoU by issuing a Termination Notice to **PMA**.

### **10.4. Termination for Utility Event of Default**

- 10.4.1 Without prejudice to any other right or remedy which **PMA** may have in respect thereof under this MoU, upon the occurrence of an **Utility** Event of Default, **PMA** shall be entitled to terminate this MoU in the manner provided in Clause 10.4.2 below.
- 10.4.2 **PMA** shall issue a Preliminary Notice to **Utility** providing 90 Days to cure the underlying Event of Default. If **Utility** fails to cure the underlying Event of Default within such period allowed, **PMA** shall be entitled to terminate this MoU by issuing a Termination Notice to **Utility**.

### **10.5. Termination for convenience by PMA**

**PMA** shall, in addition to any other right enabling it to terminate this MoU, have the right to terminate this MoU at any time by giving a 30 days written notice to **Utility** if **PMA** is of the opinion that the Project is not financially or technically viable.

## **10.6. Consequences of Termination**

- (a) Notwithstanding anything to the contrary contained in this MoU, any termination of this MoU pursuant to its term shall be without prejudice to accrued rights of any Party, including its right to claim and recover damages and other rights and remedies which it may have in law or contract. All accrued rights and obligations of any of the Parties under this MoU, shall survive the termination of this MoU to the extent such survival is necessary for giving effect to such rights and obligations.
- (b) Following issue of the Termination Notice by **Utility** or **PMA**, **Utility** take possession and control of [**PMA**]'s control room and call center and the exclusivity granted to [**PMA**] under Clause 3.2 will come to an end.
- (c) Upon termination of this MoU by [**PMA**] or [**Utility**], [**PMA**] shall be entitled to a Termination payment as agreed mutually and would be calculated basis the depreciated value of the AMI Project installed and reasonable cost of return.

## **11. Force Majeure**

- 11.1 **PMA** shall not be liable for termination for default if and to the extent that it's delay in performance or other failure to perform its obligations under the MoU is the result of an event of Force Majeure.
- 11.2 "Force Majeure" shall mean any event beyond the reasonable control of the **Utility** or of the **PMA**, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:
  - a) war, hostilities or warlike operations (whether war be declared or not), invasion, act of foreign enemy and civil war;
  - b) rebellion, revolution, insurrection, mutiny, usurpation of government, conspiracy, riot and civil commotion; and
  - c) earthquake, landslide, volcanic activity, flood or cyclone, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster
- 11.3 If a Force Majeure situation arises, **PMA** shall promptly and no later than seven (7) days from the first occurrence thereof, notify **Utility** in writing of such condition and the cause thereof. Unless otherwise directed by **Utility** in writing, **PMA** shall continue to perform its obligations under the MoU as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
- 11.4 The decision of **Utility** with regard to the occurrence, continuation, period or extent of Force Majeure shall be final and binding on **PMA**.

## **12. Governing Laws and Dispute Resolution**

- 12.1 The MoU shall be governed by and interpreted in accordance with laws of the India. The Courts of state capital shall have exclusive jurisdiction in all matters arising under this MoU.
- 12.2 **Utility** and **PMA** shall make every effort to resolve amicably, by direct informal negotiation, any disagreement or dispute arising between them under or in connection with the MoU
- 12.3 If the Parties fail to resolve such a dispute (the date of commencement of the dispute shall be taken from the date when this clause reference is quoted by either Party in a formal communication clearly mentioning existence of dispute or as mutually agreed) or difference by mutual consultation within twenty-eight (28) days from the commencement of such consultation, either Party may require that the dispute be referred for resolution to the formal mechanisms specified in section 12.
- 12.4 All disputes or differences in respect of which the decision, if any, has not become final or binding as aforesaid shall be settled by arbitration in the manner hereinafter provided. The arbitration shall be conducted by three arbitrators, one each to be nominated by the **PMA** and **Utility** and the third to be appointed as an umpire by both the arbitrators in accordance with the Indian Arbitration Act. If either of the parties fails to appoint its arbitrator within sixty (60) days after receipt of a notice from the other party invoking the Arbitration clause, the arbitrator appointed by the party invoking the arbitration clause shall become the sole arbitrator to conduct the arbitration.
- 12.5 The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The venue of arbitration shall be [X].

## **13. Miscellaneous and Notices**

### **13.1. Amendment**

No change to this MoU shall be valid or binding unless it is set forth in writing and duly executed by the authorized representatives of the Parties hereto.

### **13.2. Severability**

In the event that any term, condition or provision of this MoU is held to be a violation of any applicable mandatory law, statute or regulation, the same shall be deemed to be deleted from this MoU and shall be of no force and effect and this MoU shall remain in full force and effect as if such term, condition or provision had not originally been contained in this MoU. Notwithstanding the foregoing, in the event of any such deletion the Parties shall negotiate in good faith in order to agree the terms of a mutually acceptable and satisfactory alternative provision to be substituted for the provision so deleted which comes as close as possible to

the economic intent of the deleted provision. The foregoing shall also apply in case of an unintended, material omission in this MoU.

### **13.3. Compliance with applicable laws**

With respect to all matters and activities relating to this MoU, each of the Parties shall comply with, in all material respects, all Applicable Laws.

### **13.4. Counterparts**

This MoU may be executed in two counterparts, both of which shall constitute one and the same MoU.

### **13.5. No Partnership**

The Parties do not intend to be partners to one another or partners as to any third party, or create any fiduciary relationship among themselves, solely by virtue of their status as Parties to this MoU.

### **13.6. No agency**

No Party, acting solely in its capacity as a Party to this MoU shall act as an agent of the other or have any authority to act for or to bind the other Party.

### **13.7. Assignment**

Except as specifically provided in this MoU, no rights, liabilities or obligations under this MoU shall be assigned by any Party hereto without the prior written consent of the other Party hereto. However, notwithstanding anything to the contrary contained in this MoU, [Utility] agrees that PMA shall be entitled, to the extent permitted by law and as may be required under its financing documents (if any), to assign or create liens over its rights and interests under or pursuant to this MoU.

### **13.8. Entire MoU**

This MoU cancels and supersedes any prior MoUs between the Parties with respect to the subject matter hereof. There are no prior representations warranties, conditions or other agreements among the Parties, express or implied except as set forth herein. This MoU, together with all annexures, exhibit and attachments hereto, represents the entire agreement and understanding between the Parties with respect to the subject matter of this MoU and supersedes any prior agreement or understanding, written or oral, that the Parties may have had.

### **13.9. Waiver**

No exercise, or failure to exercise, or delay in exercising any right, power or remedy vested in any Party under or pursuant hereto shall constitute a waiver by that Party of that or any other right power or remedy and a waiver shall only be deemed duly given if done unambiguously and in writing.

### **13.10. Notices**

Notices, demands or other communication required to be given under this MoU shall be in writing and delivered personally or sent by prepaid registered post with recorded delivery, addressed to the intended recipient at its address set forth below, or to such other address as either Party may from time to time duly notify to the other:

If to [Name of Utility]:

Attention:      Address: [Utility]

If to [Name of PMA]:

Attention:      Address: [PMA]

A notice shall be deemed to have been received, if sent by fax on the working day next following a successful transmission as evidenced by the telefax confirmation sheet of the sender or, if delivered or sent by registered mail with return receipt, to have been delivered and received on the date of such delivery.

**IN WITNESS WHEREOF**, the Parties have entered into this MoU on the day and year first above written.

For and on behalf of [Name of Utility]	For and on behalf of [Name of PMA]
Authorized Signatory	Authorized Signatory
Name: Designation:	Name: Designation:
In the presence of WITNESS In presence of	In the presence of WITNESS In presence of
Name: Address:	Name: Address:

## Annexure

### **Tripartite Escrow Agreement Format**

This Escrow Agreement ("Escrow Agreement") is made on the [date] day of [month], [year] at [place], by and amongst:

[Name of PMA], constituted under [Name of Act] and having its registered office at [Address] (hereinafter referred to as the "Project Management Agency" or the "PMA", which expression shall unless repugnant to the context or meaning thereof includes its successors or permitted assigns) of the First Part;

[Name of Utility], a company constituted under the [Name of Act], with its registered office at [insert address] (hereinafter referred to as "Utility" which expression shall unless repugnant to the context or meaning thereof includes its successors or permitted assigns) of the Second Part; and

[Name of Bank], a bank duly constituted in accordance with the laws of India and carrying on the business of banking in India as a scheduled commercial bank, with its registered office at [insert address] and acting for the purpose of this Escrow Agreement through its branch office at [insert address] (hereinafter referred to as "Escrow Agent", which expression shall unless repugnant to the context or meaning thereof includes its successors and permitted assigns). PMA, Utility and the Escrow Agent are referred to herein collectively as "Parties" and individually as "Party".

WHEREAS:

- (a) Utility and PMA have executed a Memorandum of Understanding on [date] (the "MoU") for implementing and operating an AMI Project at [name of project area] (the "Project").
- (b) As per the provisions of the Agreement, the Utility is required to appoint an escrow agent and open an escrow account with such escrow agent for making periodical payments to PMA for implementing the AMI Project.
- (c) The escrow account will be funded by the Utility in accordance with the terms of this Escrow Agreement and the MoU, and such escrow account shall serve to secure the Utility's payment obligations towards PMA under the MoU.
- (d) The Escrow Agent is willing to serve as an escrow agent in accordance with the terms and conditions of this Escrow Agreement.

NOW, THEREFORE, in consideration of the foregoing and the respective covenants and agreements set forth in this Default Escrow Agreement and other considerations, the sufficiency and adequacy of which is hereby acknowledged, and intending to be legally bound hereby, the Parties agree as follows:

# **1. Escrow Account**

## **1.1. Appointment**

The Utility and PMA hereby appoint the Escrow Agent to serve as the escrow agent for the purposes of this Escrow Agreement and the Escrow Agent hereby accepts this appointment through its [insert location] branch.

## **1.2. Escrow Account**

Within [X] Business Days of the date hereof, the Utility and the Escrow Agent shall establish a segregated escrow bank account denominated in Indian Rupees for the benefit of PMA (the "Escrow Account") which account shall be maintained at all times until the termination of this Escrow Agreement. The Escrow Agent shall promptly inform PMA of the Escrow Account details.

## **1.3. Deposit**

13.3.1 Within [X] days of the date of execution of the MoU, the Utility shall transfer an amount equal to [X] Months Payment for the relevant Agreement Year in relation to the Project (the "Escrow Amount"). The Utility shall, at all times during the Term of the MoU, maintain in the Escrow Account funds sufficient to meet [X] Months Payment for the relevant Agreement Year in relation to the Project.

13.3.2 Immediately upon deposit of the Escrow Amount into the Escrow Account in accordance with Clause 1.3.1 above, the Utility shall also issue a standing and irrevocable written instruction to the Escrow Agent to release payment towards the monthly payment to PMA for each Month in accordance with the terms of Clause 3.2 of this Escrow Agreement.

## **1.4. Identification and Separation**

13.4.1 The Escrow Agent shall clearly identify in its records the Escrow Account as an escrow account and shall keep the funds standing to the credit of the Escrow Account separated and segregated from the Escrow Agent's own funds or funds of any of its other customers or third parties.

13.4.2 Any and all credits made into the Escrow Account shall be irrevocable and all income or gain earned or realized on amounts on such credit in the Escrow Account shall be treated for all purposes of this Escrow Agreement as part of the Escrow Amount.

## **1.5. Fees**

13.5.1 The Utility shall pay [Rs. [X] per annum] as fees to the Escrow Agent for the establishment and management of the Escrow Account. The Utility shall pay such fees to the Escrow Agent within 10 Business Days of receipt of an invoice from the Escrow Agent.

13.5.2 Any payment made by the Utility under this Escrow Agreement shall be made from the following account or from such other account which the Utility may designate from time to time:

Bank: [X]  
Account number: [X]  
BIC (SWIFT): [X]  
Address of Bank: [X]

## 1.6. Escrow Account Statements

The Escrow Agent shall provide Quarterly statements regarding the Escrow Account to the Utility and PMA.

## 2. Escrow Amount

- 14.1 Promptly upon the Escrow Amount being transferred to the Escrow Account, the Escrow Agent shall send to the Utility and PMA a notice informing them of the transfer.
- 14.2 Except as otherwise provided in this Escrow Agreement, the Escrow Agent shall hold the Escrow Amount in escrow for the sole benefit of and in trust for PMA for the Term of the MoU. The Escrow Agent shall not release any of the Escrow Amount to any person other than PMA. In particular, the Escrow Agent shall not accept any requests for withdrawals or transfers of the Escrow Amount from the Utility for the benefit of the Utility or any third party, unless it is made in accordance with this Escrow Agreement.
- 14.3 Notwithstanding anything contained in Section 171 and Section 221 of the Indian Contract Act, 1872, the Escrow Agent shall not apply any right of set-off against the Escrow Amount, grant any lien over the Escrow Amount, or apply any fee or deduction in relation to the Escrow Amount.

## 3. Payment

- 15.1 All amounts deposited in the Default Escrow Account shall be applied by the Escrow Agent as provided for in this Clause 3.
- 15.2 Upon the failure on part of the Utility to pay any invoice for any undisputed Payment in accordance with the terms of the MoU within [30 days] of the Payment Due Date, and provided PMA has provided a written notice (with a copy to the Utility) of such failure to the Escrow Agent along with a copy of the invoice, the Escrow Agent shall immediately, upon receipt of such written notice from PMA, transfer an amount equal to the total undisputed Payment from the Escrow Account to PMA.
- 15.3 Upon the expiry of the Term of the MoU, the Utility shall send instructions to the Escrow Agent requesting it to release and transfer any due and payable amounts to PMA and any remaining amounts to be transferred to the Utility, as the case may be.

## **4. Authorized Signatories**

- 16.1 Names and specimen signatures of the Utility and PMA officials authorized to issue notice duly attested are annexed to this Escrow Agreement. Any change in the said authorization shall be advised to the Escrow Agent and the other Party at the appropriate time.

## **5. Obligations of the Escrow Agent**

- 17.1 The obligations of the Escrow Agent under this Escrow Agreement are subject to the following terms:
- (a) the duties of the Escrow Agent are only as herein specifically provided, and are purely administrative in nature. The Escrow Agent shall neither be liable for, nor chargeable with knowledge of, the terms and conditions of any other agreement, instrument or document in connection herewith, including, without limitation, the MoU, and shall be required to act in respect of the Escrow Amount only as provided in this Escrow Agreement. This Escrow Agreement sets forth all the obligations of the Escrow Agent with respect to any and all matters pertinent to the Escrow Account contemplated hereunder and no additional obligations of the Escrow Agent shall be implied from the terms of any other agreement. The Escrow Agent shall incur no liability in connection with the discharge of its obligations under this Escrow Agreement or in connection therewith, except such liability as may arise from the Escrow Agent's negligence, willful misconduct or otherwise from any breach of this Escrow Agreement. Such liability, however, shall not exceed the amount of the Escrow Amount outstanding at the date of the said breach by the Escrow Agent;
  - (b) the Escrow Agent shall not be required to perform any acts which will violate any applicable laws;
  - (c) in the event of any bankruptcy proceedings or enforcement proceedings against any of the Parties pursuant to applicable laws or regulations, the Escrow Agent shall, notwithstanding the provisions of this Escrow Agreement, act and perform in accordance with applicable laws; and
  - (d) the Escrow Agent shall be entitled to rely and act upon any order or judgment of a court delivered to it without being required to inquire into or determine the authenticity thereof or the genuineness of the signature thereon or the authority of the signatory thereof or the correctness of any fact stated therein or the property or validity of the service thereof. However, before taking any action on receipt of such order or judgment the Escrow shall give written intimation to that effect to the Utility and PMA.

## **6. Representations and Warranties**

Each Party represents and warrants that, as of the date hereof and in the foreseeable future:

- (a) it has the authority to enter into this Escrow Agreement;
- (b) this Escrow Agreement constitutes a legally valid and binding obligation, enforceable against it in accordance with its terms;
- (c) its entry into and/or performance under this Escrow Agreement will not be in breach of any express or implied terms of any contract with or other obligation to any third party; and
- (d) it is solvent and able to perform all of its obligations under this Escrow Agreement.

## **7. Miscellaneous**

### **7.1. Definitions**

Unless otherwise defined herein, all capitalized terms shall have the meaning ascribed to them in the MoU.

### **7.2. Notices**

Any notice or other communication to be given or made under this Escrow Agreement to the Parties shall be in writing. Except as otherwise provided in this Escrow Agreement, such notice, request or other communication shall be delivered by registered mail or facsimile to the Party(ies) at the following addresses:

PMA: [Address]

Utility: [Address]

Escrow Agent: [Address]

### **7.3. Entire Agreement**

This Escrow Agreement constitutes the entire agreement and understanding between the Parties with respect to its subject matter (i.e. the escrow arrangement) and replaces and supersedes all prior agreements, arrangements, undertakings or statements regarding such subject matter.

### **7.4. Amendments**

No variation of or amendment to this Escrow Agreement shall be effective unless made in writing and executed by all the Parties hereto.

### **7.5. Assignment**

Neither this Escrow Agreement nor any of the rights or obligations hereunder may be assigned by a Party without the prior written consent of the other Parties; provided, however, that PMA shall be entitled, to the extent permitted by law and as may be required under its financing documents, to assign or create liens over its rights and interests under or pursuant to this Escrow Agreement.

## **7.6. Severability**

Whenever possible, each provision of this Escrow Agreement shall be interpreted in such a way as to be effective and valid under law, but if any provision of this Escrow Agreement is unenforceable or invalid under law, such provision shall be ineffective only to the extent of such unenforceability or invalidity, and the remaining provisions of this Escrow Agreement shall continue to be binding and in full force and effect.

## **7.7. Confidentiality**

Unless otherwise determined by a competent jurisdiction, the Parties, their employees, representatives and agents shall keep the provisions of this Escrow Agreement strictly confidential and, except as may be required by applicable laws, shall make no disclosure thereof to any person, except the Parties' respective legal counsel and professional advisers, without the prior written consent of the other Parties.

## **7.8. Termination**

This Escrow Agreement shall be automatically terminated upon expiry of the MoU. This Escrow Agreement may also be terminated earlier if the Utility and PMA mutually agree to terminate the Escrow Agreement and send a termination notice to the Escrow Agent. However, in the event of early termination of the MoU by PMA or the Utility, the Escrow Agreement shall remain valid to cover the [X] Months Payments pro-rated for such part of the AMI Project which has already been implemented by PMA as on the date of termination of the MoU.

## **7.9. Dispute Resolution Mechanism**

19.9.1 This Escrow Agreement shall be governed by and construed in accordance with the laws of India.

19.9.2 If any dispute arises out of or in connection with this Escrow Agreement, this dispute shall not affect the Parties' duty to continue the performance of all of their non-disputed obligations.

19.9.3 If any dispute arises, either Party shall give notice to the other Parties of the same, whereupon the Parties shall meet promptly and in a good faith to attempt to reach an amicable settlement.

19.9.4 All disputes not settled amicably pursuant to Clause 7.9.3 above shall be heard by the Courts of [Place].

IN WITNESS whereof the parties hereto have executed these presents the day, Quarter and year first herein above written.

Signed and Delivered On behalf of [Name of PMA]

By (Authorized Signatory)

Address:  
Telephone No:

Signed and Delivered On behalf of the [Name of Utility]

By (Authorized Signatory)  
Address:

Signed and Delivered  
On behalf of the Escrow Agent  
[Insert name of the Bank]

By (Authorized Signatory)  
Address:

Witness:

- 1.
- 2.