# BIDDING DOCUMENT

**SOUTHERN POWER DISTRIBUTION COMPANY OF A.P. LIMITED, TIRUPATI**

**REQUEST FOR PROPOSAL**

**For**

**APPOINTMENT OF ADVANCED METERING INFRASTRUCTURE (AMI) SERVICE PROVIDER FOR SMART PREPAID METERING BY REPLACING THE EXISTING METERS TO ALL GOVERNMENT SERVICES IN SPSR NELLORE, CHITTOOR, YSR KADAPA, ANANTHAPURAM AND KURNOOL DISTRICTS IN ANDHRA PRADESH STATE ON DBFOOT BASIS**

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**TENDER DISCLAIMER**

***APSPDCL*** *reserves the right to accept or reject any or all of the tenders received without assigning any reasons therefore. The* ***APSPDCL*** *also reserves the right to split the tender and place contract on more than one bidder at its discretion.*

**Tender No: CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**

**Chief General Manager/ Projects**
SPDC of A.P. Ltd., 19-13-65/A
Near Srinivasa Kalyanamandapams,
Tiruchanur Road, Tirupati–517 503

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# SUMMARY

## PART I – BIDDING PROCEDURES AND REQUIREMENTS

### Section 1: Request for Proposals (RFP) Notice

This Section includes Request for Proposals.

### Section 2: Eligibility Requirements

This Section contains information regarding specific eligibility requirements applicable for prospective bidders to be considered for further evaluation of their proposal.

### Section 3: Instructions to Bidders and Bid Data Sheet

This Section consists of two parts: “Instructions to Bidders” and “Bid Data Sheet”. “Bid Data Sheet” contains information specific to selection and corresponds to the clauses in “Instructions to Bidders” that call for selection-specific information. This Section provides information to help prospective bidders prepare their proposals. Information is also provided on the qualification requirement, submission, opening and evaluation of proposals, selection of successful bidder and award of contract.

### Section 4: Bidding Forms – Technical Proposal

This Section includes the forms for Technical Proposal that are to be completed by the prospective bidders and submitted in accordance with the requirements of Section 3.

### Section 5: Bidding Forms - Financial Proposal

This Section includes the financial forms that are to be completed by the prospective bidders, including the bidders’ costing and pricing, which are to be submitted in accordance with the requirements of Section 3.

### Section 6: Project Requirements

This Section describes the background information of the Project, Scope, of Work, System Requirement, Specifications, Quality Requirements, Service Level Agreement (SLA), Standards, Activities and Tasks, Plans, Deliverables, Documentation and other requirements/ details related to and/or connected with the Project.

# PART II – CONTRACT FORM AND CONDITIONS OF CONTRACT

### Section 7: Contract Form and Conditions of Contract

This Section includes standard contract form. It includes General Conditions of Contract ("GCC") and Special Conditions of Contract ("SCC"). The SCC include clauses specific to this contract to supplement the General Conditions.

# PART III – Contract Related Forms

### Section 8: Contract Related Forms

This Section includes the form used to notify Award of the Contract to the successful bidder and the form for Performance Security to be furnished by the bidder.

## ABBREVIATIONS

| | | |
|---|---|---|
| 1. | **AMI** | Advanced Metering Infrastructure |
| 2. | **AMISP** | Advanced Metering Infrastructure Service Provider |
| 3. | **BG** | Bank Guarantee |
| 4. | **BoM** | Bill of Material |
| 5. | **BoQ** | Bill of Quantity |
| 6. | **C&I** | Commercial and Industrial |
| 7. | **CMMI** | Capability Maturity Model Integration |
| 8. | **CV** | Curriculum Vitae |
| 9. | **DCU** | Data Concentrator Unit |
| 10. | **DBFOOT** | Design Build Finance Own Operate and Transfer |
| 11. | **FOR** | Freight on Road |
| 12. | **GPRS** | General Packet Radio Service |
| 13. | **GST** | Goods and Services Tax |
| 14. | **HES** | Head-End System |
| 15. | **IPR** | Intellectual Property Rights |
| 16. | **ISO** | International Organization for Standardization |
| 17. | **IT** | Information Technology |
| 18. | **LAN** | Local Area Network |
| 19. | **MDM** | Meter Data Management |
| 20. | **NIC** | Network Interface Controller |
| 21. | **NMS** | Network Management System |
| 22. | **P&L** | Profit & Loss |
| 23. | **PLC** | Power Line Communication |
| 24. | **PO** | Purchase Order |
| 25. | **PON** | Power Outage Notification |
| 26. | **PRN** | Power Restoration Notification |
| 27. | **QR** | Qualification Requirement |
| 28. | **RF** | Radio Frequency |
| 29. | **RFP** | Request for Proposal |
| 30. | **SEBI** | Securities and Exchange Board of India |
| 31. | **SI** | System Integrator OR System Integration |
| 32. | **SLA** | Service Level Agreement |
| 33. | **VoIP** | Voice over Internet Protocol |
| 34. | **WAN** | Wide Area Network |
| 35. | **WO** | Work Order |

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# PART I

# BIDDING PROCEDURES AND REQUIREMENTS

# SECTION – 1: REQUEST FOR PROPOSAL NOTICE

"**Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis"**

**PROCUREMENT NOTICE**

**(Single Stage Two-Envelope Bidding Process with ape-procurement)**

**GLOBAL OPEN COMPETITIVE PROCUREMENT**

**Contract Title: "Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis**'

**Request for Proposal (RFP)/Tender Number:**
**CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**

**Issued on: 29.09.2021**

1. ***Southern Power Distribution Company of A.P. Limited, Tirupati*** (hereinafter also referred to as 'Utility') invites online Proposals for "**Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis**". Bidders are advised to note the clauses on Eligibility Requirements in Section-2 & Qualification Requirements and Evaluation Criteria in Section-3 of the RFP Document for evaluation of Proposals.

2. Bidding for selection of AMI Service Provider will be conducted through global open competitive procurement.

3. The RFP Document is available online on ***www.apeprocurement.gov.in*** from **29.09.2021 to 22.10.2021** on payment of cost of document (Tender Fee) as indicated in the TABLE below. The prospective Bidders would be responsible for downloading the RFP Document and ensuring that any addenda/ corrigendum/ amendment/ clarification thereto available on the website is also downloaded and incorporated.

4. The bidding shall be conducted **under Single Stage Two-Envelope Bidding process with AP e-Procurement** as specified in Section 3.

5. Under the Single Stage Two-Envelope Bidding process, the Bidder shall not quote, disclose or submit its price in the Technical Proposal (First Envelope) or in any other manner, whatsoever, except as part of the Financial Proposal (Second Envelope). In case of any non-compliance in this regard, the Proposal shall be out-rightly / summarily rejected.

6. An incomplete and/or ambiguous and/or conditional Proposal and/or Proposal submitted late is liable to be ignored/ summarily rejected.

7. Proposal must be submitted online through the e-Procurement/ e-Tendering process specified in Section 3. Any Proposal or modifications to Proposal received outside the e-Procurement system will not be considered, unless otherwise specified in Section 3. Utility shall not be held liable for any delays due to e-Procurement/ e-Tendering system failure beyond its control.

8. Important dates, amounts and other details pertaining to this RFP Notice including submission and opening of proposal, cost of documents/ Tender Fee, address for communication, etc., are given in the TABLE below.

9. If Utility office happens to be closed on the specified date of opening of the Proposals, the Proposals/ bids will be opened on the next working day at the same time and venue or as may be notified by Utility.

10. Other details can be seen in the RFP document.

## TABLE- Important Dates, Amounts and Other Details

### DATES

| S. No. | Description | | Date | Time |
|---|---|---|---|---|
| a) | Commencement of downloading of this RFP and e-bidding | : | 29.09.2021 | 11:00 PM |
| b) | Pre-bid meeting | : | 08.10.2021 | 11:00 AM |
| c) | Last date for e-bidding | : | 22.10.2021 | 03:00 PM |
| d) | Last date for receipt of RFP (Hard Copy) | : | 22.10.2021 | 03:00 PM |
| e) | Bid Opening Technical Bid (if possible) | : | 22.10.2021 | 04:00 PM |
| f) | Evaluation of Technical Bid and Opening of Financial Bid | : | 27.10.2021 | 12:00 PM |
| g) | Issue of Letter of Award (LOA) | : | 01.11.2021 | - |
| h) | Execution of AMISP Contract | : | 22.11.2021 | - |

### AMOUNTS FOR BIDDING

| | | | |
|---|---|---|---|
| A. | Tender Fee to be submitted with the RFP (Non- Refundable) | : | INR – NIL |
| B. | Bid Security (Refundable) | : | INR. 0.96 crores |
| C. | Other Payments or Bank Guarantees for the AMISP shall be as per the terms and conditions defined in this RFP | | |

## OTHER DETAILS

| | |
|---|---|
| A. | Address for Communication including Contact details:<br>O/o **Chief General Manager/ Projects**<br>SPDC of A.P. Ltd., 19-13-65/A, Near Srinivasa Kalyanamandapams, Tiruchanoor Road, Tirupati-517503 |
| B. | Payment of cost of document/ Tender Fee:<br>1. Tender Fee shall be made in the form of A/C payee demand draft in favour of Utility or RTGS payable at [Place] drawn on any Scheduled Commercial Bank. **(Not Applicable)**<br><br>2. Bid Security must be submitted in physical form in a sealed envelope at address given above, before the Bid Submission Deadline. The sealed envelope shall be clearly marked on the top as "Bid Security - RFP for **Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis** and **CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**." The sealed envelope shall also clearly mention the name of the Lead Consortium Member/ Sole Bidder submitting the Bid, as further detailed in Section 3.<br><br>3. Any Bid not accompanied by a Bid Security as above shall be rejected by Utility as non-responsive.<br><br>4. Tender Fee is non-refundable. **(Not Applicable)** |
| C. | Other Payments or Bank Guarantees for the RFP/ Contract shall be as per the terms and conditions defined in this RFP Document |

## SECTION – 2: ELIGIBILITY REQUIREMENTS

1. The Bid can be submitted by a Sole Bidder as an individual entity or a Consortium of firms/companies (specific requirements for Consortium are given under Clause 2 below) who are eligible to participate in tenders for public procurement in India in accordance with Applicable Laws including the guidelines issued in Order No. F/No.6/18/2019-PPD by Ministry of Finance, Department of Expenditure, Public Procurement Division dated 23 July 2020 and Order No. 11/05/2018-Coord by the Ministry of Power dated 17 September 2020 including any amendments or modifications to the same from time to time.
2. General Eligibility Requirements

2.1 No Bidder applying individually or as a member of a Consortium, as the case may be, can be member of another Bidder. The term Bidder used herein would apply to both a single entity and a Consortium.

2.2 In the event, Bidder is a Consortium, it shall comply with the following requirements:

2.2.1 The Bid should contain the information required for each member of the Consortium;

2.2.2 Members of the Consortium shall enter into a binding Consortium Agreement, in the form specified at Form 9 (the "**Consortium Agreement**") given in Section 4 of RFP Document, for the purpose of submitting Bid. The Consortium Agreement, to be submitted along with the Bid, shall, *inter alia*:

a) convey the intent to comply with the terms and conditions of the AMISP Contract in the event selected to undertake the Project; and
b) clearly outline the proposed roles and responsibilities, if any, of each member.

2.3 In the event, Selected Bidder, as per Clause ITB 25, Section 3, is a Consortium, pursuant to Sub-Section D of ITB, Section 3, and if so permitted under ITB 1.1, Section 3, and provided further that the Selected Bidder chooses to do so, the Selected Bidder shall be required to form an appropriate Special Purpose Vehicle, incorporated under the Companies Act 2013 (the "**SPV"**), to execute the AMISP Contract and implement the Project. In such a case, the Selected Bidder shall comply with the following requirements:

2.3.1 Selected Bidder shall ensure that it subscribes to 100% of the equity share capital of the SPV. The members of the Consortium shall hold shares in accordance with the shareholding pattern indicated in the Consortium Agreement;

2.3.2 Selected Bidder shall continue to hold not less than 51% for the entire term of the AMISP Contract;

2.3.2 Selected Bidder shall ensure no change in shareholding up to two years after Installation Milestone as per the AMISP Contract;

2.3.3 The Lead Consortium Member shall hold at least 51% (fifty-one per cent) of the equity of the SPV at all times until the two years from Installation Milestone as per the AMISP Contract and 26% for the remaining term of the AMISP Contract.

2.4 The Lead Consortium Member shall be liable for the execution of the entire obligation in the AMISP Contract in accordance with the terms and conditions thereof. 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 AMISP Contract, during execution of the AMISP Contract.

2.5 Without prejudice to Clause 2.6 herein, for the purposes of fulfilment of its obligations as laid down under the AMISP Contract where Utility deems fit and unless the context requires otherwise, the Bidder shall refer to the Lead Member who shall be the sole point of interface between Utility 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 well as the Subcontractors if any.

2.6 The Sole Bidder / Lead Consortium Member as well as any member of the Consortium shall be permitted to appoint Subcontractor(s) to fulfil its obligations under the AMISP Contract with Utility, provided, the Subcontractor engaged are not blacklisted by any Government organization or regulatory agencies or Government undertaking. The Sole Bidder / Lead Consortium Member as well as any member of the Consortium shall only engage such sub-contractor(s) who satisfy the eligibility requirement in terms of applicable laws including the guidelines issued vide Order No. F/No.6/18/2019-PPD by Ministry of Finance, Department of Expenditure, Public Procurement Division dated 23 July 2020 and as amended from time to time.

2.7 The Lead Consortium Member/ Sole Bidder shall submit the Bid to Utility and shall be liable towards fulfilling the obligations in this RFP.

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. (if applicable) entered amongst all members of that Bidding Consortium including but not limited to those as prescribed in Form 9, Form 10 and Form 12 given in Section 4. In the absence of duly executed formats, the Bid shall not be considered for evaluation and shall be rejected.

2.9 The Bidder, individual entity in case the participating in the bidding as Sole Bidder, or as a Consortium Member or as Lead Consortium Member in case participating in the bidding as Bidding Consortium, and its Sub-Contractor(s) should not be blacklisted 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 Form 8 given in Section 4.

2.10 The Lead Consortium Member/ Sole Bidder shall submit the Bid after submitting the Tender Fees and Bid Security as per the various terms, schedules and formats prescribed in this RFP. Further, The Lead Consortium Member shall be the point of contact for the Consortium during the Bid process before award of the Project to the AMISP, and Utility shall communicate directly to the contact person appointed through the Power of Attorney as per Form 11.

2.11 In the event of successful Bid, the specified AMISP Contract, shall be signed so as to be legally binding on Sole Bidder/ all Consortium Members.

2.12 Any direct and/ or indirect change in shareholding/ management of AMISP shall require prior approval of the Utility. AMISP undertakes that any change in shareholding shall be in compliance with applicable laws including but not limited to the guidelines issued vide Order No. F/No.6/18/2019-PPD by Ministry of Finance, Department of Expenditure, Public Procurement Division dated 23 July 2020 and rules for foreign direct investment in India; and the AMISP Contract.

## SECTION – 3: INSTRUCTIONS TO BIDDERS AND BID DATA SHEET

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## INSTRUCTIONS TO BIDDER

## A. General Provisions

### 1. Definitions

**1.1 Definitions**

(a) "**Affiliate**" shall mean a company or AIF or Foreign Investment Fund that either directly or indirectly:

i. controls or
ii. is controlled by or
iii. is under common control with

a Bidder and "control" mean ownership by one company or AIF or Foreign Investment Fund of 26% of the voting rights of the other company or AIF or Foreign Investment Fund, as the case may be;

(b) **"Alternative Investment Fund" or "AIF"** " shall have the meaning as ascribed to the term 'alternative investment fund' under Regulation 2(1)(b) of the Securities and Exchange Board of India (Alternative Investment Funds) Regulations, 2012 (as may be amended from time to time)

(c) **"ACI"** shall mean minimum investible funds (i.e. immediately available funds for investment and callable capital, net of estimated expenditure for administration and management of the fund) subject to the limits of investment in a single investee entity (in the relevant jurisdiction for a Foreign Investment Fund, or the maximum permissible investment limit for an AIF) (as per the Securities and Exchange Board of India (Alternative Investment Funds) Regulations, 2012, as may be amended from time to time).

In case of an AIF or Foreign Investment Fund using ACI, ACI would be considered as per the certificate issued by statutory auditor (or such other certificate as filed with the regulator in the relevant jurisdiction) not older than 1 (one) months prior to the date of Bid Submission;

(d) **"AMISP Service Charge"** shall mean the payment to be made by the Utility to the AMISP in INR per meter per month for each category of meter as quoted in the Bid;

(e) **"AMISP Contract" or "Contract"** shall mean the Contract to be entered into between the Selected Bidder in the event the Selected Bidder is an individual entity, Lead Bidder in the event the Selected Bidder is a Consortium or *the SPV,*

*incorporated by the Selected Bidder in the event formation of SPV is permitted as per* ***Bid Data Sheet*** [1] and the Utility for undertaking the Project;

(f) **"Bid"** shall mean the bid submitted by a Bidder(s) in response to this RFP and shall include the Technical Bid and the Financial Bid;

(g) **"Bidder(s)"** shall mean individual entity or Consortium of entities bidding in response to this RFP. The Bidder can either be a company incorporated under the applicable laws of their relevant jurisdiction or an AIF or a Foreign Investment Fund;

(h) **"Bidding Consortium"** shall mean the Consortium of entities bidding for Project after executing Consortium Agreement as per the terms and conditions of this RFP;

(i) **"Bid Data Sheet (BDS)"** means an integral part of the **Instructions to Bidders (ITB) Section 3**, that is used to reflect issues, details and conditions specific to the procurement, to supplement and/or modify the provisions of ITB.

(j) **"Bid Submission Deadline"** shall have the meaning as ascribed thereto in **ITB 17.5**;

(k) **"Conflict of Interest"** shall have the meaning as ascribed thereto in **ITB 3**;

(l) **"Consortium Member"** shall mean any Member of the Bidding Consortium other than the Lead Consortium Member;

(m) **"Contractor"** shall mean the same as "AMISP";

(n) **"Contract Price"** shall have the meaning as ascribed thereto in Article 5.1 of the AMISP Contract;

(o) **Day"** means a calendar day, unless otherwise specified as **"Business Day".** A Business Day is any day that is an official working day of Utility. It excludes Utility's official public holidays.

[1] Lead Bidder in the event the Selected Bidder is a Consortium

(p) **"Financial Bid"** shall have the meaning as ascribed thereto in **ITB 16**;

(q) "**Financial Proposal"** shall mean the same as Financial Bid;

(r) **"Financial Year" or "FY"** shall mean the period starting from 1st April of a calendar year to 31st March of the consecutive calendar year;

(s) **"Foreign Investment Fund"** shall mean any pooled investment vehicle or investment fund which is registered or recognized with a securities market/banking regulator of a "foreign jurisdiction";

(t) **"Foreign Jurisdiction"** means a country, other than India, whose securities market regulator is a signatory to International Organization of Securities Commission's Multilateral Memorandum of Understanding (IOSCO's MMOU) or a signatory to bilateral Memorandum of Understanding with the Securities and Exchange Board of India, and which is not identified in the public statement of Financial Action Task Force as a jurisdiction having a strategic Anti-Money Laundering or Combating the Financing of Terrorism deficiencies to which counter measures apply or a jurisdiction that has not made sufficient progress in addressing the deficiencies or has not committed to an action plan developed with the Financial Action Task Force to address the deficiencies and are allowed to make investment India in terms of applicable law;

(u) **"ITB"** (this Section 3 of the RFP) means the Instructions to Bidders that, along with other Sections, provides the Bidders with all information needed to prepare their Proposals.

(v) **"Lead Consortium Member" or "Lead Bidder"** shall mean the Member of the Bidding Consortium, designated as such by the other members of the Consortium, having authority to represent all the members before the Utility;

(w) **"Meter-months":** At any point of time, meter-months of the AMI system is calculated as the sum of number of months from operationalization of the meter or Operational Go-Live, whichever is later, for all meters installed and commissioned

by the AMISP, taking into account all Change Orders issued by the Utility;

(x) "**Month**" shall mean calendar months unless otherwise specified.

(y) **"Operational Go-live"** shall have the meaning as ascribed thereto in Clause 8 of Section 6 of the RFP Document;

(z) "**Parent(s)"** shall mean a Company or an AIF or a Foreign Investment Fund that holds at least twenty six percent (26%) of the paid - up equity capital directly or indirectly in the Bidder, as the case may be;

(aa) **"Project"** shall mean the Utility's AMI Project defined in Clause 1 of Section 6 of the RFP Document;

(bb) **"Proposal"** shall mean the same as Bid and shall include the Technical Proposal and the Financial Proposal;

(cc) **"Request for Proposal" or "RFP"** means this Tender of which the number, name and details have been mentioned in **Bid Data Sheet**, including all its Volumes/ Sections/ Forms/ Annexures/ Appendices etc., for Appointment of AMISP (including all clarification/ addendum/ amendment/ corrigendum/ etc. issued from time to time);

(dd) "**RFP Document**" shall have the same meaning as ascribed thereto in ITB 2.1 and ITB 2.1.1

(ee) **"Service(s)" or "Related Service(s)"** shall mean any Service(s) performed or to be performed as a part of the Project by the AMISP;

(ff) **"Special Purpose Vehicle" or "SPV"** shall mean a company incorporated under Companies Act, 2013 for the purpose of executing the Project as set out in in Clause 2.3 of Section 2;

(gg) **"Sub-Contractor"** shall mean any person, natural or legal, including manufacturers, to whom execution of any part of the AMISP Contract, including preparation of any design or supply of the AMI Project, is sub-contracted directly or indirectly by the Contractor, and includes its legal successors or permitted assigns;

(hh) **"Technical Bid"** shall have the meaning as ascribed thereto in **ITB 15**;

(ii) **"Technical Proposal"** shall mean the same as Technical Bid;

(jj) **"Tender"** shall mean the same as "RFP";

(kk) **"Tender Fee"** shall mean the fees submitted with the RFP;

(ll) **"Total Meter-months":** Total Meter-months of the AMI system is calculated as the product of total number of smart meters installed, integrated and operationalized in the Project (by taking into account all Change Orders issued by the Utility) and 90 (ninety) months commencing post Operational Go-Live.

(mm) **"Utility"** means the entity, named and as briefly described in **Bid Data Sheet**, that has issued the Request for Bids for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on Design Build Finance Own Operate Transfer (DBFOOT basis), to enter into a Contract for Design Build Finance Own Operate Transfer (DBFOOT) AMI system in the Project area as per the RFP Document.

1.1.1 Capitalised terms used herein but not defined specifically shall have the meaning as ascribed to them in Section 5 and Section 6, and elsewhere in RFP Document.

1.2 **Singular and Plural**: Where the context so requires, words imparting the singular only also include the plural and vice versa.

1.3 **Headings and Marginal Notes**: Headings and marginal notes to the terms and conditions of the Contract are not deemed to form part thereof nor are to be taken into consideration in the interpretation or construction thereof or of the Contract.

## 2. Introduction

**(a) About this Request for Proposal**

2.1 This Request for Proposal (RFP) is issued by the Utility for selecting the AMISP to implement Utility's AMI Project. This RFP Document provides the overall structure of the document (as outlined in the beginning of the document in the section titled "Summary, Abbreviations & Table of Content"), requirements and general terms and conditions applicable to each Bidder.

2.1.1 The RFP Document ( also referred to as the bidding document) consist of Parts I, II, and III, which include all the sections indicated below, and should be read in conjunction with any Addenda/ Corrigenda/ Amendments/ Clarifications etc. issued thereto from time to time in accordance with this Section 3.

**PART I Bidding Procedures and Requirements**

- Section 1 - Request for Proposal Notice
- Section 2 - Eligibility Requirements
- Section 3 - Instructions to Bidders and Bid Data Sheet
- Section 4 - Bidding Forms - Technical Proposal
- Section 5- Bidding Forms - Financial Proposal
- Section 6 - Project Requirements

**PART II Contract Form and Conditions of Contract**

- Section 7 – Contract Form and Conditions of Contract

**PART III Contract Related Forms**

- Section 8 – Contract Related Forms

**(b) Bidding Process and Electronic-Procurement System**

2.2 Bidding against the Request for Proposal shall be under Two Envelope Single Stage Bidding Process. The bidding process will be conducted online with Electronic – Procurement System (e-Procurement/ e- Tendering/ e- Bidding System) as specified in **BDS**.

2.2.1 The Bidders who wish to participate in online Tenders will have to procure/ should have legally valid digital signature as per Information Technology Act, 2000 using which they can sign their electronic Bids.

2.2.2 All Bids should be digitally signed. For details regarding digital signature certificate and related training, the Bidder should contact at the address mentioned in **BDS**.

**(c) Study of Utility's Existing Systems**

2.3 The Bidders are invited to submit their Proposal comprising a Technical Proposal and a Financial Proposal, for award of Contract named in the **BDS**. The Proposal will be the basis for evaluation and holding discussions, if required, and ultimately signing the Contract with the Selected Bidder.

2.4 A standard brief regarding detail of existing systems relevant to the AMI Project has been provided in **BDS**. However, notwithstanding the same, all Bidders are advised to visit and examine the site and existing facilities, and obtain for itself, on its own responsibility and cost, all information that may necessary for preparing the Bid and entering into the AMISP Contract. The cost of visiting the site shall be at the Bidder's own expense.

2.5 The Bidder and any of its personnel or agents shall be granted permission, through the assistance of the Utility, 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 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.

**(d) Pre-Bid Meeting**

2.6 The Bidder's designated representative(s) is/are invited to attend a pre-bid meeting at Bidder's expense, which shall take place at the time and venue specified in the **BDS**

2.7 The purpose of the meeting will be to clarify any issues regarding this RFP in general and the scope of work in particular.

2.8 The Bidder may submit any question or query to Utility in writing, to reach Utility not later than one week before the meeting in Form 7 as per the format given in **BDS**. It may not be practicable at the meeting to answer questions received late, but questions and responses will be transmitted as indicated hereafter.

2.9 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 through the e-Procurement System mentioned in ITB 2.2 without delay to all prospective Bidders who have downloaded the RFP.

2.10 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a Bidder

**3. Conflict of Interest**

3.1 A Bidder shall not have a conflict of interest that affects the Bidding process (the "**Conflict of Interest")**. In the event a Bidder is found to have a Conflict of Interest, the Utility may choose to reject the Bid, terminate the AMISP Contract (in the event it has been awarded) as per termination clause in the AMISP Contract. Any Bidder found to have a Conflict of Interest shall be disqualified.

3.2 A Bidder shall be deemed to have a Conflict of Interest affecting the bidding process, if:

(a) the Bidder or its Member (or any constituent thereof) and any other Bidder or its Member (or any constituent thereof) have common controlling shareholders or other ownership interest;

Provided that this disqualification shall not apply in cases where the direct or indirect shareholding of a Bidder or its Member (or any shareholder thereof having a shareholding of more than 15% (fifteen per cent) of the paid up and subscribed share capital of such Bidder or its Member, as the case may be) in the other Bidder or its Member, is less than 15% (fifteen per cent) of the subscribed and paid up equity share capital thereof;

Provided further that this disqualification shall not apply to any ownership by a bank, insurance company, pension fund or a public financial institution referred to in sub-section (72) of section 2 of the Companies Act, 2013.

For the purposes of this Clause, indirect shareholding held through one or more intermediate persons shall be computed as follows: (i) where any intermediary is controlled by a person through management control or otherwise, the entire

shareholding held by such controlled intermediary in any other person (the "Subject Person") shall be taken into account for computing the shareholding of such controlling person in the Subject Person; and (ii) subject always to sub-clause (a) above, where a person does not exercise control over an intermediary, which has shareholding in the Subject Person, the computation of indirect shareholding of such person in the Subject Person shall be undertaken on a proportionate basis; provided, however, that no such shareholding shall be reckoned under sub-clause (ii) if the shareholding of such person in the intermediary is less than 26% of the subscribed and paid up equity shareholding of such intermediary; or

(b) a constituent of such Bidder is also a constituent of another Bidder; or

(c) such Bidder or its Member thereof receives or has received any direct or indirect subsidy, grant, concessional loan or subordinated debt from any other Bidder or its Member, has provided any such subsidy, grant, concessional loan or subordinated debt to any other Bidder or its Member; or
(d) such Bidder has the same legal representative for purposes of this Bid as any other Bidder; or

(e) such Bidder, has a relationship with another Bidder, directly or through common third party/ parties, that puts either or both of them in a position to have access to each other's information about, or to influence the Bid of either or each other; or

(f) such Bidder has participated as a consultant to the Authority in the preparation of any documents, design or technical specifications of the Project.
*Explanation: In case a Bidder is a Consortium, then the term Bidder as used in this Clause shall include each Member of such Consortium*.

**4. Bidders to Inform Itself Fully**

4.1 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, 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 Services or financial compensation for any reasons whatsoever attributable to AMISP.

4.2 The Bidders should particularly acquaint themselves with the technical requirements of Utility's systems, operations, assets, equipment, statutory codes and standards.

4.3 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

**5. Fraud and Corruption**

5.1 Utility requires compliance with the Anti-Corruption Guidelines/ Laws in force of the relevant Government/ its instrumentalities/ Utility.

**6. Eligibility, Qualification and General Requirements**

**(a) Eligibility Requirements**

6.1 The eligibility requirements for submission of Proposals against the RFP are given in Section 2. Proposals, if any, from Bidders not complying with the same shall be out-rightly rejected and shall not be considered for evaluation.

**(b) Qualification Requirements**

6.2 The Qualification Requirements for Bidders are given in **BDS**. Qualification of Bidder will be based on meeting the minimum requirements specified therein regarding the Bidder's technical experience and financial requirement as demonstrated by the Bidder's responses. Proposals/ Bids submitted by the Bidders shall be evaluated to ascertain their compliance with Qualification Requirements, based on the details/ information/ documentary evidence pertaining to the same to be submitted in the Technical Proposal, as specified. A Proposal shall be rejected if the Bidder submitting the Proposal, fails to meet the Qualification Requirements.

**(c) General Requirements**

6.3 If at any stage of the bidding, 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 or any appropriate Commission or any Arbitral Tribunal against the Sole Bidder/

Lead Bidder/ any Consortium Members or its Affiliates for breach of any Contract awarded by any Government agency/department, then Bids from such Bidders shall be liable to be rejected. All Bidders shall confirm in accordance to Form 8 that no such order(s)/ ruling(s) have been passed by a competent Court of Law or an appropriate Commission against it or its Affiliates. In case of any such order/ ruling, it is the duty of the Bidder to inform Utility for the same during the Bid submission.

6.4 Technically qualified Bidders shall continue to maintain compliance with the Eligibility Requirements specified in Section 2 and the Qualification Requirement specified in ITB 6.2 in BDS, throughout the bidding process. Failure to comply with the aforesaid requirements shall make the Bid from such Bidders liable for rejection at any stage of the bidding process.

## B. Preparation of Proposals

### 7. General Considerations and Instructions

7.1 In preparing the Proposal, the Bidder is expected to examine the RFP Document in detail. Material deficiencies in providing the information or documentation requested in the RFP Document may result in rejection of the Proposal.

7.2 All Bidders shall comply with the dates and amounts indicated in **Section 1** of this RFP.

7.3 The Bidders shall comply with and agree to all the provisions 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.

7.4 The Bidders shall be evaluated based on the requirements, criteria, norms and procedures laid out or included by reference, in this Section 3 of the RFP Document.

7.5 The Bidders shall be required to undertake the scope of work for the Project indicated in **Section 5** of the RFP Document.

7.6 The Bidder is expected to examine all instructions, forms, terms, and specifications in the RFP Document. Failure to furnish all information or documentation required by the RFP Document may result in the rejection of the Bid.

7.7 The Bidders must conform to the requirements and provide a list of equipment (including any special equipment) necessary to meet the technical specifications, functional & performance requirements as specified in the Section 5 of RFP Document as per the format provided in Form 17. The equipment supplied shall confirm to all the requirements under all applicable laws including any order issued by the central government including Order No No.9/16/2016-Trans-Part(2) dated 18 November 2020 and Order No. 11/05/2018-Coord. dated 17 September 2020 issued by Ministry of Power and Order No. F/No.6/18/2019-PPD by Ministry of Finance, Department of Expenditure, Public Procurement Division dated 23 July 2020 including any amendments or modifications to the same from time to time.

7.8 Bidder shall submit 'Clause by Clause' compliance to the RFP document including the AMISP Contract and the technical specifications and functional requirements (with amendments, if any) as per the format prescribed in Form 18.

7.9 Bidder's Proposal shall include sufficient information and supporting documentation in order to determine compliance without further necessity for inquiries.

7.10 The Bidder's Proposal shall clearly identify all features described in the specifications along with any supporting reference material in accordance with ITB 15.13 as per the format prescribed in Form 3.

7.11 An analysis of the technical specifications, functional and performance requirements of the AMI system as provided in Section 6 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 installing such items (at no additional cost to the Utility) such that a reliable and fully functional AMI system is implemented that meets or exceed the capacity and performance requirements. Such materials shall be deemed to be within the scope of the AMISP Contract. To the extent possible, the Bidder shall identify and include all such additional items in their proposal.

7.12 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.

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

7.14 Bid submitted by the Bidders before the Bid Submission Deadline, shall become the property of the Utility and shall not be returned to the Bidders.

7.15 The cost of all stamp duties payable for executing the RFP, Bid Documents or Project shall be borne by the Bidders.

7.16 No interest shall be paid to the Bidder on any amount submitted to Utility, whether to be returned or not.

**8. Cost of Bidding / Preparation of Proposal**

8.1 The Bidder shall bear all costs associated with the preparation and submission of its Proposal, including post-bid discussions, technical and other presentations etc., and Utility shall not be responsible or liable for those costs, regardless of the conduct or outcome of the selection process. Utility is not bound to accept any proposal, and reserves the right to annul the selection process at any time prior to Contract award, without thereby incurring any liability to the Bidder.

**9. Language**

9.1 Bid/Proposal prepared by the Bidders and all correspondence and documents relating to the Bid exchanged by the Bidder and Utility and its associates shall be written in the English language.

**10. Documents Comprising the Proposal and List of Forms**

10.1 The Proposal shall comprise the documents and forms mentioned in this Section in general and listed in **Section 4** and **Section 5** in particular. A Document Checklist for the same as well as the list of forms referred to in this RFP Document is provided in **BDS**.

**11. Only One Proposal**

11.1 Sole Bidder/ any Consortium Member or its Affiliates shall participate as a Member of only one Consortium. No Sole Bidder/ any Consortium Member or its Affiliates shall, directly or indirectly, become a party to submission of more than one Bid.

**12. Proposal / Bid Validity & Bid Security**

12.1 The Bid/ Proposal submitted by the Bidder(s) shall be valid for a period of specified in **BDS** reckoned from the Bid Submission Deadline specified in ITB 17 as may be extended from time to time.

12.1.1 All such offers, and terms and conditions set forth in this RFP shall be valid for the AMISP till the successful completion of the Project as certified by Utility.

12.1.2 In exceptional circumstance, Utility 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 extend the 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.

12.2 The Bidder shall furnish as part of its Technical Bid, a Bid security in original form, and in the amount specified in the **BDS**.

12.3 Pursuant to **ITB 12.2**, the Bid Security shall be a demand guarantee, and in any of the following forms, at the Bidder's option:

(a) an unconditional bank guarantee issued by any of the banks mentioned in **BDS**;

(b) Bid Security in other forms, if specified in the **BDS.**

In the case of a bank guarantee, the Bank Guarantee for Bid Security shall be provided by the Lead Consortium Member/ Sole Bidder in the format prescribed in Form 6 included in **Section 4**, Bidding Forms - Technical Proposal. The bid security shall be valid for 90 (ninety) Days beyond the end of validity period of the Bid specified in ITB 12.1. This shall also apply if the period of the Bid validity is extended.

12.4 Any Bid not accompanied by a substantially responsive Bid Security as specified, shall be rejected by the Utility as non-responsive.

12.5 If the Bid Security from any Bidder is forfeited or lapsed either partly or wholly during the Bid process, then such Bidders and Consortium are liable for rejection.

12.6 Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful bidder's signing the contract and furnishing the Performance Security pursuant to **ITB 29**.

12.7 The Bid Security of the Selected Bidder shall be returned as promptly as possible once the AMISP has signed the Contract with the Utility and furnished the required Performance Security.

12.8 The Bid Security may be forfeited if

12.8.1 the Bidder withdraws/ modifies/ substitutes its Bid during the period of Bid validity as specified in ITB 12.1 or any extension thereto provided by the Bidder;

12.8.2 bid is rejected for existence of conflict of interest or more than one bid being submitted by a Bidder;

12.8.3 bid submitted by a Consortium is not accompanied by Consortium Agreement in the form provided in this RFP.

12.8.4 The Selected Bidder:

12.8.4.1 fails to sign the AMISP Contract; or

12.8.4.2 fails to furnish a Performance Security in accordance with ITB 29; or

12.8.4.2 is found to have submitted false particulars/ fake documents; or

12.8.4.3 refuses to execute the work at its agreed scope/quoted rates, after Utility issues the Letter of Award;

12.8.4.4 is involved in incidents of manipulation of rates either by cartelization or otherwise.

**a. Extension of Proposal Validity**

12.8 Utility will make its best effort to complete the bidding process and award the contract prior to the date of expiry of the Bid/ Proposal validity. However, should the need arise, Utility may request, in writing, all Bidders who submitted Bids/Proposals

prior to the Bid Submission Deadline to extend the Proposals' validity.

12.9 If the Bidder agrees to extend the validity of its Proposal, it shall be done without any change in the original Proposal.

12.10 The Bidder has the right to refuse to extend the validity of its Proposal in which case such Proposal will not be further evaluated.

**13. Clarification and Amendment of RFP**

13.1 Bidders may seek clarifications on this RFP in writing, through a letter, fax or email to reach Utility no later than the period specified in **BDS**.

13.2 Utility may issue clarification only, at its sole discretion, which is considered reasonable by it.

13.3 Any such clarifications issued shall be sent to all the Bidders to whom the RFP has been issued. Any such clarification shall also be hosted on the website of the Utility and transmitted through the e-Procurement System mentioned in ITB 2.1.

13.4 Utility is not under any obligation to entertain/ respond to suggestions made or to incorporate modifications sought for.

13.5 For the avoidance of any doubt, it is hereby clarified that the Utility is not obliged to extend the Bid Submission Deadline on account of clarifications sought in accordance to ITB 13.4. .

13.6 During the bidding process, Utility, for any reason may modify the RFP, including the timelines, by issuance of addendum / modification / errata and / or a revised document.

13.7 Revisions or amendments in the bidding guidelines may cause Utility to modify amend or supplement the RFP to be in conformance with any applicable Law. Such document shall be notified in writing through the e-Procurement System mentioned in ITB 2.1, or letter or fax or e-mail to all the entities who have downloaded the RFP, and and the same shall be binding on them.

13.8 Utility 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 Utility 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 7 (seven) working days prior to the Bid Submission Deadline.

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

**14. Preparation of Bid/ Proposal and Bid Formats**

14.1 The Bidder shall prepare its Bid and furnish required information and documents as per the guidelines, formats, forms, schedules, fees, and other specification in this Section, as well as the RFP Document in general.

14.2 Strict adherence to the formats/ forms, 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 must be duly signed and stamped by the authorized signatory of the Bidder.

**15. Technical Bid/ Proposal Format and Content**

15.1 The Technical Bid/Proposal shall be prepared using the Forms provided in Section 4 of the RFP and shall comprise the information, details and documents listed in subsequent clauses herein The Technical Bid/ Proposal shall not include any financial information. A Technical Proposal containing material financial information shall be declared non-responsive.

15.2 The Technical Bid shall contain the list of all participating Consortium Members and Sub-contractor(s) (if applicable) participating in the Bid as per the format prescribed in Form 1. Furthermore, the Technical Bid shall contain a covering letter by the Lead Consortium Member/ Sole Bidder duly designated and signed by all Members of that Bidding Consortium as per the format prescribed in Form 9.

15.3 The Technical Bid shall contain a legally enforceable Consortium Agreement (in case Bidder is a 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 Form 9. In the absence of a duly

executed Consortium Agreement, the Bid shall not be considered for evaluation and will be rejected.

15.4 The Technical Bid shall contain Power of Attorney from each Consortium Member in favour of the Lead Consortium Member as per the format prescribed in Form 10. All submissions and representations by the Lead Member shall be deemed to be on-behalf of the entire consortium and shall be binding all the members of the Consortium.

15.5 In case a Sole Bidder or 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 Form 10.

15.6 The Lead Consortium Member/ Sole Bidder shall designate one person to represent the Bidding Consortium/ Bidder in its dealings with Utility. The person designated by the Lead Consortium Member/ Sole Bidder (registered Company) shall be authorized through a Power of Attorney as per Form 11 to perform all tasks including, but not limited to, providing information, responding to inquiries, signing of Bid on behalf of the Consortium, etc. and attach the same in the Technical Bid.

15.7 The Technical Bid shall contain signed Letter of Consent as per Form 12 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.

15.8 The Technical Bid shall contain the Tender Fees and the Bid Security as per the format prescribed in Form 6.

15.9 The Technical Bid shall contain all documents required to prove/ substantiate the Eligibility Requirement of the Bidders or the Bidding Consortium specified in ITB 6.1 and Section 2 and the Qualification Requirements specified in ITB 6.2 in BDS including (as per the format prescribed in Form 2):

a) Company profile document with evidence of fields of competence for each Consortium Member;
b) Attested copy of Certificate of Registration/ Incorporation issued by the Registrar of Companies for each Consortium Member/ Bidder;
c) Certificate of Commencement of Business issued by

the Registrar of Companies for Lead Consortium Member/ Sole Bidder clearly indicating the number of years of operation.

15.10 The Bidder shall submit a preliminary Project implementation plan along with the Bid which shall include at least the following activities (as per the format prescribed in Form 3).

15.11 In case of Award of the AMISP Contract, the detailed Project implementation plan, submitted as part of the Technical Bid, shall be revised and submitted by the AMISP, in consultation with the Utility, to ensure smooth takeover of existing Utility systems and any ongoing Services under the scope of the AMI Project.

15.12 The Technical Bid of the Bidder shall contain the detailed Bill of Quantities (BOQ) in the format prescribed in Form 15 without any mention of costs/ prices.

15.13The BOQ shall be accompanied by the detailed specifications of the supply in the Technical Bid demonstrating responsiveness of the quoted Solution. The Bidder shall also indicate the country of origin of each equipment in Form 15. For supply of equipment / material from the country of origin other than India, the bidder shall submit performance certificate in support of satisfactory operation in India or a country other than the country of origin having climatic and operational conditions including ambient temperature similar to that of India for more than number of years, indicated in **BDS** in accordance with Order No. 11/05/2018-Coord. dated 17 September 2020 issued by the Ministry of Power including any amendments or modifications to the same from time to time.

15.14 The Technical Bid of the Bidder shall contain the names and details of the suitably qualified Bidder's representative and Key Personnel to perform the AMISP Contract as per the format provided in Form 4. The data on their experience should be supplied using the Form 5 for each candidate proposed.

15.15 Any removal/ change/ replacement of Key Personnel (as provided in Form 4 and 5) shall be notified to Utility within 7(seven) working days along with the Curriculum Vitae (CV) of the personnel replacing the previous personnel.

Note: Submission of the Technical Proposal in a wrong format may lead to the Proposal being deemed non-responsive to the RFP requirements.

**16. Financial Bid/ Proposal Format and Content**

16.1 The Financial Proposal shall be prepared using the Forms provided in Section 5 of the RFP and shall comprise the information, details and documents listed in subsequent clauses herein.

16.2 The Financial Bid shall only be submitted electronically as per the format prescribed in Form 16. No hard copy of the Financial Bid shall be submitted.

16.3 The Financial Bid shall include only the cost of different meter types that are required for 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. The Financial Bid will be evaluated basis the total cost of the Project as quoted by the Bidder(s) for the Contract Period in Form 16.

16.4 The Bidder shall quote the AMISP Service Charge for each meter type for the Contract Period on INR per meter per month basis in line with the payment schedule as provided in the AMISP Contract. The Financial Bid shall be quoted in both 'numbers' and 'words'. In case of any discrepancy between the quoted Financial Bid in 'numbers' and 'words', the quoted Financial Bid in 'words' will prevail over the quoted Financial Bid in 'numbers'. The value of lumpsum payment for each meter type is indicated in **BDS**. While providing the financial quote, the Bidder must consider the lump-sum payment to AMISP on completion of Operational Go-Live of the AMI system. The AMISP shall accordingly quote the AMISP Service Charge for Contract Period.

16.5 Unit prices (exclusive of all taxes/ duties/ levies/ cess etc.) (as provided in Form 16) quoted by the Bidder shall be firm and final and shall remain constant throughout the Contract Period and shall not be subject to any modifications.

16.6 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 the AMISP Contract, shall be borne by the Bidder with no financial liability on Utility.

16.7 Any scope of work required for expansions during the Contract Period shall be supplied by the AMISP keeping the specifications and unit price same as per the BoQ (as provided in Form 15) and Financial Bid (as provided in Form 16), respectively.

16.8 All prices in the Financial Bid shall be quoted in Indian Rupees. The Bidder shall bear the risk related to foreign exchange variations during the Contract Period. The variation in the statutory taxes will be in accordance to the AMISP Contract.

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

## C. Submission, Opening and Evaluation

### 17. Submission of Bids/ Proposals and Bid Submission Deadline

**(a) Submission of Bids/ Proposals**

17.1 Both Technical Bid and Financial Bid shall be digitally signed and submitted electronically using the e-Procurement system syndicated in ITB 2.2 on or before the Bid Submission Deadline following the instructions therein. All the documents shall be scanned and uploaded however, where the data is required to be entered manually, the same shall be entered accordingly by the Bidder .

17.2 Requisite Tender Fee and Bid Security in the specified form/ instrument shall be submitted in original so as reach before the Bid Submission Deadline, failing which the Bid shall be deemed non-responsive.

17.3 In addition to the electronic submission and submission of Tender Fee and Bid Security in the specified form/ instrument in original as per ITB 17.2, if so specified in **BDS,** the Bidder shall also provide certain document in original/ hard copy/(ies) of the original/ revised (if any) in a sealed envelope before the Bid Submission Deadline.

17.4 The hard copies to be submitted as per ITB 17.3 shall be in original and/ or attested as may be specified in **BDS**.

17.5 The hard copy of the document as per ITB 17.2 and ITB 17.4 above shall be sent in a sealed envelope to Utility via Registered Post with Acknowledgement Due (RPAD), speed post or courier in the manner specified in ITB 17.4.3, which should reach Utility before the Bid Submission Deadline.

17.6 The sealed envelope shall be clearly marked on the top with details mentioned in **BDS**. The sealed envelope shall be addressed to the Utility as specified in **BDS**. The sealed envelope shall also clearly mention the name of the Lead Consortium Member/ Sole Bidder submitting the Bid.

17.7 The sealed envelope shall not contain the Financial Bid. The Financial Bid shall only be submitted electronically.

17.8 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.

17.9 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.

17.10 All Bids shall be electronically submitted and physically received, as may be specified in this Section, by Utility no later than the Bid Submission Deadline indicated in **BDS** as may be extended from time to time by the Utility.

**(b) Bid Submission Deadline**

17.11 Bidders may prepare, edit, substitute or withdraw their offers any number of times online before the Bid Submission Deadline as may be permitted by the e-Procurement system. 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 entertained.

17.12 Any Bid received by Utility, either electronically or physically, after the Bid Submission Deadline prescribed by Utility will not be uploaded and accordingly be rejected. In case of hard copy submissions, late Bids shall be returned unopened to the Bidder.

17.13 Utility 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 Utility and the Bidders shall thereafter be subject to the deadline as extended.

17.14 Any Proposal or its modification received by Utility after the deadline through any means or medium, whatsoever, shall be declared late and rejected, and promptly returned unopened.

**18. Confidentiality**

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

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

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

**19. Opening of Technical Bids/ Proposals**

19.1 The Technical Bids shall be opened at the date and time, and the address indicated **BDS**. In case hard copy submission of Technical Bid or certain document is requested by the Utility as per ITB 17 the physically submitted Technical Bids/ documents in the sealed envelope shall be opened simultaneously to check interalia requisite submissions and for the Tender Fees and the Bid Security.

19.2 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 Utility to the Bidders.

19.3 Utility shall then separately evaluate the Bids with respect to the Eligibility and Qualification Requirements, , sufficiency of the submission, conformation/ compliance/ responsiveness to all the mandatory requirements, terms, conditions, and

specifications of the RFP Document without any deviation, reservation, or omission, and other parameters outlined in this RFP.

19.4 The Financial Proposal shall remain unopened in the e-Procurement/ e-Tendering system securely, until they are opened in accordance with ITB 22.

19.5 At the opening of the Technical Proposals the following shall be read out: (i) the name of the Bidder; (ii) any modifications to the Proposal submitted through the e-Procurement/ e-Tendering system prior to proposal submission deadline; and (iii) any other information deemed appropriate.

**20. Bid/ Proposals Evaluation Overview and Verification/ Clarifications**

20.1 The bidding process is designed to select the AMISP through a series of assessment of: (i) conformation/ compliance to all the mandatory requirements under applicable laws and this tender, terms, conditions, and specifications of the RFP Document without any deviation, reservation, or omission; and (ii) the financial amounts quoted by the Bidder. The Bid submitted by the Bidder shall consist of a Technical Bid and a Financial Bid.

**First Stage-Fulfillment of Eligibility Requirement, Qualification Requirement and determination of substantial responsiveness to the RFP Documents:** The Technical Bids shall be opened by Utility and be checked to determine (i) whether the Bidders comply with the Eligibility Requirements, have offered eligible AMI Services in their Bids, as specified in ITB 3.1 and Section 2; (ii)whether the Bidders meet the Qualification Requirement specified in ITB 3.2 in BDS; (iii) whether the Bids are substantially responsive to the RFP document including the requirements specified in Section 7 basis 'Clause by Clause' compliance to the RFP Document including the technical specifications and functional requirements (with amendments, if any) as per the format prescribed in Form 18

**Second Stage-Opening of Financial Bid:** Financial Bids of all technically qualified Bidders would be opened, basis which the award of AMISP Contract shall be determined.

**Third Stage-Award of Project:**

The "Successful Bidder" as defined in ITB 25 shall be awarded the AMISP Contract.

20.2 The Bidder is not permitted to alter or modify its Bid/ Proposal in any way after the Bid Submission Deadline.

20.3 Utility's determination of the responsiveness of a pBid/ Proposal is to be based on the contents of the Proposal itself including any response to clarifications sought by Utility which does not alter the substance of the Proposal or the price.

20.4 A responsive Proposal is one that conforms to all the mandatory requirements, terms, conditions, and specifications of the RFP Document without any material deviation, reservation, or omission as defined in ITB 24.1.

20.5 The Contract, if awarded, shall be executed in accordance with RFP document and any other conditions.

20.6 Notwithstanding anything stated in the RFP Document, Utility reserves the right to verify the authenticity of the documents submitted for meeting the eligibility, qualification and/or other specified requirements and may request for clarifications any additional information/ documents from the Bidder. However, the Bidder shall not be permitted to alter the substance of the Proposal or the price under any circumstances whatsoever

20.7 Utility 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 eligibility, qualification and/ or other specified requirements.

20.8 Utility 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.

20.9 To assist in the examination, evaluation, comparison and post-qualification of the Bids, Utility 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 Utility shall not be considered. Utility's request for clarification and the response shall be in writing. No change in the prices shall be sought, offered, or permitted by Utility in the evaluation of the Financial Bids.

**21. Evaluation of Technical Bids/ Proposals**

21.1 All Bids will first be evaluated for 'Clause by Clause' compliance to the RFP document and the AMISP Contract including the technical specifications and functional requirements (with amendments, if any) as per the format prescribed in Form 18. The Bidders fulfilling the Eligibility and the Qualification Requirement as well as conforming to all the mandatory requirements, terms, conditions, and specifications of the RFP Document without any material deviation, reservation, or omission, shall qualify for the opening of Financial Bid.

21.2 In the event the Technical Bid is responsive, Utility may waive any deviation, reservation, or omission in the Bid as defined in ITB 24.1, if the same is not material to the evaluation of the Bid.

21.2.1 Provided that a Technical Bid is responsive, Utility 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.

**22. Opening of Financial Proposals**

22.1 At the completion of the technical evaluation, Utility shall intimate the technically qualified Bidders for opening of Financial Bids, along with the date, time and venue of opening of Financial Bids.

22.2 The Financial Bids shall be opened through the e-Procurement system referred to in ITB 2.2, in the presence of authorized representatives of all technically qualified Bidders who chose to be present at the specified venue on the specified date and time.

**23. Evaluation of Financial Bids/ Proposals**

23.1 Provided that the Technical Bid is responsive, Utility will correct arithmetical errors during evaluation of Financial 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 Utility 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.

Except as provided in (i) to (iii) herein above, Utility shall reject the Financial Bid if the same contains any other computational or arithmetic discrepancy or error.

**24. Deviations, Reservations and Omissions**

24.1 During the evaluation of Bids/ Proposals, the following definitions apply:

(a) "Deviation" is a departure from the requirements specified in the RFP document;

(b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the RFP document; and

(c) "Omission" is the failure to submit part or all of the information or documentation required in the RFP document.

25. **Successful / Selected Bidder**

25.1 The price as per the Financial Proposal/ Bid of all technically qualified Bidders, determined upon evaluation of Financial Proposals/ Bids, shall be the basis for determination of the Successful Bidder/ Selected Bidder.

25.2 The technically qualified Bidder with the lowest Financial Bid shall be considered as the Successful Bidder/ Selected Bidder and shall be considered for award of the AMISP Contract.

25.3 If the Successful Bidder/ Selected Bidder does not accept the correction of errors as per ITB 23.1, its Bid shall be disqualified, and its Bid Security shall be forfeited.

## D. Award of Contract

**26. Award Criteria**

26.1 Subject to ITB 25.3, the Utility shall award the Contract to the Successful Bidder/ Selected Bidder .

26.2 Utility shall present the Letter of Award (as per the format prescribed in Form 20) to the Successful Bidder and invite the Performance Security in order to sign the AMISP Contract to implement the Project.

26.3 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

26.4 If for any reason the Bid of the Successful Bidder is rejected or Letter of Award issued to the Successful Bidder is cancelled, Utility is empowered to take decisions for any of the following:

i. Consider the next lowest evaluated Bid from eligible and qualified Bidder whose bid is determined responsive ; or
ii. Annul the Bid process; or
iii. Take any such measure as may be deemed fit in the sole discretion of Utility, as applicable.

**27. Utility's Right to Vary Quantities at the time of Award**

27.1 At the time the AMISP Contract is awarded, the quantity provided by the AMISP in the BoQ (as provided in Form 15) and the Financial Bid (as provided in Form 16) shall not be modified. However, Utility reserves the right to increase or decrease the number of items under the AMISP Contract subject to the limit of - 20% (twenty percent) up to +30% (thirty percent) of the existing number of items, covered under the AMISP Contract, without any change in the unit prices or other terms and conditions of the AMISP Contract and the Bid.

**28. Letter of Award**

28.1 Prior to the expiry of the period of Bid validity, Utility shall notify the successful Bidder, in writing, by issuing the Letter of Award, that its Bid has been accepted.

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

**29. Signing of Contract and Contract Performance Security**

29.1 Within 21 (twenty-one) Days of receipt of the Letter of Award, the successful Bidder shall sign the AMISP Contract.

29.2 Within 14 (fourteen) Days of the receipt of Letter of Award from Utility, the Successful Bidder shall furnish the Performance Security, using for that purpose the format of Performance Security given in Form 19. Immediately upon furnishing of Performance Security, AMISP may request the Utility to execute the AMISP Contract.

29.3 Failure of the Successful Bidder to submit the above-mentioned Performance Security or sign the AMISP Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event Utility may award the AMISP Contract to the next lowest Bidder.

## E. Bid Data Sheet

| ITB Reference | A. General Provisions |
|---|---|
| **1.1 (e)** | **Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis** |
| **1.1 (cc)** | RFP/ Tender No **CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22** |
| **1 (mm)** | ***SOUTHERN POWER DISTRIBUTION COMPANY OF A.P. LIMITED,*** 19-13-65/A, Near Srinivasa Kalyanamandapams, Tiruchanoor Road, Tirupati-517503 |
| **2.2** | Bidding against RFP shall be conducted through/ with Electronic – Procurement (e- Procurement/ e- Tendering) System.<br>Utility shall use the following Electronic-Procurement system to manage this Request for Proposal (RFP) process:<br>***www.apeprocurement.gov.in***<br>The electronic-procurement system shall be used to manage the following part of the RFP process:<br>***[e.g. issuing RFP, corrigendum/ addendums, submissions of Proposals, opening of Proposals etc.]***<br>To aid and facilitate the Bidders on e-Procurement/ e-Tendering process a detailed manual on the same titled **Bidder Help Manual for e-Bidding** has been provided annexed to the Bid Data Sheet as **Annexure I (BDS)**. The same may be utilized by the Bidders. |
| **2.2.2** | **Chief General Manager/Projects**<br>**APSPDCL**<br>19-13-65/A, Near Srinivasa Kalyanamandapams,<br>Tiruchanoor Road, Tirupati-517503<br>Ph: +91-8332999180 (Mobile)<br>e-mail: cgmprojects@gmail.com |
| **2.3** | The name of the Contract is : **Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR** |

| | |
|---|---|
| | **Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis** |
| **2.4** | Standard brief regarding detail of existing systems relevant to the AMI Project:<br>i. ***1 No. AMI Solution for* 3000 Nos. (approx.) Meters with Cloud Based Service.**<br>ii. **1 No. billing System based on JAVA, ORACLE and AIX/LINUX.**<br>iii. **1 No. Collection System based on JAVA, ORACLE and AIX/LINUX.**<br>iv. **1 No. Customer Service Center and 1 No. Customer Care Center based on JAVA, ORACLE and AIX/LINUX.**<br>v. **1 No. Outage Management System (OMS) with JAVA/MySQL.**<br>vi. **1 No. Energy Audit System with Servers based on ORACLE/MySQL with AIX/SUSI LINUX.**<br>vii. **1 No. SAP System with ERP supplied by SAP India.**<br>viii. **1 No. SCADA-DMS System with OSI Software (at Nellore)**<br>ix. **1 No. GIS System (ArcGIS) for integrating/sharing GIS details of the Smart Meters.** |
| **2.6** | **A Pre-Bid Meeting will be held as per the details below.**<br><br>**[Date of Pre-Bid Meeting:** 08.10.2021<br>**Time:** 11:00 AM<br>**Address:** 19-13-65/A, Near Srinivasa Kalyanamandapams, Tiruchanoor Road, Tirupati-517503<br>**Telephone:** +91-8332999180 (Mobile)<br>**E-mail:** cgmprojects@gmail.com<br>**Contact person/Meeting coordinator:** General Manager/Projects]<br><br>*Due to prevailing COVID-19 conditions and as per the applicable directives and SoP, if so necessitated the pre-bid meeting may be held over a Video Conferencing, Link for which will be made available seven days prior to holding this meeting at Utility website www.apspdcl.in or www.apeprocurement.gov.in (Corrigendum)* |
| 2.8 | Form 7: Format for Sending Query to Utility<br><br>*[Query may be sent in hard copy to the Nodal Officer of Utility, at the below-mentioned address AND/ OR via email to E-mail ID]*<br>**RFP/ Tender No CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**<br><br>From:<br>[Address of the Bidder]<br>[Telephone No., Fax No., Email]<br>[Date]<br><br>To: |

*Chief General Manager/Projects/APSPDCL*
19-13-65/A, Near Srinivasa Kalyanamandapams, Tiruchanoor Road,
Tirupati-517503
**e-mail: cgmprojects@gmail.com**

**Sub: Query.**
***Ref**:* **Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis**
**RFP/ Tender No CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**

Dear Sir/ Madam,
Please find below our query with respect to the RFP subject to the terms and conditions therein:

| Sr. | RFP / AMISP Contract | Reference Clause No. | Page No. | Query |
|---|---|---|---|---|
| 1. | | | | |
| 2. | | | | |

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

| | |
|---|---|
| **6.2** | Qualification of Bidder will be based on meeting the minimum requirements specified in Qualification Requirements, annexed to the Bid Data Sheet as **Annexure II (BDS)**, regarding the Bidder's technical experience and financial requirement as demonstrated by the Bidder's responses in its Technical Bid. |
| **B. Preparation of Proposals** | |

**10.1**

## Document Checklist and List of Forms

| Sr. No | Document | RFP Section Reference |
|---|---|---|
| 1. | Tender Fee | 1,3 |
| 2. | List of Consortium Members and Subcontractor(s) (as applicable) as per the format prescribed in Form 1 | 4 |
| 3. | Bidder Information as per the format prescribed in Form 2 | 4 |
| 4. | Project Implementation Plan as per format provided in Form 3 | 4 |
| 5. | Curriculum Vitae of key personnel as per format provided in Form 4 and Form 5 | 4 |
| 6. | Bid Security in the form of Demand Draft or Bank Guarantee as per format prescribed in Form 6 | 4 |
| 7. | Covering Letter for Submission of Bid by Sole Bidder / Lead Consortium Member as per format prescribed in Form 8 | 4 |
| 8. | Consortium Agreement Format entered amongst all Members of the Bidding Consortium as per format prescribed in Form 9 | 4 |
| 9. | Power of Attorney by each Consortium Member in favour of Lead Consortium Member as per format prescribed in Form 10 | 4 |
| 10. | Power of Attorney by Lead Consortium Member/ Sole Bidder authorizing an Individual Designated Representative for the Consortium/ Bidder as per the format prescribed in Form 11 | 4 |
| 11. | Letter of Consent by each Consortium Member reviewing each element of the Bid as per format prescribed in Form 12 | 4 |
| 12. | **For Lead Member in case of Consortium Bidding / Sole Bidder Experience [Refer Clause 1.0 in Annexure II(BDS)]:**<br>i. References along with requisite contract/ Purchase Order (PO)/ Work Order (WO). The references should indicate client name, scope of work, Project start date (as per the format prescribed in Form 14);<br>ii. Documentary evidence of Project completion such as client completion certificate, proof of payment received and client certificate of delivery of material, proof of asset capitalized in books of accounts (as applicable)/ and similar proofs along with contact details of the client. | 4 |
| 13. | **For System Integration Experience [Refer Clause 1.2 in Annexure II(BDS)]:**<br>i. References along with requisite contract/ Purchase Order (PO)/ Work Order (WO). The references should indicate client name, scope of work, Project start date (as per the format prescribed in Form 14);<br>ii. Documentary evidence of completion of the Project or completion of Go-Live status (i.e. Go-live certificate, | 4 |

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<tr><td></td><td>UAT testing certificate etc.) or other documentary evidence indicating completion (e.g. proof of payment received and client certificate for supply of material or similar proofs) along with contact details of the client;<br>iii. Client certificate and other documentation for implementation performance/ operation.</td><td></td></tr>
<tr><td>14.</td><td>For Financial Strength [Refer Clause 1.2 in Annexure II(BDS)]: Audited Annual financial statements, Balance Sheet and P&L Account of all Consortium Members/ Sole Bidder for the respective Financial Years as per the format prescribed in Form 13</td><td>4</td></tr>
<tr><td>15.</td><td>Bill of Quantities as per format provided in Form 15</td><td>4</td></tr>
<tr><td>16.</td><td>Financial Bid as per format provided in Form 16</td><td>5</td></tr>
<tr><td>17.</td><td>Data Requirement Sheet as per format provided in Form 17</td><td>4</td></tr>
<tr><td>18.</td><td>Table of Compliance as per format provided in Form 18</td><td>4</td></tr>
<tr><td>19</td><td>Performance Security as per the format prescribed in Form 19</td><td>8</td></tr>
<tr><td>20.</td><td>Letter of Award as per the format prescribed in Form 20</td><td>8</td></tr>
<tr><td>21</td><td>Copy of this RFP with sign and official seal on every page</td><td>1 to 8</td></tr>
<tr><td>22</td><td>Format for Sending Query to Utility for clarification</td><td>3</td></tr>
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</td></tr>
<tr><td>12.1</td><td>The Bid shall remain valid until i.e. upto and including 180 days reckoned from the Bid Submission Deadline specified in ITB 17, as may be extended by the Utility.</td></tr>
<tr><td>12.2</td><td>Currency and the amount of Bid Security to be furnished by the Bidder is :<br>[ Currency: INDIAN RUPEE] [ Amount: …Rs. 0.96 Crores]</td></tr>
<tr><td>12.3(a)</td><td>Banks by whom Bank Guarantee is required to be issued:<br>Nationalized/Scheduled bank</td></tr>
<tr><td>12.3(a)</td><td>Bid Security may be furnished in other forms mentioned below:<br>Online Payment (or) in the form of DD in favor of Pay Officer/APSPDCL/Tirupati</td></tr>
<tr><td>13.1</td><td>Clarifications may be requested no later than 7 days prior to Bid Submission Deadline.<br>Request to be sent at:<br><br>O/o Chief General Manager/Projects/APSPDCL, 19-13-65/A, Near Srinivasa Kalyanamandapams, Tiruchanoor Road, Tirupati – 517503<br>Contact Person: P. Ayub Khan, Designation: General Manager<br>Phone No.: +91-8332999985 (Mobile)</td></tr>
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| | |
|---|---|
| | **e-mail: cgmprojects@gmail.com** |
| **15.13** | Number of years : 18 Months for Completion & 90 Months for total duration. |
| **16.4** | Value of lump-sum payment for each meter type is as indicated below:<br>***NIL*** |
| **C. Submission, Opening and Evaluation** | |
| **17.3** | Bidder shall provide the following document in original/ hard copy :<br>**Bank Guarantee/Demand Draft taken against Bid Security** |
| **17.4** | The following documents shall be submitted in original:<br>**Bank Guarantee/Demand Draft taken against Bid Security**<br>The copies of the following documents shall be duly attested as specified:<br>**Documents related to Eligibility (Technical, Financial and others if any) as specified in Form 2: Bidder Information** |
| **17.6** | Details to be marked on the sealed envelope:<br>**RFP/ Tender No CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**<br>**Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis.**<br>*Bid Submission Deadline: 22.10.2021 @ 3:00 PM*<br>*Time and Date of Bid Opening: 22.10.2021 @ 4:00 PM*<br>*Name of the Lead Consortium Member/ Sole Bidder submitting the Bid:*<br>**Sealed Envelope(s) to be addressed to:**<br>O/o Chief General Manager/Projects/APSPDCL, 19-13-65/A, Near Srinivasa Kalyanamandapams, Tiruchanoor Road, Tirupati – 517503<br>**Contact Person: P. Ayub Khan, Designation: General Manager**<br>**Phone No.: +91-8332999985 (Mobile)** |
| **17.10** | The Bid Submission Deadline is:<br>Date: ***22.10.2021***<br>Time: *3:00 PM* |
| **19.1** | The Technical Bids/ Proposals shall be opened as indicated below:<br>The opening shall take place at:<br>O/o Chief General Manager/Projects/APSPDCL, 19-13-65/A, Near Srinivasa Kalyanamandapams, Tiruchanoor Road, Tirupati – 517503<br>**Date**: **22.10.2021** |

| | |
|---|---|
| | **Time: 04:00 PM**<br>Due to prevailing COVID-19 conditions if necessitated and, the bid opening meeting may be held over a Video Conferencing, Link for which will be made available at least 7 Days prior to the Bid Opening event, at Utility website www.apspdcl.in or **www.apeprocurement.gov.in (Corrigendum)** |

## Annexure I (BDS)

**Bidder Help Manual for E-Bidding**

**HELP LINE TO VENDORS**

**www.apeprocurement.gov.in/helpdesk.html**

Phone No: **08645 - 246370/ 71/ 72/ 73/ 74**

e-mail Support: eprocsupport@vupadhi.com

## Annexure-II (BDS)

### Qualification Requirements for Bidders

1.0 Qualification Requirement (QR)

The Bidder can be an individual entity or a consortium of entities meeting the QR. In case of a consortium, one of the consortium members shall be designated the Lead Consortium Member/Lead Bidder.

The Bidder may seek qualification on the basis of technical and financial capability of its Parent(s) and/ or its Affiliate(s) for the purpose of meeting the qualification requirements. Authorization for use of such technical or financial capability shall have to be provided from its Parent(s) and/or Affiliate(s). The technical and financial capability of a particular entity, including its Parent(s) and/or Affiliate(s), shall not be used by more than one Bidder.

The determination of the relationship of Parent(s) and/or Affiliate(s) with the Bidder shall be on the date 7 (seven) Days prior to the Bid Submissions Deadline. Documentary evidence to establish such relationship shall be furnished by the Bidder along with the Technical Bid.

The determination of the relationship of Parent(s) and/or Affiliate(s) with the Bidder shall be on the date 7 (seven) days prior to the last date of submission of the Bid. Documentary evidence to establish such relationship shall be furnished by the Bidder along with the

| Bid. S. No. | Requirements | Supporting Documents |
|---|---|---|
| **Technical Requirements** | | |
| 1. | Sole/ Lead Bidder must have either:<br><br>(a) Executed & received payments for construction of Eligible Project(s);<br>Or<br>(b) received payments for development of Eligible Project(s)<br><br>in the power/telecom sector in the last 5 (five) Financial Years with aggregate project value of not less than ***INR Rs. 38 Crores***. However, the project cost of each Eligible Project shall not be less than ***INR Rs. 9.5 Crores***; | a) References along with requisite contract/ Purchase Order (PO)/ Work Order (WO). The references should indicate client name, scope of work, Project start date (as per the format prescribed in Form 14);<br>b) Documentary evidence of completion of the Project or completion of Go-live status (i.e. Go-live certificate, UAT testing certificate etc) or other documentary evidence indicating completion (e.g. proof of payment received/ proof of asset capitalized in books of accounts (as applicable) and client certificate for supply of material or |
| 2. | Sole/ Lead Bidder/ any other Consortium Member must have experience of integration of head-end system with MDM on standard interfaces and data exchange | |

| | | |
|---|---|---|
| | models for at least [20,000] consumers (cumulatively) in an Indian/ Global Utility (power/ telecom) in the last 5 (five) years which are in operation for at least 1 (one) year.<br>**OR**<br>Sole/ Lead Bidder/ / any other Consortium Member should have installed, integrated, tested and commissioned control centre hardware and application software for at least [50,000] endpoints (cumulatively) in an Indian/ Global Utility (power/ telecom) in last 5 (five) years which are in operation for at least 1(one) year | similar proofs) along with contact details of the client;<br>c) Client certificate and other documentation for implementation performance/ operation |
| **Financial Requirements** | | |
| 3. | The Bidder shall have positive net worth for each of the last three financial years. The Networth of the Bidder should be at least ***Rs. 29 Crores*** in any of the last three Financial Years<br>*Or*<br>Bidder shall have a minimum ACI of ***Rs. 29 Crores*** at the close of the preceding financial year<br>*[Net Worth means sum total of the paid up capital and free 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.].*<br>*[ACI means minimum investible funds (i.e. immediately available funds for investment and callable capital) subject to the limits of investment in a single investee entity (in the relevant jurisdiction for a Foreign Investment Fund, or the maximum permissible investment limit for an AIF) (as per the SEBI (AIF) Regulations, 2012, as may be amended from time to time), as applicable].*<br>Please note:<br>a. In case a Bidder and/(or) it's Parent(s)/ Affiliate(s) has issued any fresh equity | Audited Annual financial statements, Balance Sheet and P&L Account for the respective Financial Years as per the format prescribed in Form 13 |

| | | |
|---|---|---|
| | capital during the current financial year, the same shall be permitted to be added to the Bidder's Net Worth subject to the statutory auditor of the Bidder certifying to this effect.<br>b. In case a Bidder and/(or) it's parent(s)/ Affiliate(s), being a SEBI registered AIF or Foreign Investment Fund, has received any fresh capital commitment available for the immediate deployment during the current financial year, the same shall be permitted to be added to the Bidder's ACI subject to the statutory auditor of the Bidder certifying to this effect | |
| **Additional Requirements** | | |
| 4. | In addition to the above qualifying requirements, the Bidder shall comply with all applicable laws including the guidelines issued in the Public Procurement (Preference to Make in India) Notification to provide for purchase preference (linked with local content) in respect of Power Distribution Sector vide Order No. 11/05/2018-Coord. published by the Ministry of Power, Government of India dated 17 September 2020 including any amendments or modifications to the same from time to time. | |
| 5. | The selected Bidder should arrange for Type testing of the Sample meters in NABL accredited laboratory and should pass the Type tests as per specifications. The Letter Of Award (LOA) will be issued only after completion of successful Type testing of sample meters. | |

**1.1. For the purposes of satisfaction of Technical Requirement, the following shall apply:**

a) Eligible Projects, as referred in Technical Requirement, shall mean works contracts for developing asset/ facility in India or abroad which involve building/ installing, and commissioning/ go-live such asset/ facility but shall not include any assignment where the scope is limited to only (i) supply of goods or (ii) supply of manpower;

b) Projects that have achieved completion/ or have achieved commissioning/ go-live as identified in the Project document(s) at least 7 (seven) Days prior to the Bid Submission Deadline shall be considered.

c) The entity claiming experience must have either executed such projects itself or must own at least 26% of the shareholding in the company that has executed the project(s) up to the date of commissioning of such project.

d) For the purpose of clause a and b above the Eligible Project(s) in the

i. power sector shall mean projects relating to generation or transmission or distribution of electricity;

ii. water sector shall mean projects relating to water treatment including desalination or water supply (rural or urban) or wastewater / sewerage or drainage or water pipelines; - ***Not Applicable***

iii. natural gas sector shall mean projects relating to natural gas transmission or distribution; ***Not Applicable***

iv. telecom sector shall mean projects relating to infrastructure cabling or communication systems for setting up Wide Area Network (WAN) or Local Area Network (LAN) or Internet Services or VOIP solutions, etc

**1.2. For the purposes of satisfaction of Financial Requirement, the following shall apply:**

a. In the event Bidder is a Consortium, the financial requirement shall be met individually and collectively by all the Members in the Bidding Consortium. The financial requirement to be met by each Member of the Bidding Consortium shall be computed in proportion to the shareholding pattern indicated in the Consortium Agreement *[or equity commitment made by each of them for investment in the Project]*

b. The Lead Consortium Member/ Lead Bidder shall meet not less than 51% of the minimum financial requirement criteria given in the table under clause no. 1.0 above;

c. While, each of the other Consortium Member(s) that have committed equity contribution of atleast 26% in the consortium agreement, shall meet not less than same proportion of he minimum financial requirement criteria given in the table under clause no. 1.0 above.

# SECTION 4. BIDDING FORMS- TECHNICAL PROPOSAL

## CHECKLIST OF REQUIRED FORMS

This Checklist shall be filled in and submitted by the bidder along with the Technical Bid. Except Form 16 (to be completed and submitted by the Bidder in the Financial Bid) all other documents/ forms duly filled and complete in all respect are to be submitted by the Bidder in the Technical Bid.

| Sr. | Document | Attached? (Yes/ No) | For Official Use |
|---|---|---|---|
| 1. | Tender Fee | | |
| 2. | List of Consortium Members and Subcontractor(s) (as applicable) as per the format prescribed in Form 1 | | |
| 3. | Bidder Information as per the format prescribed in Form 2 | | |
| 4. | Project Implementation Plan as per format provided in Form 3 | | |
| 5. | Curriculum Vitae of key personnel as per format provided in Form 4 and Form 5 | | |
| 6. | Bid Security in the form of Demand Draft or Bank Guarantee as per format prescribed in Form 6 | | |
| 7. | Covering Letter for Submission of Bid by Sole Bidder / Lead Consortium Member as per format prescribed in Form 8 | | |
| 8. | Consortium Agreement Format entered amongst all Members of the Bidding Consortium as per format prescribed in Form 9 | | |
| 9. | Power of Attorney by each Consortium Member in favour of Lead Consortium Member as per format prescribed in Form 10 | | |
| 10. | Power of Attorney by Lead Consortium Member/ Sole Bidder authorizing an Individual Designated Representative for the Consortium/ Bidder as per the format prescribed in Form 11 | | |
| 11. | Letter of Consent by each Consortium Member reviewing each element of the Bid as per format prescribed in Form 12 | | |
| 12. | **For Lead Member in case of Consortium Bidding / Sole Bidder Experience [Refer Clause 1.0 in Annexure II(BDS)]:**<br>iii. References along with requisite contract/ Purchase Order (PO)/ Work Order (WO). The references should indicate client name, scope of work, Project start date (as per the format prescribed in Form 14);<br>iv. Documentary evidence of Project completion such as client completion certificate, proof of payment received and client certificate of delivery of material, proof of asset capitalized in books of accounts (as applicable)/ and similar proofs along with contact details of the client. | | |
| 13. | **For System Integration Experience [Refer Clause 1.2 in Annexure II(BDS)]:**<br>i. References along with requisite contract/ Purchase Order (PO)/ Work Order (WO). The references should | | |

| Sr. | Document | Attached? (Yes/ No) | For Official Use |
|---|---|---|---|
| | indicate client name, scope of work, Project start date (as per the format prescribed in Form 14);<br>ii. Documentary evidence of completion of the Project or completion of Go-Live status (i.e. Go-live certificate, UAT testing certificate etc.) or other documentary evidence indicating completion (e.g. proof of payment received and client certificate for supply of material or similar proofs) along with contact details of the client;<br>iii. Client certificate and other documentation for implementation performance/ operation. | | |
| 14. | **For Financial Strength [Refer Clause 1.2 in Annexure II(BDS)]:** Audited Annual financial statements, Balance Sheet and P&L Account of all Consortium Members/ Sole Bidder for the respective Financial Years as per the format prescribed in Form 13 | | |
| 15. | Bill of Quantities as per format provided in Form 15 | | |
| 16. | Data Requirement Sheet as per format provided in Form 17 | | |
| 17. | Table of Compliance as per format provided in Form 18 | | |
| 18. | Copy of this RFP with sign and official seal on every page | | |
| 19. | Financial Bid as per format provided in Form 16 | | |

### Form 1: List of Consortium Members/ Sub-Contractor(s)

*[The Bidder shall identify below the Consortium Members/ Sub-contractor(s) for major Project items. For sub-contractor a Letter of Intent must be provided.]*

| Major Project Item | Proposed Consortium Member / Sub-Contractor(s) | Nationality |
|---|---|---|
| **Meter Manufacturer (if any)** | | |
| **Communication Provider (if any)** | | |
| **System Integrator (if any)** | | |
| **MDM Provider (if any)** | | |
| **HES Provider (if any)** | | |
| **Cloud Service Provider (if any)** | | |
| **[Other] (if any)** | | |

### Form 2: Bidder Information

*[Sole Bidder/ all Consortium Members must provide all documents required to prove/ substantiate its Eligibility as required in Eligibility Criteria Clause 4.3. for each Consortium Member]*

| S.No. | Information Requirement | Details |
|---|---|---|
| 1 | Company Name and Details | |
| 2 | Address of its place of business in India | |
| 3 | List of board of directors or regulating/controlling body | |
| 4 | Attested copy of Certificate of Registration/ Incorporation issued by the Registrar of Companies | |
| 5 | Memorandum and Articles of Association or document constituting the company and regulating its affairs | |
| 6 | Certificate of Commencement of Business issued by the Registrar of Companies | |
| 7 | Copy of the Goods and Services Tax (GST) Registration Certificate | |
| 8 | Provident Fund (PF) Certificate indicating PF Code | |
| 9 | Copy of Permanent Account Number (PAN) Card | |
| 10 | Copy of the Goods and Services Tax (GST) Registration Certificate | |
| 11 | Audited annual financial statements and financial Net worth for the last three years | |
| 12 | Any other papers or documents required by Utility at a later stage or in future | |

## Form 3: Project Implementation Plan

*The Bidder shall submit a preliminary Project implementation plan along with the Bid which shall include at least the following activities:*

a) *Understanding of Utility and its requirement with respect to Project implementation;*
b) *Overall system architecture and system philosophy capable of scale-up;*
c) *Details of proposed methodology;*
d) *Schematic Diagram of Proposed System Configuration*
e) *An approach paper documenting the interfaces for integration with existing and future applications based on the information provided by utility*
f) *Project team structure;*
g) *Line of Credit / Source of funding and supporting documents;*
h) *Governance Framework;*
i) *Resource planning and estimation;*
j) *Risk planning;*
k) *Quality Assurance Program;*
l) *Data Privacy Approach;*
m) *Cyber Security Approach;*
n) *Site Survey;*
o) *Documents, Data Requirement Sheet (as per Form 17), Drawing submission and approval;*
p) *Installation & Field update schedule;*
q) *Repair and Maintenance Schedule including details on Spares Management;*
r) *Training schedule;*

## Form 4: Bidder's Representative and Key Personnel

*[Bidders should provide the names and details of the suitably qualified Contractor's Representative and Key Personnel to perform the AMISP Contract. The data on their experience should be supplied using the Form 5 below for each candidate.]*

| | | |
|---|---|---|
| **1.** | **Title of position:** Project Manager | |
| | **Name of candidate:** | |
| | **Duration of appointment:** | [*insert the whole period (start and end dates) for which this position will be engaged*] |
| | **Time commitment: for this position:** | [*insert the number of days/week/months/ that has been scheduled for this position*] |
| | **Expected time schedule for this position:** | [*insert the expected time schedule for this position (e.g. attach high level Gantt chart*] |
| **2.** | **Title of position:** *[System Integration Specialist]* | |
| | **Name of candidate:** | |
| | **Duration of appointment:** | [*insert the whole period (start and end dates) for which this position will be engaged*] |
| | **Time commitment: for this position:** | [*insert the number of days/week/months/ that has been scheduled for this position*] |
| | **Expected time schedule for this position:** | [*insert the expected time schedule for this position (e.g. attach high level Gantt chart*] |
| **3.** | **Title of position:** *[Cyber Security Specialist]* | |
| | **Name of candidate:** | |
| | **Duration of appointment:** | [*insert the whole period (start and end dates) for which this position will be engaged*] |
| | **Time commitment: for this position:** | [*insert the number of days/week/months/ that has been scheduled for this position*] |
| | **Expected time schedule for this position:** | [*insert the expected time schedule for this position (e.g. attach high level Gantt chart*] |
| **4.** | **Title of position:** *[Communication Technology Specialist]* | |
| | **Name of candidate:** | |
| | **Duration of appointment:** | [*insert the whole period (start and end dates) for which this position will be engaged*] |
| | **Time commitment: for this position:** | [*insert the number of days/week/months/ that has been scheduled for this position*] |
| | **Expected time schedule for this position:** | [*insert the expected time schedule for this position (e.g. attach high level Gantt chart*] |

## Form 5: Resume and Declaration

| **Name of Bidder:** |
|---|

| **Position [*#1*]: [*title of position*]** | | |
|---|---|---|
| **Personnel information** | **Name:** | **Date of birth:** |
| | **Address:** | **E-mail:** |
| | | |
| | **Professional qualifications:** | |
| | **Academic qualifications:** | |
| | **Language proficiency:** *[language and levels of speaking, reading and writing skills]* | |
| **Details** | | |
| | **Address of employer:** | |
| | **Telephone:** | **Contact (manager / personnel officer):** |
| | **Fax:** | |
| | **Job title:** | **Years with present employer:** |

Summarize professional experience in reverse chronological order. Indicate technical and managerial experience relevant to the Project.

| **Project** | **Role** | **Duration of involvement** | **Relevant experience** |
|---|---|---|---|
| *[main project details]* | *[role and responsibilities on the project]* | *[time in role]* | *[describe the experience relevant to this position]* |
| | | | |
| | | | |

**Declaration**

I, the undersigned *[ insert either "Contractor's Representative" or "Key Personnel" as applicable]*, certify that to the best of my knowledge and belief, the information contained in this Form 5 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

| Commitment | Details |
|---|---|
| **Commitment to duration of contract:** | *[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]* |
| **Time commitment:** | *[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]* |

I understand that any misrepresentation or omission in this Form may:

(a) be taken into consideration during Bid evaluation;

(b) result in my disqualification from participating in the Bid;

(c) result in my dismissal from the contract.

**Name of** Contractor's Representative or **Key Personnel: [*insert name*]**

Signature: _____

Date: (day month year): _____

**Countersignature of authorized representative of the Bidder:**

Signature: _____

**Date: (day month year):** _____

## Form 6: Format of Bank Guarantee for Bid Security

Whereas. ..... (hereinafter called "the Bidder") has submitted its Bid dated (date of submission of bid) for the supply of. .....(name and /or description of the Materials / equipment) (hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that WE. .....(name of bank) having our registered office at. .....(address of bank)(hereinafter called "the Bank"), are bound unto. .....(name of Purchaser) (hereinafter called "the Purchaser") in the sum of for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this day of 20 .

THE CONDITIONS of this obligation are:

1. If the Bidder

   a) withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or

   b) does not accept the correction of errors in accordance with the Bid Specification, or

2. If the Bidder, having been notified of the acceptance of its bid by the Purchaser during the period of bid validity;

   (a) fails or refuses to furnish the performance security, in accordance with the Bid Specification.

   (b) fails or refuses to execute the Contract Form if required; or

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including forty five (45) days after …….(Specification Date) the period of the bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

. ..... (Signature of the Bank)

**NOTE**: This will be executed on a Rs.100/- non-judicial stamp paper issued by a scheduled Bank.

## Form 8: Format of Covering Letter by Lead Consortium Member/ Sole Bidder for Submission of Bid

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

[Reference No.]
From:
[Address of the Lead Consortium Member/ Sole Bidder]
[Telephone No., Fax No., Email]
[Date]

To:
[Utility]
[Address]

**Sub: Bid for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis**

**Ref: CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**

Dear Sir/ Madam,

We, the undersigned ……. *[Insert name of the Lead* Consortium Member/ Sole Bidder*]* having read, examined and understood in detail the RFP for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis 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 Utility, 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 fulfil the Eligibility Criteria stipulated in the RFP and fulfil all the eligibility requirements as the Lead Consortium Member/ Sole Bidder 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 Form 6 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 Utility 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 fulfil 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 the AMISP Contract have been fully examined and considered while submitting the Bid.

**7. Contact Person**

Details of the contact person representing our Bidding Consortium/ Sole Bidder (registered Company) supported by the Power of Attorney prescribed in Form 11 of the RFP are furnished as under:
Name: …….
Designation: …….
Company: …….
Address: …….
Mobile: …….
Phone: …….
Fax: …….
Email: …….

1. 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.

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

8. It is confirmed that our Bid is consistent with all the requirements of submission as stated in the RFP and subsequent communications from Utility.

9. 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.

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

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

12. 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 in the preceding 1 (one) 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 1 (one) year from the Bid Submission Deadline.

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

14. We are registered/ exempt from registering in accordance with applicable laws
[Evidence of valid registration by the Competent Authority shall be attached if applicable]

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]*

**Form 9: 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

1. **THIS Consortium Agreement** (hereinafter referred to as "Agreement") executed on this ..... *[date]* day of ..... *[month]*, ..... *[year]* between
2. M/s. ....., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called "**Party 1**," or "**Lead Consortium Member**" 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 "**Party 2**," 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 "**Party 3**," which expression shall include its successors, executors and permitted assigns);

.

5. M/s. ....., a company incorporated under the laws of ..... and having its Registered Office at ....., (hereinafter called "**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.]*

WHEREAS the Parties abovenamed are entering into this Consortium Agreement 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 AMISP Contract as may be required to be entered into with Utility.

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

**WHEREAS** the RFP stipulates that the Bidders applying as 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 AGREEMENT 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 Utility, 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. In the event the Consortium is selected pursuant to the Bidding Process, the shareholding of all each of the Consortium Members in the AMISP shall be as under:

| S.No | Party | Proposed Shareholding |
|---|---|---|
| 1. | Lead Consortium Members | (Not Less than 51%) |
| 2. | Party 1 | (Not Less than 10%) |
| 3. | Party 2 | (Not Less than 10%) |
| 4. | Party 3 | (Not Less than 10%) |
| 5. | Party 4 | (Not Less than 10%) |

3. Each Consortium Member 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. 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.

4. In case of any breach of any of the commitment as specified under this Agreement by any of the Consortium Members, the Lead Consortium Member of the Consortium shall be liable to meet the obligations as defined under the AMISP Contract and the 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. The Members expressly agree to adhere to all the terms and conditions of the RFP and confirm that we don't have any Conflict of Interest (as defined in the RFP).

7. 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.

8. 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.

9. It is hereby agreed that in case of selection of Bidding Consortium as the AMISP, the Parties to this Consortium Agreement do hereby agree that they shall furnish the Performance Security and other commitments to Utility as stipulated in the RFP and AMISP Contract. The Lead Member shall be responsible for ensuring the submission of the Performance Security and other commitments on behalf of all the Consortium Members.

10. It is further expressly agreed that the Consortium Agreement shall be irrevocable and, for the AMISP, shall remain valid over the term of the Project, unless expressly agreed to the contrary by Utility.

11. 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. The representation by the Lead Member shall be deemed to be on behalf of and binding on all members of the Consortium.

12. 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-A** 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.

13. It is clearly agreed that the Lead Consortium Member shall ensure performance indicated in the RFP. In the event 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.

14. 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 Utility.

15. 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 Utility.

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

Witness 1

[Signature of Witness 1]
.....
Name:

| | |
|---|---|
| Designation<br><br>Witness 2<br><br>[Signature of Witness 2]<br>.....<br>Name:<br>Designation: | |
| .. | |
| **N.** Common Seal of ..... has been affixed in my/ our presence pursuant to Board Resolution dated ..... | For M/s. ..... (Party N)<br>*[Signature of Authorized Representative]*<br>.....<br>*[Name of the Authorized Representative]*<br>*[Designation of the Authorized Representative]* |
| N.1. Witness 1<br><br>[Signature of Witness 1]<br>.....<br>Name:<br>Designation: | N.2. Witness 2<br><br>[Signature of Witness 1]<br>.....<br>Name:<br>Designation: |

**Annexure-A**

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

**Form 10: Format of Power of Attorney by Consortium Member in favour of Lead Consortium Member**

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

**WHEREAS** [Utility] has issued for Tender No. [Tender Details] (the "RFP") dated [Date] for inviting Bids in respect of Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis (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 Utility 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 Utility may require us to submit. The aforesaid attorney is further authorized for making representations to Utility named in the RFP, and providing information / responses to Utility, representing us and the Consortium in all matters before Utility named in the RFP, and generally dealing with Utility 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……**

1. **WITNESS1. ……. (Signature)**
   **Name …….**
   **Designation.....……..**
2. **WITNESS2.....……..... (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).*

**Form 11: Format of Power of Attorney by Lead Consortium Member / Sole Bidder 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/ Sole Bidder]* 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 Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis (the "Project") issued by [Utility], 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 Utility may require us to submit. The aforesaid attorney is further authorized for making representations to Utility, and providing information / responses to Utility, representing us in all matters before Utility, and generally dealing with Utility 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……**

1. **WITNESS 1. ……. (Signature)**

**Name …….**

**Designation.....……**

2. **WITNESS 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).*

**Form 12: 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/ Sole Bidder]
[Telephone No., Fax No., Email]
[Date]

To:
[Utility]
[Address]

**Sub: Bid for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis.**

**Ref: CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**

Dear Sir/ Madam,

We, ……..…… [Insert name of the undersigned Consortium Member] Member of Consortium or Lead by ……..…… [Insert name of the Lead Consortium Member] have read, examined and understood the RFP and RFP Documents for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis.

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]*

## Form 13: Format of Summary of Audited Financial Statements

*< This form needs to be submitted by sole bidder and all consortium members. In case of an AIF or Foreign Investment Fund using ACI, ACI would be considered as per the certificate issued by statutory auditor (or such other certificate as filed with the regulator in the relevant jurisdiction) not older than 1 (one) month prior to the date of Bid Submission>*

[Reference No.]

From:
[Address of the Lead Consortium Member/ Sole Bidder] [Telephone No., Fax No., Email] [Date]

To: [Utility] [Address]

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

**Ref: CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**

Dear Sir/ Madam,

This is to certify that ..... *[Insert name of Sole Bidder/Consortium Member]* having its Registered Office at ..... *[Insert Registered Address of the Consortium Member]* are in the business of ..... *[Insert briefly the nature of the business]*, have recorded the following:

| **NETWORTH FOR LAST THREE FINANCIALYEARS** | | |
|---|---|---|
| Sr. | Financial Year (FY) | Networth Amount (In Indian Rupees) |
| 1. | | |

*Or*

| **ACI FOR PRECEDING FINANCIALYEAR** | | |
|---|---|---|
| Sr. | Financial Year (FY) | ACI Amount (In Indian Rupees) |
| 1. | | |

The above Networth/ ACI are arrived from our Audit Reports for the last three/ preceding[2] financial years duly submitted to the Income Tax Department along with our Audit Reports.

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

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

Date: [Date] Place: [Place]

[2] In case ACI is used to meet the financial requirements

## Form 14: Record of Similar Work Done

| S No | Name of Client Company | Date of PO/ WO | Contract Period | No. of Consumers, Nodes, etc. | Description of Work | PO/ WO Value (In INR) | Confirm attachment of PO/ WO | Confirm attachment of Installation Milestone/ execution certificate |
|---|---|---|---|---|---|---|---|---|
| 1. | | | | | | | | |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |

## Form 15: Format of Bill of Quantities

*Please Note: The list is indicative only. This needs to be detailed out and customized by [ AMISP] basis Project requirement*

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

*<The quantity of smart meters to be installed should be based upon As-Is consumer database as well as projected load growth in the selected AMI Project Area during the Contract Period.>*

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| **1.** | **Smart Meters (Including NIC card/Communication module and polycarbonate meter box** | | | |
| 1.1 | Single Phase (1 Ø) Whole Current Smart Meter (5-30 Amp) | Nos | 37386 | |
| 1.2 | Single Phase (1 Ø) Whole Current Smart Meter **Net meter** (5-30 Amp) | Nos | 100 | |
| 1.3 | Single Phase (1 Ø) Whole Current Smart Meter (10-60 Amp) | Nos | 28540 | |
| 1.4 | Single Phase (1 Ø) Whole Current Smart Meter **Net meter** (10-60 Amp) | Nos | 150 | |
| 1.5 | Three Phase (3 Ø) Whole Current Smart Meter (5-30 Amp) | Nos | 7499 | |
| 1.6 | Three Phase (3 Ø) Whole Current Smart Meter **Net meter** (5-30 Amp) | Nos | 01 | |
| 1.7 | Three Phase (3 Ø) Whole Current Smart Meter (10-60 Amp) | Nos | 26914 | |
| 1.8 | Three Phase (3 Ø) Whole Current Smart Meter **Net meter** (10-60 Amp) | Nos | 01 | |
| 1.9 | Three Phase (3 Ø) Whole Current Smart meter (20-100 Amp) | Nos | 6659 | |
| 1.10 | Three Phase (3 Ø) Whole Current Smart **Net meter** (20-100 Amp) | Nos | 4085 | |
| 1.11 | LT Three Phase (3 Ø) CT Operated Smart Tri Vector Meter including SMC Meter Box with Polycarbonate Meter fixing board and CTs embeded in separate chamber of SMC box (CT Ratio 125/5 Amp) | Nos | 2121 | |
| | Sub Total 1 | | **113456** | |
| **2.** | **Mandatory Spares** | | | |
| 2.1 | 3% of each item from S. No. 1.1 to 1.9 | | | |
| | Sub Total 2 | | | |
| **3.** | **Installation & Commissioning and verification of meter communication with head end system, removal of old meter and handing over to MRT lab as per** | | | |

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| | **departmental procedure, writing consumer service no. on its meter box along with digital photograph of meter reading before and after installation.(including incidental works, transportation of smart meters to installation site with communication module) including Detailed Engineering Design Report and Implementation Plan based on actual field survey** | | | |
| 3.1 | Single Phase Whole Smart Current Meter with Box | Nos | 66176 | |
| 3.2 | Three Phase Whole Current Smart Meter with Box | Nos | 45159 | |
| 3.3 | LT Three Phase CT Operated Smart Tri Vector Meter (CT Ratio 125/5 Amp) with Box for Consumer with necessary accessories /Hardware for fixing | Nos | 2121 | |
| | Sub Total 3 | | | |
| **4.** | **Other Requirement** | | | |
| 4.1 | Any other product/ services, if required, along with details. | Nos./ Lot/ Job | | |
| | Sub Total 4 | | | |
| **5.** | **Communications Hardware** | | | |
| 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 AMISP]**

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| **1.** | **Application Software** | | | |
| 1.1 | Meter Data Acquisition Software (MDAS)/Head End System (HES) | Lot | | |
| 1.2 | Meter data management (MDM) ..... | Lot | | |
| 1.3 | .... | | | |
| | Sub Total 1 | | | |
| **2.** | **Data Archiving Software** | | | |
| 2.1 | Data Archiving and SAN management software | Lot | | |
| 2.2 | .... | | | |
| | Sub Total 2 | | | |
| **3.** | **Network Management Software** | | | |
| 3.1 | Centralized network management software along with patch management & identity management | Lot | | |
| 3.2 | Antivirus software for all machines in Network | Lot | | |

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| | Operation cum Monitoring Center | | | |
| 3.3 | Access control software with single sign on feature | | | |
| … | …. | | | |
| | Sub Total 3 | | | |
| **4.** | **Installation & Commissioning** | | | |
| 4.1 | Supply, Installation, Commissioning & Testing & Integration with Existing System (if any) | Job | | |
| 4.2 | .... | | | |
| | Sub Total 4 | | | |
| **5.** | **Other Requirement** | | | |
| 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 AMISP]**

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| **1.** | **Hardware for Network Operation cum Monitoring Centre** | | | |
| 1.1 | Workstation consoles | Set | | |
| 1.2 | Firewall | | | |
| 1.3 | Router | | | |
| .. | .. | | | |
| | Sub Total 1 | | | |
| **2.** | **Mandatory Spares** | | | |
| 2.1 | X% of Subtotal 1 | Lot | | |
| 2.2 | .... | | | |
| | Sub Total 2 | | | |
| **3.** | **Installation & Commissioning** | | | |
| 3.1 | Supply, Installation, Commissioning & Testing & Integration with Existing System (if any) | Job | | |
| 3.2 | .... | | | |
| | Sub Total 3 | | | |
| **4.** | **Other Requirement** | | | |
| 4.1 | Any other product/ services, if required, along with details. | Nos./ Lot/ Job | | |
| | Sub Total 4 | | | |

**Table 4: Bill of Materials and Services for Training [Indicative Only. To be defined by AMISP]**

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| **1.** | **Training at Site** | | | |
| 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 5: Bill of Materials and Services for Operation and Maintenance [Indicative Only. To be defined by AMISP]**

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| **1.** | **Operation and Maintenance** | | | |
| 1.1 | Operation of complete system (during warranty period) including providing communication link to Network Operation cum Monitoring Center as well as network connectivity for Cellular services for AMI System | Year 1 | | |
| | | Year 2 | | |
| | | Year 3 | | |
| | | Year 4 | | |
| | | Year 5 | | |
| | | Year 6 | | |
| | | Year 7 | | |
| | | Year 8 | | |
| 1.2 | Maintenance of complete System during AMI operations period | Year 1 | | |
| | | Year 2 | | |
| | | Year 3 | | |
| | | Year 4 | | |
| | | Year 5 | | |
| | | Year 6 | | |
| | | Year 7 | | |
| | | Year 8 | | |
| 1.3 | .... | Nos./ Job | | |
| | Sub Total 1 | | | |

**Table 6: Bill of Materials and Services for Infrastructure for Recharge through Feature Phones/ Offline Channels [Indicative Only. To be defined by AMISP]**

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| **1.** | **Infrastructure for Recharge** | | | |
| 1.1 | Retail distribution centres @ 1 No. in each ERO | Nos./ Job | 78 | |
| 1.2 | Workstation Consoles | Nos. | | |
| 1.3 | Computer System | Nos. | | |
| .. | .. | | | |
| | Sub Total 1 | | | |

**Table 7: Bill of Materials and Services for Consumer Engagement Activities [Indicative Only. To be defined by AMISP]**

| S. No. | Item Description | Unit | Quantity | Country of Origin |
|---|---|---|---|---|
| **1.** | **Consumer Engagement Activities** | | | |
| 1.1 | Consumer engagement plan | Nos. | | |
| 1.2 | Communication and media plan | Nos. | | |
| 1.3 | .. | Nos. | | |
| **2** | **Implementation support for consumer engagement activities as per point 1** | | | |
| 2.1 | Knowledge Materials/ Tools/ Brochures | Nos. | | |
| 2.2 | Social media campaigns | Nos. | | |
| 2.3 | Press release/ ads/ newsletters | Nos. | | |
| 2.4 | Videos/ Film | Nos. | | |
| 2.5 | Consumer Surveys | Nos. | | |
| .. | .. | | | |

**Form 17: Data Requirement Sheet**

*<Please Note: In case of any deviation of minimum requirement of features (listed below) from the existing BIS standards, the existing BIS standards shall prevail over the same>*

**Single Phase Whole Current Smart Meter**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 1 | Applicable Standards | The meters shall comply with IS 16444 Part 1 for all requirements. | |
| 2 | Reference Voltage | As per relevant IS (240 V) | |
| 3 | Current Rating | 5-30 A<br>10-60 A | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 4 | Category | UC1 | |
| 5 | Starting Current | As per IS 16444 Part 1 | |
| 6 | Accuracy | Class 1.0 as per IS 16444 Part 1 | |
| 7 | Limits of error | As per IS 16444 Part 1 | |
| 8 | Operating Temperature range | As per IS 13779 | |
| 9 | Humidity | As per IS 13779 | |
| 10 | Frequency | As per IS 16444 Part 1 | |
| 11 | Influence Quantities | As per IS 16444 Part 1 | |
| 12 | Power Consumption of meter | As per IS 16444 Part 1 | |
| 13 | Current and Voltage Circuit | As per IS 16444 Part 1 | |
| 14 | Running at No Load | As per IS 16444 Part 1 | |
| 15 | Test output device | As per IS 16444 Part 1 | |
| 16 | Meter Display | As per IS 16444 Part 1 | |
| 17 | Name Plate & marking Meter Display | As per IS 16444 Part 1 | |
| 18 | Parameters to be measured | As per IS 16444 Part 1 / As per IS 15959 Part-2 | |
| 19 | Maximum Demand resetting | As per IS 15959 Part 2 | |
| 20 | Time of Use registers | As per IS 15959 part 2 | |
| 21 | Power Quality Information | As per IS 15959 part 2 | |
| 22 | LED/LCD Indicators | As per IS 16444 Part 1 | |
| 23 | Load Survey/Interval Data | As per IS 15959 part 2 | |
| 24 | Tamper/ Event Recording | As per IS 15959 part 2 | |
| 25 | Measuring Elements | As per IS 16444 part 1 | |
| 26 | Alarm | As per IS 16444 Part 1/ 15959 Part 2 | |
| 27 | Load Control | As per IS 16444 Part 1 | |
| 28 | Connect/Disconnect switch | UC1 (As per IS 16444 part 1) | |
| 29 | Status of load switch | As per IS 16444 Part 1 | |
| 30 | Programmability | As per IS 16444 Part 1 | |
| 31 | Communication | As per IS 16444. Part 1 | |
| 32 | Data Exchange Protocol | As per IS 16444 Part 1 | |
| 33 | Remote Firmware upgrade | As per IS 15959 part 2 | |
| 34 | Real Time Clock (RTC) | As per IS 16444 Part 1<br>IS 15959 Part1 & Part 2 | |
| 35 | Data Retention | As per IS 16444 Part 1 | |
| 36 | Battery Backup | Meter shall be supplied with adequate separate battery backup for RTC. | |
| 37 | First Breath (power on) and Last gasp (power off) condition detection and communication to HES | As per IS 16444 Part 1 | |
| 38 | Plug-in Communication Module | The Smart Meters shall be have a dedicated sealable slot for accommodating plug-in type bi -directional communication module which shall integrate the | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | respective communication technology ( RF/PLCC/ Cellular) with the Smart Meters, leading to easy adaptability for network interfaces (WAN/NAN).The Plug-In module shall be field swappable/ replaceable. The meter/communication module is proposed to have redundant dual communication mode with fallback arrangement to communicate with HES. | |
| 39 | Anti-Tamper Features | The meter shall continue working under tamper conditions as defined in IS 15959 Part 2 and would log the event and send alarm at Head End System after detection of the defined tamper features as per IS 15959 Part 2 | |
| 40 | Data Display Facility | As per IS 16444. However, minimum requirements should include the following:<br>Data Display shall be in two modes-<br>1. Auto Scroll<br>2. Scroll with Push Button<br>The display parameters shall be:<br>• Auto Scroll<br>• Display Check<br>• Date and Time<br>• Last Recharge Amount<br>• Last Recharge Time<br>• Current Balance Amount<br>• Current Balance Days Left<br>• Cumulative Active Energy kWh with legend.<br>• Current calendar month MD in kW with legend.<br>• Instantaneous voltage<br>• Instantaneous Phase current<br>• Instantaneous Load kW<br>• Instantaneous average Power Factor<br>These parameters should be displayed on the Meter Display continuously for a period of 10 seconds on Auto scroll.<br><br>Scroll with Push-button<br>• All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed:<br>• Internal diagnostics (display check)<br>• Meter Serial No.<br>• Last month cumulative kWh with legends<br>• Last month MD in kW with legends<br>• Current month Average Power Factor<br>• Last month Average Power Factor<br><br>Further, the Meter should display high resolution energy values with resolution of 3 digits before decimal and 2 digits after decimal in push button mode | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. (The order of display may be revised as per requirement of the Utility). Meter display should go in to sleep mode during Power-On condition in case the push button is not operated for more than 10 minutes | |

**Three Phase Whole Current Smart Meter**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 1 | Applicable Standards | The meters shall comply with IS 16444 Part 1 for all requirements. | |
| 2 | Reference Voltage | As per relevant IS | |
| 3 | Current Rating | 10-60 A<br>20-100 A | |
| 4 | Category | UC1 | |
| 5 | Starting Current | As per IS 16444 Part 1 | |
| 6 | Accuracy | Class 1.0 as per IS 16444 Part 1 | |
| 7 | Limits of error | As per IS 16444 Part 1 | |
| 8 | Operating Temperature range | As per IS 13779 | |
| 9 | Humidity | As per IS 13779 | |
| 10 | Frequency | As per IS 16444 Part 1 | |
| 11 | Influence Quantities | As per IS 16444 Part 1 | |
| 12 | Power Consumption of meter | As per IS 16444 Part 1 | |
| 13 | Current and Voltage Circuit | As per IS 16444 Part 1 | |
| 14 | Running at No Load | As per IS 16444 Part 1 | |
| 15 | Test output device | As per IS 16444 Part 1 | |
| 16 | Meter Display | As per IS 16444 Part 1 | |
| 17 | Name Plate & marking Meter Display | As per IS 16444 Part 1 | |
| 18 | Parameters to be measured | As per IS 16444 Part 1 / As per IS 15959 Part-2 | |
| 19 | Maximum Demand resetting | As per IS 15959 Part-2 | |
| 20 | Time of Use registers | As per IS 15959 Part-2 | |
| 21 | Power Quality Information | As per IS 15959 Part-2 | |
| 22 | LED/LCD Indicators | As per IS 16444 Part 1 | |
| 23 | Load Survey/Interval Data | As per IS 15959 Part-2 | |
| 24 | Tamper/ Event Recording | As per IS 15959 Part-2 | |
| 25 | Measuring Elements | As per Is 16444 Part 1 | |
| 26 | Alarm | As per IS 16444 Part 1 /<br>As per IS 15959 Part-2 | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 27 | Load Control | As per IS 16444 Part 1 | |
| 28 | Connect/Disconnect switch | UC1 as per IS 16444 Part 1 | |
| 29 | Status of Load switch | As per IS 16444 Part 1 | |
| 30 | Programmability | As per IS 16444 Part 1 | |
| 31 | Communication | As per IS 16444 Part 1 | |
| 32 | Communication Protocol | As per IS 16444 Part 1 | |
| 33 | Remote Firmware upgrade | As per IS 15959 Part-2 | |
| 34 | Real Time Clock (RTC) | As per IS 16444 Part 1 /<br>IS 15959 Part 1 & Part 2 | |
| 35 | Data Retention | As per 16444 Part 2 | |
| 36 | Battery Backup | Meter shall be supplied with adequate separate battery backup for RTC. | |
| 37 | First Breath (Power on) and Last gasp (Power off) condition detection and communication to HES | As per IS 16444 Part 1 | |
| 38 | Plug-in Communication Module | The Smart Meters shall be have a dedicated sealable slot for accommodating plug-in type bi - directional communication module which shall integrate the respective communication technology ( RF/PLC/ Cellular) with the Smart Meters, leading to easy adaptability for network interfaces (WAN/NAN).The Plug-In module shall be field swappable/ replaceable.<br>The meter/communication module is proposed to have redundant dual communication mode with fallback arrangement to communicate with HES. | |
| 39 | Anti-Tamper Features | The meter shall continue working under tamper conditions as defined in IS 15959 Part 2 and would log the event and send alarm at Head End System after detection of the defined tamper features as per IS 15959 Part 2 | |
| 39 | Data Display Facility | As per IS 16444. However, minimum requirements should include the following:<br>Data Display shall be in two modes-<br>1. Auto Scroll<br>2. Scroll with Push Button<br>The display parameters shall be:<br>▪ Auto Scroll<br>• Display Check<br>• Date and Time<br>• Last Recharge Amount<br>• Last Recharge Time<br>• Current Balance Amount<br>• Current Balance Time<br>• Cumulative Active Energy kWh with legend.<br>• Cumulative Active Energy kVAh with legend.<br>• Current month MD in kW with legend.<br>• Current month average Power Factor | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | • Instantaneous voltage VRN<br>• Instantaneous voltage VYN<br>• Instantaneous voltage VBN<br>• Instantaneous current IR<br>• Instantaneous current IY<br>• Instantaneous current IB<br>• Instantaneous current IN<br>• Instantaneous Load kW and kVA<br>• Instantaneous average Power Factor<br>These parameters should be displayed on the LCD/LED continuously for a period of 10 seconds on Auto scroll.<br><br>▪ Scroll with Push-button<br>All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed:<br>• Internal diagnostics (display check)<br>• Meter Serial No<br>• Cumulative Energy in kVArh Lag/ Lead with legend<br>• Cumulative Active Energy kWh ToD wise with legends.<br>• Cumulative Apparent Energy kVAh ToD wise with legends.<br>• Current month MD in kVAh with legends<br>• Last month cumulative kWh with legends<br>• Last month cumulative kVAh with legends<br>• Last month MD in kW with legends<br>• Last month Average Power Factor<br>Further, the Meter should display High Resolution energy values with resolution of 3 digits before decimal and 2 digits after decimal in push button mode.<br>The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. (The order of display may be as per the requirement of Utility). Meter display should go in to sleep mode during Power-On condition in case the push button is not operated for more than 10 minutes | |

**Three Phase LT-CT Operated Smart Meter**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 1 | Applicable Standards | The meters shall comply with IS 16444: Part2 for all requirements except for those parameters which have | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | been specifically mentioned to be otherwise in this specification. | |
| 2 | Reference Voltage | [As per relevant IS] | |
| 3 | Current Rating | Ib 5A | |
| 4 | Starting Current | As per IS 16444: Part2 | |
| 5 | Accuracy | Class 0.5S as per IS 16444: Part2 | |
| 6 | Limits of error | As per IS 16444: Part2 | |
| 7 | Operating Temperature range | As per IS 16444: Part2 | |
| 8 | Humidity | As per IS 16444: Part2 | |
| 9 | Frequency | As per IS 16444: Part2 | |
| 10 | Influence Quantities | As per IS 16444: Part2 | |
| 11 | Power Consumption of meter excluding communication module | As per I S 16444: Part2 | |
| 12 | Current and Voltage circuit | As per IS 16444: Part2 | |
| 13 | Running at No Load | As per IS 16444: Part2 | |
| 14 | Test output device | As per IS 16444: Part2 | |
| 15 | Meter Display | As per IS 16444: Part 2 | |
| 16 | Time of Use (In case of net-meter both export & import parameters to be measured) | As per IS 15959: Part 3 (as applicable) | |
| 17 | Parameters to be measured | As per IS 16444: Part 2 / As per IS 15959: Part 3 (as applicable) | |
| 18 | Power Quality Information | As per IS 15959: Part 3 (as applicable) | |
| 19 | Maximum Demand | As per IS 15959: Part 3 (as applicable) | |
| 20 | Load Survey/Interval Data | As per IS 15959: Part 3 (as applicable) | |
| 21 | LED/LCD Indicators | As per IS 16444: Part 2 | |
| 22 | Tamper/Event recording | As per IS 15959: Part 3 (as applicable) | |
| 23 | Alarm | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) | |
| 24 | Measuring Elements | As per IS 16444: Part 2 | |
| 25 | Anti-Tamper features | The meter shall continue working under tamper conditions as defined in IS 15959 : Part 3 (as applicable)and would log the event and send alarm at HES after logging of the defined tamper features as per IS 15959 : Part 3 (as applicable) | |
| 26 | Programmability | As per IS 16444 Part 2. | |
| 27 | Communication | As per IS 16444 Part 2 | |
| 28 | Communication Protocol | As per IS 15959: Part 3 (as applicable) | |
| 29 | Real Time Clock (RTC) | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) | |
| 30 | Data Retention | As per IS 16444 Part 2 | |
| 31 | Battery Backup | Meter shall be supplied with separate battery backup for | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | RTC | |
| 32 | Data display facility (manual/Auto) | As per IS 16444: Part 2. However minimum requirement should include the following:<br>Data Display shall have following features:<br>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 5 digits after decimal.<br>• The Push button for manual scrolling in addition to auto scrolling with a persistence time of 10 seconds for each parameter shall be provided.<br>Display of data as per IS 16444 (Part 2) | |
| 33 | Remote Firmware Upgrade | As per IS 15959 : Part 3 (as applicable) | |
| 34 | Real Time Clock (RTC) | As per IS 16444 Part 1<br>IS 15959 Part1 & Part 2 | |
| 35 | Data Retention | As per IS 16444 Part 1 | |
| 36 | Battery Backup | Meter shall be supplied with adequate separate battery backup for RTC. | |
| 37 | First Breath (power on) and Last gasp (power off) condition detection and communication to HES | As per IS 16444 Part 1 | |
| 38 | Plug-in Communication Module | The Smart Meters shall be have a dedicated sealable slot for accommodating plug-in type bi -directional communication module which shall integrate the respective communication technology ( RF/PLCC/ Cellular) with the Smart Meters, leading to easy adaptability for network interfaces (WAN/NAN).The Plug-In module shall be field swappable/ replaceable.<br>The meter/communication module is proposed to have redundant dual communication mode with fallback arrangement to communicate with HES. | |
| 39 | Anti-Tamper Features | The meter shall continue working under tamper conditions as defined in IS 15959 Part 2 and would log the event and send alarm at Head End System after detection of the defined tamper features as per IS 15959 Part 2 | |
| 40 | Data Display Facility | As per IS 16444. However, minimum requirements should include the following:<br>Data Display shall be in two modes-<br>3. Auto Scroll<br>4. Scroll with Push Button<br>The display parameters shall be:<br>• Auto Scroll<br>• Display Check<br>• Date and Time<br>• Last Recharge Amount | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | • Last Recharge Time<br>• Current Balance Amount<br>• Current Balance Days Left<br>• Cumulative Energy records kWh, kvarh, kvah with legend.<br>• Current calendar month MD in KVA/kW with legend.<br>• Instantaneous voltage<br>• Instantaneous Phase current<br>• Instantaneous Load kW<br>• Instantaneous, average Power Factor<br>These parameters should be displayed on the Meter Display continuously for a period of 10 seconds on Auto scroll.<br><br>Scroll with Push-button<br>• All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed:<br>• Internal diagnostics (display check)<br>• Meter Serial No.<br>• Last month cumulative kWh with legends<br>• Last month MD in kW with legends<br>• Current month Average Power Factor<br>• Last month Average Power Factor<br><br>Further, the Meter should display high resolution energy values with resolution of 3 digits before decimal and 2 digits after decimal in push button mode<br>The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. (The order of display may be revised as per requirement of the Utility). Meter display should go in to sleep mode during Power-On condition in case the push button is not operated for more than 10 minutes | |
| | **SPECIFICATION FOR RESIN CAST RING TYPE CURRENT TRANSFORMERS** | | |
| | The resin cast ring type LT Current Transformers conforming to IS -2705/1992(Part I, II & III) or the latest version thereof, are of class 0.5s Accuracy , 1VA Burden for use in conjunction with -/5A Energy Meters being supplied and are to be installed in a moulded box<br>**Ratings:** The Current Transformers shall be of the following details.<br>1) Aluminium PT link rings to be supplied along with 8 Nos., PVC Cable holders<br>2) Meter base Plate to be extended close to CT Base plate<br>3) All CT wires to be extended atleast by 6 inches than the normal length. | | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

| Type | Resin cast ring type LT CTs (without bar) |
|---|---|
| **Capacity** | **125/5A** |
| a) Number of C.T's | 4 No's. |
| b) Rated Voltage | 440V |
| c) No. of Cores | One |
| d) Rated Burden | 1VA |
| e) Rated continuous Thermal Current temperature rise over ambient | As per IS 2705/1992 or latest version thereof |
| f) One minute withstand Power Frequency Voltage | 3Kv |
| **Class of Accuracy** | **0.5S** |
| **Material** | |
| i) Core | High grade non-ageing electrical low loss core of superior CRGO |
| ii) Conductor | silicon sheet steel Super enameled copper wire |
| iii) Insulation | 2/1.22 mm |
| iv) Base | MS Hot dip galvanized |
| **Secondary Termination** | **Terminals S1 & S2 shall be clearly marked** |

**Three Phase CT/PT Operated Smart Meter**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 1 | 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. | |
| 2 | Reference Voltage | [As per relevant IS] | |
| 3 | Current Rating | lb 5A/ 1A | |
| 4 | Starting Current | As per IS 16444: Part2 | |
| 5 | Accuracy | Class 0.5S or 0.2S as per IS 16444: Part2 | |
| 6 | Limits of error | As per IS 16444: Part2 | |
| 7 | Operating Temperature range | As per IS 16444: Part2 | |
| 8 | Humidity | As per IS 16444: Part2 | |
| 9 | Frequency | As per IS 16444: Part2 | |
| 10 | Influence Quantities | As per IS 16444: Part2 | |
| 11 | Power Consumption of meter excluding communication module | As per I S 16444: Part2 | |
| 12 | Current and Voltage circuit | As per IS 16444: Part2 | |
| 13 | Running at No Load | As per IS 16444: Part2 | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 14 | Test output device | As per IS 16444: Part2 | |
| 15 | Meter Display | As per IS 16444: Part 2 | |
| 16 | Time of Use (In case of net-meter both export & import parameters to be measured) | As per IS 15959 Part 3 (as applicable) | |
| 17 | Parameters to be measured | As per IS 16444: Part 2 / As per IS 15959: Part 3 (as applicable) | |
| 18 | Power Quality Information | As per IS 15959 Part 3 (as applicable) | |
| 19 | Maximum Demand | As per IS 15959: Part 3 (as applicable) | |
| 20 | Load Survey/Interval Data | As per IS 15959: Part 3 (as applicable) | |
| 21 | LED/LCD Indicators | As per IS 16444 Part 2 | |
| 22 | Tamper/Event recording | As per IS 15959: Part 3 (as applicable) | |
| 23 | Alarm | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) | |
| 24 | Measuring Elements | As per IS 16444: Part 2 | |
| 25 | Anti-Tamper features | The meter shall continue working under tamper conditions as defined in IS 15959 : Part 3 (as applicable) and would log the event and send alarm at HES after logging of the defined tamper features as per IS 15959 : Part 3 (as applicable) | |
| 26 | Programmability | As per IS 16444 Part 2. | |
| 27 | Communication | As per IS 16444 Part 2 | |
| 28 | Communication Protocol | As per IS 15959: Part 3 (as applicable) | |
| 29 | Real Time Clock (RTC) | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) | |
| 30 | Data Retention | As per IS 16444 Part 2 | |
| 31 | Battery Backup | Meter shall be supplied with separate battery backup for RTC | |
| 32 | Data display facility (manual/Auto) | As per IS 16444: Part 2. However minimum requirement should include the following:<br>Data Display shall have following features:<br>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 5 digits after decimal.<br>• The Push button for manual scrolling in addition to auto scrolling with a persistence time of 10 seconds for each parameter shall be provided.<br>Display of data as per IS 16444 (Part 2) | |
| 33 | Remote Firmware Upgrade | As per IS 15959: Part 3 (as applicable) | |
| 34 | Real Time Clock (RTC) | As per IS 16444 Part 1<br>IS 15959 Part1 & Part 2 | |
| 35 | Data Retention | As per IS 16444 Part 1 | |
| 36 | Battery Backup | Meter shall be supplied with adequate separate | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | battery backup for RTC. | |
| 37 | First Breath (power on) and Last gasp (power off) condition detection and communication to HES | As per IS 16444 Part 1 | |
| 38 | Plug-in Communication Module | The Smart Meters shall be have a dedicated sealable slot for accommodating plug-in type bi -directional communication module which shall integrate the respective communication technology ( RF/PLCC/ Cellular) with the Smart Meters, leading to easy adaptability for network interfaces (WAN/NAN).The Plug-In module shall be field swappable/ replaceable.<br>The meter/communication module is proposed to have redundant dual communication mode with fallback arrangement to communicate with HES. | |
| 39 | Anti-Tamper Features | The meter shall continue working under tamper conditions as defined in IS 15959 Part 2 and would log the event and send alarm at Head End System after detection of the defined tamper features as per IS 15959 Part 2 | |
| 40 | Data Display Facility | As per IS 16444. However, minimum requirements should include the following:<br>Data Display shall be in two modes-<br>5. Auto Scroll<br>6. Scroll with Push Button<br>The display parameters shall be:<br>• Auto Scroll<br>• Display Check<br>• Date and Time<br>• Last Recharge Amount<br>• Last Recharge Time<br>• Current Balance Amount<br>• Current Balance Days Left<br>• Cumulative Energy records kWh, kvarh, kvah with legend.<br>• Current calendar month MD in KVA/kW with legend.<br>• Instantaneous voltage<br>• Instantaneous Phase current<br>• Instantaneous Load kW<br>• Instantaneous, average Power Factor<br>These parameters should be displayed on the Meter Display continuously for a period of 10 seconds on Auto scroll.<br><br>Scroll with Push-button<br>• All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed: | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | • Internal diagnostics (display check)<br>• Meter Serial No.<br>• Last month cumulative kWh with legends<br>• Last month MD in kW with legends<br>• Current month Average Power Factor<br>• Last month Average Power Factor<br><br>Further, the Meter should display high resolution energy values with resolution of 3 digits before decimal and 2 digits after decimal in push button mode<br>The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. (The order of display may be revised as per requirement of the Utility). Meter display should go in to sleep mode during Power-On condition in case the push button is not operated for more than 10 minutes | |

**Routers for RF Mesh Network (If Applicable)**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 1. | **General Requirements** | • The communication network shall have dynamic & self-healing capability. If one of the communication elements such as router or access point fails, then nodes connecting to that element shall switch to best available element for communication of data to HES.<br>• It shall support IPv6 network addressing.<br>• Each node shall keep a track of best available nearby nodes.<br>• The communication network equipment shall use Unlicensed or Licensed frequency band as permitted by WPC/Statutory Bodies in India.<br>• 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.<br>• It shall support remote firmware upgrading as per IS 16444<br>• It shall be secure enough to avoid all cyber threats such as DDoS, spoofing, malwares etc.<br>• The communication network shall ensure secure communication of data to HES.<br>• The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP-65). A suitable mounting provision shall be made for the equipment. | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | • 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.<br>• The list of standards followed in all the devices/equipment used in communication network shall be furnished | |

**Access Points for Communication Networks (if Applicable)**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 1. | **Configuration Requirement** | • It shall be able to configure the communication with underlying nodes/end points.<br>• It shall support on demand read and ping of individual/group of meters.<br>• It shall push events such as tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.<br>• It shall have Wide Area Network (WAN) connectivity to the HES through suitable means.<br>• It shall communicate with routers/nodes/end points on RF / RF mesh (Unlicensed or Licensed frequency band as permitted by WPC/Statutory Bodies in country of deployment as applicable).<br>• It shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.<br>• After power Interruption, on restoration of power supply, it shall establish communication with underlying devices as well as upstream application (HES) automatically.<br>• Access point shall facilitate recording of:<br>  ○ No of packet failures<br>  ○ Retry attempts<br>  ○ Missed periodic reading<br>  ○ Failure to connect<br>  ○ Tamper events<br>• 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.<br>• Access point shall support remote firmware upgrades as well as remote configuration from the Network Operation cum Monitoring Center. | |

## Data Concentrator Unit (DCU) (If Applicable)

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| 1. | **Configuration, Functionality & Interface** | • It shall be able to configure the communication with underlying nodes/meters.<br>• 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 devises/meters. The data acquisition (Push/Pull) frequency shall be programmable. DCU shall be capable to prioritize control commands.<br>• DCU shall ensure a secure communication to HES and shall have internal memory for storing interval data for at least 5 (five) days.<br>• DCU shall support on demand read and ping of individual/group of meters.<br>• It shall support IPv6 network addressing.<br>• DCU shall push events such as tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.<br>• The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP-65). A suitable mounting provision shall be made for the equipment.<br>• 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. | |
| 2. | **Communication** | • The communication architecture shall be any, as defined under IS 16444.<br>• The DCU shall ensure the appropriate backhaul for secure transfer of data to HES either via cellular or Fiber Optic communication. In case of cellular 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.<br>• DCU shall be able to communicate with meters either on RF / RF mesh (Unlicensed or Licensed frequency band as permitted by WPC/Statutory Bodies in country of deployment as applicable) or PLCC.<br>• DCU shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.<br>• It shall push events such as 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. | |

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | Full capacity of DCU is required to be indicated in the offer.<br>• After Power Interruption, on restoration of power supply, DCU shall establish communication with underlying devices as well as upstream application automatically.<br>• 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.<br>• Remote Firmware Upgrade: The DCU shall support remote firmware upgrades as well as remote configuration from the network operation cum monitoring center. Configuration of programmable parameters of Smart Meters shall be done through HES.<br>• All meters falling under one DCU shall be commissioned and checked for proper communication in presence of Utility in-charge.<br>• DCU shall keep the records of minimum of the following events:<br>o No of packet failures<br>o Retry attempts<br>o Missed periodic readings<br>o Failure to connect<br>o Tamper events | |

**Head-End System (HES) <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

**Meter Data Management System (MDMS) <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

**Workstation Consoles <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

**Monitors<Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

**Firewall and Intrusion Protection System <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |
| | | | |

**Internet Router <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |
| | | | |

**Printers <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

**Local Area Network <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

**Video Display System <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |
| | | | |

**UPS <Refer Schedule B of AMISP Contract as added by Utility shall be duplicated in the table below>**

| S. No. | Description of the Features | Minimum Requirement of Features | As per Bidder Offering |
|---|---|---|---|
| | | | |

**Form 18: Table of Compliance**

The Bidder shall submit 'Clause by Clause' compliance to the RFP document and the AMISP Contract including the technical specifications and functional requirements (with amendments, if any) as per the format prescribed in Form 18

. The Bidder shall annotate the Table of Contents of each section 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 handwritten.

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" shall also 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 Utility will assess the merits of each alternative and exception and will be the sole judge as to their acceptance.

# SECTION 5. FINANCIAL PROPOSAL - FORMS

| Sr. | Document | Attached ? (Yes/ No) | For Official Use |
|---|---|---|---|
| 1 | Financial Bid as per format provided in Form 16 | | |

## Form 16: Format of Submission of Financial Bid (For Reference Only)

***[IMPORTANT NOTE: THE FINANCIAL BID SHALL ONLY BE SUBMITTED IN THE ELECTRONIC FORMAT. IT SHALL NOT BE SUBMITTED IN HARD COPY OR AS A PART OF THE TECHNICAL BID..]***

[On the letter head of each Member of the Consortium including Lead Member/ Sole Bidder]

[Reference No.]

From:
[Address of the Lead Consortium Member/ Sole Bidder]
[Telephone No., Fax No., Email]
[Date]

To:
[Utility]
[Address]

**Sub: Financial Bid for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis.**
**Ref: CGM/PROJ/APSPDCL/TPT/AMISP/SIP-07/2021-22**

Dear Sir/ Madam,

We, the undersigned ……. [Insert name of the Lead Consortium Member/ Sole Bidder '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 [Utility]'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.

C. Price quoted clearly mentions the total cost (basic cost, Goods and Services Tax, or any other taxes/duties/levies).

D. Under no circumstances shall escalation in prices of this Financial Bid be entertained by Utility whether due to factors within or beyond control of the Bidding Consortium such as change in tax structure, currency value change, etc.

E. The details quoted herein shall stand valid at least for 9 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 Total Cost of the Project for the contract period is INR……; and the quoted AMISP Service Charge will be a fixed for the entire contract duration

G. 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.

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

**Table : Bill of Materials and Services for Smart Meters [Indicative Only. To be defined by AMISP. The Total Quantity of Smart Meters and Lumpsum payment amount to be defined by the Utility**

| Sl. No. | Item Description | Quantity in Nos. | Rate per Unit (in INR/ month/ meter) | Welfare Cess @ 1% | GST @ 18% | Total Rate per Unit (in INR/ month/ meter) | AMISP Service Charge (in INR) | Lumpsum payment per Unit (in INR/ meter) | Total cost for each category of meter |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D=C*1% | E = (C+D)*18% | F = C+D+E | G = B * F | H | I = (G*90 months)+(H*B) |
| **1** | **Smart Meters (Including NIC Card/Communication Module and Polycarbonate Meter Box)** | | | | | | | | |
| 1.1 | Single Phase (1 Ø) Whole Current Smart Meter (5-30 Amp) | 37386 | | | | | | | |
| 1.2 | Single Phase (1 Ø) Whole Current Smart Meter **Net meter** (5-30 Amp) | 100 | | | | | | | |
| 1.3 | Single Phase (1 Ø) Whole Current Smart Meter (10-60 Amp) | 28540 | | | | | | | |
| 1.4 | Single Phase (1 Ø) Whole Current Smart Meter **Net meter** (10-60 Amp) | 150 | | | | | | | |
| 1.5 | Three Phase (3 Ø) Whole Current Smart Meter (5-30 Amp) | 7499 | | | | | | | |
| 1.6 | Three Phase (3 Ø) Whole Current Smart Meter **Net Meter** (5-30 Amp) | 1 | | | | | | | |
| 1.7 | Three Phase (3 Ø) Whole Current Smart Meter (10-60 Amp) | 26914 | | | | | | | |
| 1.8 | Three Phase (3 Ø) Whole Current Smart Meter **Net Meter** (10-60 Amp) | 1 | | | | | | | |
| 1.9 | Three Phase (3 Ø) Whole Current Smart meter (20-100 Amp) | 6659 | | | | | | | |
| 1.10 | Three Phase (3 Ø) Whole Current Smart **Net meter** (20-100 Amp) | 4085 | | | | | | | |
| 1.11 | LT Three Phase (3 Ø) CT Operated Smart Tri Vector Meter including SMC Meter Box with Polycarbonate Meter fixing board and CTs embeded in separate chamber of SMC box (CT Ratio 125/5 Amp) | 2121 | | | | | | | |
| | **TOTAL** | **113456** | | | | | | | |

| New requirement of Manpower incase of any future or additional requirement beyond RFP/Contract.<br>Mandatory to Quote "Person Day Rate (J)" even if "Person Days Required (I)" are Zero. | | | | |
|---|---|---|---|---|
| **Mention the Nature of the Work below (other than mentioned in Annexure-L):** | | | | |
| | | | | |
| **S. No.** | **Item Description** | **Total Person days Required** | **Person Day Rate** | **Total Cost** |
| | **J** | **K** | **L** | **M=K*L** |
| **2** | **New requirement of Manpower** | | | |
| 2.1 | Architecture Specialists (Experience- 10+ years) | | | 0.00 |
| 2.2 | Security Specialists (Experience- 10+ years) | | | 0.00 |
| 2.3 | Integration Specialists (Experience- 10+ years) | | | 0.00 |
| 2.4 | Data Base Developer- Sr. (Experience- 5+ years) | | | 0.00 |
| 2.5 | Web/ Mobile Application Developer- Sr. (Experience- 5+ years) | | | 0.00 |
| 2.6 | Core Application Developer- Sr. (Experience- 5+ years) | | | 0.00 |
| 2.7 | Data Base Developer- Jr. (Experience- Less than 5 years) | | | 0.00 |
| 2.8 | Web/ Mobile Application Developer- Jr. (Experience- Less than 5 years) | | | 0.00 |
| 2.9 | Core Application Developer- Jr. (Experience- Less than 5 years) | | | 0.00 |
| | **TOTAL** | | | **0.00** |

**Total Cost of the Project** (*Sub-total of Column G and K in tables above*) = **INR [X] crores**

# Section 6. Project Requirements

## AMI System Requirements and Service Level Agreement

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## Abbreviations

| | |
|---|---|
| **AMI** | Advanced Metering Infrastructure |
| **AMISP** | Advanced Metering Infrastructure Service Provider |
| **BIS** | Bureau of Indian Standards |
| **BOQ** | Bill of Quantity |
| **CAIDI** | Consumer Average Interruption Duration Index |
| **CAIFI** | Consumer Average Interruption Frequency Index |
| **CEA** | Central Electricity Authority |
| **CERT-In** | Indian Computer Emergency Response Team |
| **CIM** | Common Information Model |
| **CIS** | Consumer Information System |
| **CPU** | Central Processing Unit |
| **CRM** | Consumer Relationship Management |
| **CT** | Current Transformer |
| **CUM** | Cumulative |
| **DBMS** | Database Management System |
| **DBFOOT** | Design Build Finance Own Operate and Transfer |
| **DCU** | Data Concentrator Unit |
| **DMZ** | Demilitarized Zone |
| **DT** | Distribution Transformer |
| **ESB** | Enterprise Service Bus |
| **FAT** | Factory Acceptance Test |
| **GPRS** | General Packet Radio Service |
| **GIS** | Geographic Information System |
| **GPS** | Global Positioning System |
| **GUI** | Graphical User Interface |
| **HES** | Head End System |
| **HHU** | Handheld Unit |
| **IBMS** | Integrated Building Management Systems |
| **IDS** | Intrusion Detection Systems |
| **IEC** | International Electrotechnical Commission |

| | |
|---|---|
| **ISO** | International Organization for Standardization |
| **IP** | Internet Protocol |
| **IS** | Indian Standard |
| **ISP** | Internet Service Provider |
| **IVRS** | Interactive Voice Response System |
| **LCD** | Liquid Crystal Display |
| **LED** | Light Emitting Diode |
| **kVA** | kilo Volt-Ampere |
| **kW** | kilo Watt |
| **LAN** | Local Area Network |
| **MCB** | Miniature Circuit Breaker |
| **LT** | Low Tension |
| **MICC** | Mineral-Insulated Copper-Clad Cable |
| **MD** | Maximum Demand |
| **MDAS** | Meter Data Acquisition System |
| **MDM** | Meter Data Management system |
| **M&V** | Monitoring and Verification |
| **NAN** | Neighbourhood Area Network |
| **NIC** | Network Interface Card |
| **NTP** | Network Time Protocol |
| **NMS** | Network Management System |
| **NOMC** | Network Operation cum Monitoring Center |
| **OEM** | Original Equipment Manufacturer |
| **OSF** | Open Software Foundation |
| **OS** | Operating System |
| **PCI** | Payment Card Industry |
| **PT** | Potential Transformer |
| **PLCC** | Power Line Carrier Communication |
| **PV** | Photovoltaic System |
| **QA** | Quality Assurance |
| **QC** | Quality Control |

| | |
|---|---|
| **QR** | Qualification Requirement |
| **RAM** | Random Access Memory |
| **R-APDRP** | Restructured Accelerated Power Development and Reforms Programme |
| **RDBMS** | Relational Database Management System |
| **RF** | Radio Frequency |
| **RFP** | Request for Proposal |
| **RPO** | Recovery Point Objective |
| **RTC** | Real Time Clock |
| **RTO** | Recovery Time Objective |
| **SAIDI** | System Average Interruption Duration Index |
| **SAIFI** | System Average Interruption Frequency Index |
| **SAN** | Storage Area Network |
| **SAT** | Site Acceptance Test |
| **SCADA** | Supervisory Control and Data Acquisition |
| **SLA** | Service Level Agreement |
| **SNMP** | Simple Network Management Protocol |
| **SOA** | Service Oriented Architecture |
| **SQL** | Structured Queried Language |
| **TCP** | Transmission Control Protocol |
| **TOD** | Time of Day |
| **TOU** | Time of Use |
| **UDP** | User Datagram Protocol |
| **UPS** | Uninterrupted Power Supply |
| **VEE** | Validation Estimation and Editing |
| **VM** | Virtual Machine |
| **WAN** | Wide Area Network |
| **WPC** | Wireless Planning & Coordination Wing |
| **XML** | Extensible Mark-up Language |

## 1. Overview of the AMISP Scope of Work

1.1 Utility intends to appoint a "Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on Design-Build-Finance-Own-Operate-Transfer (DBFOOT) the Advance Metering Infrastructure (AMI) Project in the pre-paid (by default) mode in selected AMI Project Area. AMISP shall finance and implement the entire project. The AMISP shall also operate for 'Total Meter-months' as defined in this Contract. Utility shall make payments to the AMISP in accordance with the terms and conditions of this Contract. AMISP shall transfer the ownership of the entire system including all the hardware, software along with its valid licenses, and any data collected during the Project to the Utility at the end of the Contract Period to facilitate seamless operation of Utility businesses.

### 1.2 About the AMI Project and the AMI Project Area

The AMI Project shall cover end-to-end smart metering (from Feeders, Distribution Transformers (DTs) and all end consumers) at contiguous electrical locations (which will be ring fenced with boundary meters) to enable complete energy accounting with zero manual intervention and dispersed metering (for certain Industrial, Commercial and Government consumers) at non-contiguous electrical locations in the selected AMI Project Area.

[Profile of Project area. The key details include following:

**A) Contiguous Electrical Locations: Not applicable in this Bid**

a) Geographical Boundary: No Contiguous electrical locations are proposed in this Bid.

***b)*** Number of single phase whole current Smart Meters (with/without net-metering), three phase whole current Smart Meters (with/without net-metering), LT-CT operated three phase Smart Meters (with/without net-metering), and CT/PT operated three phase Smart meters to be installed; - ***if any are to be identified during execution***

c) Total number of consumer by category (Domestic/ Industrial/ Commercial/ Government);

d) Substation information;

e) Feeder information;

f) DT information;

g) AT&C loss information (including billing and collection efficiency)

h) Historical load growth in project area;

i) Manpower deployed in the selected area(s) of operations;

**B) Non-Contiguous Electrical Locations:**

a) Geographical Boundary: The proposed services are scattered in the area of APSPDCL comprising of Anantapuram, Kurnool, Kadapa, Chittoor & Nellore Districts.

b) Number of single phase whole current Smart Meters (with/without net-metering), three phase whole current Smart Meters (with/without net-metering), LT-CT operated three phase Smart Meters (with/without net-metering), and CT/PT operated three phase Smart meters to be installed; -

| Sl. No. | Item Description | Quantity in Nos. |
|---|---|---|
| | | |
| **1** | **Smart Meters (Including NIC Card/Communication Module and Polycarbonate Meter Box)** | |
| 1.1 | Single Phase (1 Ø) Whole Current Smart Meter (5-30 Amp) | 37386 |
| 1.2 | Single Phase (1 Ø) Whole Current Smart Meter **Net meter** (5-30 Amp) | 100 |
| 1.3 | Single Phase (1 Ø) Whole Current Smart Meter (10-60 Amp) | 28540 |
| 1.4 | Single Phase (1 Ø) Whole Current Smart Meter **Net meter** (10-60 Amp) | 150 |
| 1.5 | Three Phase (3 Ø) Whole Current Smart Meter (5-30 Amp) | 7499 |
| 1.6 | Three Phase (3 Ø) Whole Current Smart Meter **Net Meter** (5-30 Amp) | 1 |
| 1.7 | Three Phase (3 Ø) Whole Current Smart Meter (10-60 Amp) | 26914 |
| 1.8 | Three Phase (3 Ø) Whole Current Smart Meter **Net Meter** (10-60 Amp) | 1 |
| 1.9 | Three Phase (3 Ø) Whole Current Smart meter (20-100 Amp) | 6659 |
| 1.10 | Three Phase (3 Ø) Whole Current Smart **Net meter** (20-100 Amp) | 4085 |
| 1.11 | LT Three Phase (3 Ø) CT Operated Smart Tri Vector Meter including SMC Meter Box with Polycarbonate Meter fixing board and CTs embeded in separate chamber of SMC box (CT Ratio 125/5 Amp) | 2121 |
| | **TOTAL** | **113456** |

c) Total number of consumer by category (Industrial/ Commercial/ Government);

d) Substation information;

e) Feeder information;

f) DT information;

g) Historical load growth in project area;

h) Manpower deployed in the selected area(s) of operations;

**C) Other Details:**

a) Details regarding periodicity/ frequency of the integration, data parameters including feeder energy data/ formats to be sent and received, protocol(s) to identify and address exceptions, and concurrency requirements;

b) Details on requirement of infrastructure for recharge through feature phones/ offline channels required by the Utility.

***One KIOSK at each ERO***

**1.3** The AMI system should be designed such that all the required hardware, software, and firmware with upgrades satisfy the AMI system requirements and service level agreements as specified in this Contract and are suitable for future scaling up. AMISP 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 AMISP in order to meet the performance levels as given in the Contract. The AMISP shall ensure that the Solution comply with the Applicable Law, technical specifications and other provisions of the Contract.

**1.4 Brief Scope of Work:**

AMISP shall include, in complete conformity with the technical and financial bid as mentioned in Schedule B of this contract as well as AMI system requirements and Service Level Agreements as mentioned in Schedule A of this Contract and Applicable Laws, site survey, planning, designing, financing, engineering, manufacturing, supply, transportation & insurance, delivery at site, unloading, handling, storage, installation, integration, testing, commissioning, demonstration for acceptance, training, maintenance, operation and documentation of various AMISP components.

A. Supply, installation, integration, testing and commissioning of :
   a. Smart pre-paid metering as per Clause 2.1 of Schedule A of this Contract.
   b. Communication Infrastructure to ensure the performance levels provided in this Contract as per Clause 2.2 of Schedule A of this Contract;
   c. Head End System (HES) and deployment on cloud as per Clause 2.3 of Schedule A of this Contract;
   d. Meter Data Management system (MDM) with prepaid functionality and deployment on cloud as per Clause 2.4 of Schedule A of this Contract;
   e. Consumer portal and mobile application as per Clause 2.5 of Schedule A of this Contract;
   f. Network Operation cum Monitoring Centre (NOMC) with suitable backend communication infrastructure, hardware and power supply as per Clause 2.6 of Schedule A;
   g. All other necessary software along with valid licenses relevant to the Project (as per Clause 2.7 of Schedule A of this Contract);

B. AMI System integration as per Clause 3 of Schedule A;

C. Carry out consumer indexing on de-novo basis for contiguous electrical locations in the selected AMI Project Area along with its regular updates during contract period as per Clause 4 of Schedule A of this Contract;

D. Develop a comprehensive consumer engagement plan (as per Clause 5 of Schedule A of this Contract) related to different stages of implementation (Pre, during and post installation phases of smart metering) in consultation with utility and implement its part of its activities as per the developed plan. The plan at the minimum should include consumer engagement activities to be undertaken at Utility's headquarter, division and sub-division level as well as communication and media plan;

E. Generation of automated energy audit reports (DT level/ Feeder level / Sub-division level/ Division level/ Circle) and other reports as per Clause 6 of Schedule A of this Contract;

F. Operation, maintenance, and support services after the successful completion of the Operational Go-Live of the system as per Clause 7 of Schedule A of this Contract;

G. Training of Utility personnel, as required for efficient, viable and fully functional system as per Clause 8 of Schedule A of this Contract;

1.5 Testing, inspection, approval of test records and in general, management of the Quality Assurance / Quality Control program of the AMI project as per Clause 9 of Schedule A of this Contract;

1.6 Project management as per Clause 10 of Schedule A of the Contract.

**1.7** Submit project documentation to the Utility describing the system operations for information/ approval as per Clause 11 of Schedule A of this Contract.

1.8 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. The same may be mutually enlisted and agreed upon by Utility and AMISP during the design phase as defined in the Contract;

1.9 Wherever references are made in the Contract to codes and standards in accordance with which the Solution shall be executed, the edition or the revised version of such codes and standards shall be those specified in the scope of work;

**1.10** 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

1.11 **Exclusion from Scope of Work:** Following shall be excluded from AMISP's scope of work

a. Construction of building for AMI Network Operation cum Monitoring Centre;
b. Lighting system for AMI Network Operation cum Monitoring Centre;
c. Interior and Integrated Building Management System (IBMS) of building for AMI Network Operation cum Monitoring Centre;
d. Air conditioning and ventilation for AMI Network Operation cum Monitoring Centre;
e. Firefighting system for AMI Network Operation cum Monitoring Centre;
f. A.C. input power and back-up supply for AMI Network Operation cum Monitoring Centre;
g. Service cable including electrical neutral connectivity to the transformer, wherever applicable;
h. Any modifications required in the existing system of the Utility (Billing, Website, etc.).
i. Consumer indexing for dispersed metering at non-contiguous electrical locations in the selected AMI Project Area

**1.12 Responsibilities of the Utility**

a) Whenever implementation of any component of the Solution requires that the AMISP obtain permits, approvals, and import and other licenses from local public authorities, Utility shall, if so required by the AMISP, make its best effort to assist the AMISP in complying with such requirements in a timely and expeditious manner;

b) The Chairman/ Managing Director of Utility or any other person designated by the Chairman/ Managing Director of Utility shall act as the nodal point for the implementation of the Contract and for issuing necessary instructions, approvals, commissioning, acceptance certificates, payments etc. to the AMISP;
c) The Chairman/ Managing Director of Utility or any other person designated by the Chairman/ Managing Director of Utility shall approve all such documents required for completion of Pre-Operational Go-Live Phase, in accordance with Clause 11 of Schedule A of this Contract, within 15 (fifteen) working days from the date of submission of such documents;
d) Provide on AMISP's request, particulars/ information / or documentation that may be required by the AMISP within 30 (thirty) days from date of execution of the Contract to enable preparation of the Project Implementation plan by the AMISP;
e) Provide existing database of consumer indexing and physical & IT infrastructure as available with the Utility. Utility shall provide all required data to the AMISP to identify all the consumers connected on the identified sub-stations, feeder lines and transformers of the AMISP Project area;
f) Review and approval of AMISP's Project Implementation Plan;
g) Provide drawings for NOMC building where AMI system installations are planned;
h) Provide necessary inputs for developing a comprehensive consumer engagement plan;
i) Provide necessary approvals for shutdowns as required for implementing the AMI System;
*j) [Storage and disposal of replaced old meters]; -* ***Old Meters are to be devoluted to the concerned District Stores in Co-ordination with concerned APSPDCL authorities****.*
k) Implement consumer engagement plan with support of AMISP. This would include running media campaign to raise awareness and countering myths around smart metering prior to installation, providing SOPs for smart meter installation to AMISP, etc.;
l) Informing AMISP of any changes in the area network during the project installation and operation period. Furthermore, Utility will partner with AMISP for discovering/ updating consumer indexing (DT/ Feeder wise) after installation of smart meters through structured power events data analysis including scheduling such events for each node with minimum inconvenience to consumer;
m) Provide A.C. power supply inputs;
n) Provide all required documents for delivery of material at site;
o) Provide at its expense, the electrical energy required for performance of the Project activities, installation, testing, and operation of the AMI Systems;
p) Providing support and access to facilities at the sites, including consumer premises;
q) Arranging for necessary shutdowns and work permits;
r) Implement major civil works such as expansions or construction of rooms, trenches etc. as required for the AMI equipment;
s) Utility to ensure that sites for installation for Smart Meters are ready along with service cable including electrical neutral connectivity to the transformer, wherever applicable for AMISP;
t) Provide the required integration interface details of the existing billing enterprise and related information required for Operational Go-Live of the AMI system, within 6 (six) months from date of execution of the Contract;
u) Provide necessary clearance/ approval/ permits that are to be issued by it for initial 20% of contiguous area for Smart Meter deployment along with related documentation within 6 (six) months from date of execution of this Contract. Provide necessary clearance/ approval/ permits to be issued by it for remaining contiguous area as well as non-

contiguous area for Smart Meter deployment along with related documentation on quarterly basis. Utility shall endeavour to provide 20% of contiguous area cleared each quarter and complete area within 18 (eighteen) months from date of execution of the Contract. Utility shall issue a Notice (provided if the Utility has not been able to provide clearance/ approval/ permits for installation of the meters) no later than 7 days of expiry of time period specified above confirming the actual number of meters for which clearance/ approval/ permits is available

v) Review the specifications of the Goods proposed to be used to ensure compliance with the provisions of this Contract.

w) Provide reasonable support to the AMISP for the Operational Go-Live in terms of the provisions of this Contract;

x) Utility shall provide necessary support to AMISP in the Project area, in relation to (amongst others) access to Utility's/consumers premises, installation of AMI system, repair and maintenance services, etc. Utility shall also:

   i. Give access to AMISP supervisor or its operation & maintenance staff to work in the Project area during the Contract Period;
   ii. Provide an office space for AMISP personnel as mentioned in Clause 10 of Schedule A of this Contract document within the Utility premises;
   iii. Give access to AMISP to use existing power and water supply, and other necessary equipment, as mutually agreed with the AMISP;
   iv. Not move, remove, modify, alter, or change the AMI system or any part thereof in the boundary of the AMI system installed by the AMISP without the prior written consent of AMISP. Utility shall take all reasonable steps to protect the AMI system from damage or injury and shall follow procedure for emergency action provided in advance by AMISP;

y) Participate in periodic review meetings as per the project governance structure, and shall support with the required interventions requested;

z) 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 continuity of electricity supply for AMI system operation;

aa) Permit AMISP to perform the project activities during working hours, and also after working hours as necessary, to meet the requirements of Project Implementation Plan;

bb) Necessary support in creation of pre-payment infrastructure;

cc) Attend to any irregularity with respect to AMI system operation, the cause of which has been brought to its attention by the AMISP;

dd) Promptly notify the AMISP of any events or circumstances that could affect the Project outcomes, or the AMISP's Services and obligations under this Contract;

ee) Allow AMISP (and/or its implementation partner, investor(s), authorized agency) unfettered access to network operation cum monitoring centre. Such covered and enclosed space as required by AMISP shall be provided to it by Utility free of cost during the Contract Period;

ff) Cooperate with AMISP in arranging financing for the Project, including by signing any relevant documents (such as substitution Contract) and providing such approvals, no-objections and waivers as may be required by investors/lenders;

gg) Appoint and notify to AMISP of the names and contact details of the Utility representative and its dedicated staff for the Project, which would include:

i. An engineer-in-charge for the Project who shall render full support to AMISP for Service delivery during the Term of this Contract and shall coordinate for payment to AMISP;
ii. A nodal officer, Utility Project Manager, to co-ordinate with AMISP in relation to the Project.

hh) Maintain consumer expectations basis the consumer engagement plan;
ii) Certify Installation Milestone in accordance with the provisions of this Contract.
jj) Facilitate AMISP for the timely implementation of the AMI Project and for its successful operation and maintenance during the Contract Period;
kk) Release payments to AMISP as per agreed terms;
ll) At its own cost, replace or repair existing equipment (other than AMI systems), such as poles, cables including consumer service lines, 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 AMISP's scope of maintenance;
mm) Apart from the aforesaid, the Utility shall provide all other necessary support as may be required time to time.

## 2. Supply, installation, integration, testing and commissioning of:

### 2.1 Smart Meters

Single phase whole current Smart Meters shall comply with technical specifications as provided in Annexure – A, three phase whole current Single Smart Meters shall comply with technical specifications as provided in Annexure – B, three phase LT-CT operated smart meters shall comply with technical specifications as provided in Annexure – C and three phase CT/PT operated smart meter shall comply with technical specifications as provided in Annexure – D. The AMISP has to furnish valid BIS certification before the supply of meters.
After meter installation, details of consumer connections, such as consumer identification no., meter ID, its hardware & software configuration, name plate details, make, type i.e. 1 Phase or 3 Phase shall be updated in the system. The information would also be updated on the consumer portal and app for providing information to consumers.
Reference, the Smart Meter communication, it is envisaged that plug and play type communication modules shall be deployed in the smart meter, for any given communication technology. These modules shall be field-deployable, with corresponding communication interface modules being used in the DCU/Gateway or BTS of wide area network in accordance with the details provided in Annexure F. The Network Interface Card (NIC) / Communication Module should be integrated with at least 3 (three) makes of meters in India to enable the respective meters to seamlessly integrate with proposed HES and/or MDM thus enabling interoperability of the system. The meter is proposed to have redundant communication (Cellular/RF/PLCC) mode with fallback arrangement to communicate with HES. In future, it would be AMISP's responsibility to integrate new meter in consultation with Utility or facilitate integration of other application as per the approach paper submitted under the Project Implementation Plan.

### 2.2 Communication Infrastructure

The communication infrastructure should either be based on RF / RF mesh network / PLCC /cellular network or a combination of these. Communication network shall provide reliable medium for two-way communication between various nodes (Smart Meter, Gateway/Router/Access Point/ DCU (wherever applicable)) & HES. RF based network should use licensed / unlicensed frequency band as permitted by WPC. The engagement of network

service provider would be in the scope of AMISP to meet the performance level as given in the document.
Meter data shall be routed / collected by field devices like Gateway/Router/Access Point, Data Concentrator Units (DCUs) wherever applicable given the communication technology used and transported to HES through WAN backhaul connectivity.

### 2.2.1 General Requirements

The AMISP shall design / hire reliable, interference free & robust communication network. It shall be effective for providing communication in terrain, topology & the consumer density of the project site.

During designing, suitable consideration shall be kept for future expansion as mentioned in Annexure-E. Before designing the communication network, the AMISP 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 such as DCUs, repeaters, routers & access points etc. shall be in the scope of AMISP.

The network Solution deployed by the AMISP should have disaster recovery mechanism in place. The redundancy mechanism of HES and MDM and their disaster recovery plan shall also be highlighted by the AMISP. AMISP shall satisfy itself through the operational testing of network as a whole and its element for reliability before starting operations and billing.

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

A suitable NMS shall be built 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. In case of public network such as cellular, the web-based portal (for example Open Network platform) should be provided to have the network view at location of installed devices. The portal shall have connectivity & subscription management.

A suitable digital platform (cloud-based application) and mobile apps could be provided to support field installation and capture field related activities and to manage the field operation & maintenance activity during the contract period. This platform shall manage project life cycle.

### 2.2.2 Network Management System

The proposed NMS shall facilitate following activities:

a) Security Management to protect systems and network from unauthorized access, manage user access, authorizing rights and privileges.

b) Viewing of all network elements deployed in the field and administer configuration changes of the network devices and nodes through toolkits to automate the following tasks:

   i. Capture running configuration, capture start-up configuration, upload configuration

   ii. Compare configuration

   iii. Real-time or scheduled capture of device configurations

iv. Store historical device configurations captured and enable comparison of current device configuration against a previously captured configuration

c) Security patch management of all applications shall be encrypted and signed.

d) Performance Management to monitor network performance as specified.

e) Fault Management to recognize, isolate, log and identify fault on network and connected nodes, devices.

The network management software shall be based on the latest secured version of SNMP v3. The NMS 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 1% of network bandwidth and shall have secure communication.

The Network Management Software shall have following functionality:

a) It shall maintain performance & 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 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 peripheral devices. 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 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 PLCC and RF between Smart Meter & DCU) deployed in the field. It shall maintain statistics on the performance and availability of node being delivered per AMI technology.

#### 2.2.2.1 NMS Requirements Specific to HES

The Network Management System (NMS) function within the HES shall manage communication network and its associated devices and monitor the performance of network. This module shall provide real time information about the IP network and its associated NAN/WAN modules in the field device/s.

a) NMS shall be able to collect parameters viz. terminal status, device status, next hop information, RF / PLC signal strength, Hardware/software version numbers, communication logs/events etc. For cellular WAN network, it shall be able to constantly monitor the meter WAN module for its connectivity and signal strength and quality

b) NMS function shall be able to perform ping & trace-route to an individual and a group of Nodes (NAN / WAN), Routers /Gateways / Access Point, DCU.

c) NMS function shall routinely check the logged in status of the end node / field device and its availability in the network for data exchange. In case of failure to get the 'alive' message from the end node/field device, it shall mark and notify the node as logged out. It shall be also possible to restart of a node (NAN/WAN) as well as trigger a hardware reset of the node.

d) NMS function should be able to collect and store monitoring profiles from End Points (NAN/WAN modules) and network devices for performance evaluation, and troubleshooting purposes. Historical logs of monitored profiles shall be available analysis through standard reporting tool.

e) If GIS is enabled, then topology, location (lat/long) and status of all network nodes shall be visible on GIS map.

### 2.2.3 Network Protection & Security

The AMI 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 applications environment. 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.

The overall cyber security policy and implementation shall account for:

a) Prevent unauthorized users from reading or writing data or files, executing programs or performing operations without appropriate privileges.

b) Document all user sign on procedure

c) Record all network traffic for detecting unauthorized activity, unusual activity and attempts to defeat system security (AMISP to propose and document what constitutes normal activity/traffic)

d) 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.

e) GUI to provide role-based access based on user identity and user role. Shall have following types of users:

   i. Administrator

ii. Operator

iii. Field staff

iv. Viewer/Guest

2.2.4 Communication Network Elements

Following sections provide detail on both DCU based communication network and router-based RF mesh network. The AMISP shall select relevant parts as applicable for designing and establishing communication infrastructure. The network, shall be horizontally and vertically scalable to accommodate future meter installations. The system shall be scalable to accommodate 10,00,000 Meters. The network elements may be comprised of the following.

**2.2.4.1 Data Concentrator Unit (DCU) based Communication Network (<to be kept as redundant item if required, otherwise the entire section is to be deleted>)**

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 passes it on to HES / 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 / PLCC communication and with HES on WAN.

2.2.4.1.1 **Hardware & Power Supply of DCU**

a) Enclosure/box of DCU shall be IP65 or better compliant. A suitable mounting arrangement required for DCU installation shall also be provided.

b) 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 6 kV. Power supply shall be terminated on suitable sized Miniature Circuit Breaker (MCB) to facilitate isolation during on-site maintenance.

c) DCU shall have battery with backup for 1(one) 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.

d) DCU shall have built-in Real Time Clock (RTC) with separate battery backup. It shall have self- diagnostic feature for RTC, memory, battery, communication module, etc.

**2.2.4.1.2 Configuration, Functionality & Interface of DCU**

DCU shall have following configuration functionalities / tools:

a) Configuring the communication with underlying nodes/meters.

b) Communication of 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 configurable. DCU shall be capable to prioritize control commands.

c) DCU shall ensure a secure communication to HES and shall have internal memory for storing interval data for at least 5(five) days. This storage shall be in non-volatile memory as opposed to battery backed memory.

d) DCU shall support on demand read and ping of individual/group of meters.

e) It shall support IPv6 network addressing.

f) DCU shall push events such as tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.

g) The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP65). A suitable mounting provision shall be made for the equipment.

h) 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.

i) The list of standards followed in all the devices/equipment used in communication network shall be furnished

#### 2.2.4.1.3 DCU Communication

a) The DCU shall ensure the appropriate backhaul for secure transfer of data to HES either via cellular or Fiber Optic communication. In case of cellular backhaul, it shall support SIM card / e-SIM with dynamic/static IP as the architecture demands from any service provider. It shall have Wide Area Network (WAN) connectivity to the HES through suitable means. Best available link shall be used to connect to HES.

b) DCU shall be able to communicate with meters through a secured, standard communication protocol between meter and DCU.

c) DCU shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.

d) It shall push events such as 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.

e) On restoration of power supply, DCU shall establish communication with underlying devices as well as upstream application automatically.

f) DCU shall be able to communicate with the nearest meters.

g) Remote firmware upgrade: The DCU shall support remote firmware upgrades as well as remote configuration from the Network Operation cum Monitoring Centre (NOMC)

h) DCU shall facilitate recording of minimum of the following events at HES (for 7 days):

   i. No of packet failures

ii. Retry attempts

iii. Missed periodic readings

iv. Failure to connect

v. Tamper events

#### 2.2.4.2 Gateway/ Router/ Access Point based RF Mesh Network

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

##### 2.2.4.2.1 General Requirement of RF Mesh Network:

a) The communication network shall have dynamic & self-healing capability. If one of the communication elements such as gateways/ routers/ access points fails, then nodes connecting to that element shall switch to best available element for communication of data to HES.

b) It shall support IPv6 network addressing.

c) Each node shall keep a track of best available nearby nodes or access points.

d) The communication network equipment shall use Unlicensed or Licensed frequency band as permitted by WPC/Statutory Bodies as applicable.

e) All the communication network equipment shall be as per WPC guidelines, Government of India for operation in licensed / license free frequency band.

f) Suitable 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.

g) It shall support remote firmware upgrading

h) It shall be secure enough to avoid all cyber threats

i) The communication network shall ensure secure communication of data to HES.

j) The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP65). A suitable mounting provision shall be made for the equipment.

k) The list of standards followed in all the devices/equipment used in communication network shall be furnished.

##### 2.2.4.2.2 Configuration, Functionality & Interface

Access points shall have following configuration functionalities:

a) It shall be able to configure the communication with underlying nodes/end points.

b) It shall support on demand read and ping of individual/group of meters.

c) It shall push events such as tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters.

d) It shall have Wide Area Network (WAN) connectivity to the HES through suitable means.

e) It shall communicate with gateways/ routers/ nodes/ end points/ access points on RF mesh network (Unlicensed or Licensed frequency band as permitted by WPC/Statutory Bodies in country of deployment as applicable).

f) It shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.

g) After power Interruption, on restoration of power supply, it shall establish communication with underlying devices as well as upstream application (HES) automatically.

h) Access point shall facilitate recording of minimum of the following events at HES (for seven (7) days):

   i. No of lost packets

   ii. Retry attempts

   iii. Missed periodic reading

   iv. Failure to connect

   v. Tamper events

i) It shall be capable to handle interval data of suitable nos. of any type of Smart Meter. 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.

j) Gateway / Router / Access point shall support remote firmware upgrades as well as remote configuration from the Network Operation cum Monitoring Centre.

k) The Gateway / Router / Access Points shall have provision to maintain the time and date information and shall always be in Time synchronization to the HES server via NTP to sub second accuracy. The Gateway / Router / Access Points, shall support time distribution to each Mesh Node

## 2.3 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 AMISP shall provide a HES which is 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.
HES shall be responsible for discovery of all Smart Meters once deployed in the field, the periodic collection of all meter data as well as the processing of all alarms and commands such as connect/disconnect for those meters.
HES would perform all the requisite functions as per the defined functionalities of AMI and it is the responsibility of the AMISP 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. The scalability shall ensure the ability to handle applicable workloads including the following:

a) Up to **10,00,000** numbers of meters installed
b) **[5/15]** mins interval meter reads for 10,000 Meters.
c) **250** users requesting data from meters
d) Other events and statuses coming from meters. (VEE and billing determinant calculations involving 10,000 meters and System Activity Alarams).

The HES shall be cloud enabled and support deployment with high availability clustering and automatic load balancing that ensure hardware as well as application failover. 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:

a) On power up after installation, Smart Meter shall register itself automatically into the HES along with its metering profile. The HES shall store meter profile status by meter type, hardware & software versions, device IDs, logged in / logged out details etc.
b) Upon deployment and establishment of communication, it shall be possible for field level end device nodes (NAN/WAN) like Router/Gateway, Access Point, DCU to have self-discovery and registration.
c) Acquisition of meter data on demand & at user selectable periodicity. On demand meter read may be for single meter (unicast) or for a group of meters (multicast).
d) Two-way communication with meter/ DCU
e) Signals for connect & disconnect of switches present in end points such as meters. This facility shall be provided for both single meter (unicast) as well as for a group of meters (multicast).
f) Audit trail and Event & Alarm Logging
g) Ability to redirect messages including configuration commands from the MDM in order to reach the desired meter
h) Maintain time sync with DCU / meter
i) Store raw data for defined duration (minimum 3 days). HES shall hold the data before it is transferred to the MDM
j) Handling of Control signals / event messages on priority
k) Manage time distribution to ensure that nodes / meters always have an accurate RTC using NTP servers. The time distribution mechanism shall take into account the network latencies.
l) Setting of Smart Meter configurable parameters
m) Critical and non-critical event reporting functionality
n) Device management functionality to get periodic updates from devices on health check, hardware & firmware version, location mapping etc.

### 2.3.1 Configuration

HES shall facilitate configuration of following minimum AMI parameters:

a) Load profile capture period
b) Demand integration period
c) Setting of parameters for TOU billing
d) Prepaid / post-paid configuration

e) Net metering

f) Billing date / month-to-date for prepaid meters

g) Clock setting/time synchronizations

h) Load curtailment limit

i) Event setting for connect/disconnect

j) Number of auto reconnection attempt

k) Time interval between auto reconnection attempt

l) Lock out period for endpoint (meter) relay

m) Remote firmware update: It shall be possible to update the firmware of the meters in both Unicast (one to one) and in Multicast fashion (Group of meters). It shall be also possible to have remote firmware upgrade for an individual and a group of nodes (NAN/WAN, Routers/Gateways/Access Point, DCU.

n) Password setting

o) Push schedule

p) Setting threshold limits for monitored parameters

The AMISP may suggest more parameters as per the requirement.

2.3.2 Communication

The following communication functions with network devices shall be supported:

a) HES shall communicate with DCUs/access points using WAN technology

b) HES shall encrypt data for secure communication

c) HES shall be able to accept data according to IS 15959 part-2 /part 3 and latest amendments

d) HES shall automatically retry for missed data; the number of retry attempts shall be configurable

e) To receive confirmation on successful execution of a command

f) HES shall ensure data integrity checks, for example, checksum, time check, pulse, overflow, etc. on all metered data

2.3.3 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.

**2.3.3.1 Critical Reporting**

HES shall have alarms and keep record of following events:

a) Event log for node's (meter) events such as tamper/power failures etc.

b) Data not received from nodes/end points

c) Relay does not operate for connect / disconnect

d) Communication link failure with nodes/end points

e) Network Failure

f) Power Failure

#### 2.3.3.2 Non-Critical Reporting

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

a) Retry attempts

b) Missed periodic reading

c) 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 its users.

## 2.4 Meter Data Management system (MDM)

The Meter Data Management system (MDM) shall support storage, archiving, retrieval & analysis of meter data and various other MIS along with validation & verification algorithms. The MDM shall be a scalable and COTS product. 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.

As mentioned in Clause 1.2 (g) of this Schedule, MDM should support the future requirement of utility by way integration with other smart grid functionalities as listed in Clause 1.2 (g) as and when implemented by Utility. In this effort, the methodology as outlined in the approach paper shall be followed.

The key use cases to be enabled by AMISP are provided below. Please note that these are illustrative list of use cases only and is not an exhaustive list. Further please note that all IS Standards shall be applicable.

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 1. | **Scheduled Meter Read Automatically from Consumer Premises** | | | |
| 1.1 | At scheduled frequency meter sends data to HES. Consumption details including non-critical events will be in 15 min block data, and data could be incremental to what was sent by meter in preceding instance | Meter | HES | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 1.2 | At scheduled frequency meter sends billing Data to HES | Meter | HES | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF |
| 1.3 | Scheduled meter data reaches MDM | HES | MDM | Meter Number, reading date & time, kW, kVA, kWh, kVAh, PF, Non-critical Event Code / Date |
| 2. | **Remote Meter disconnection / reconnection** | | | |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 2.1 | Meter re-connect / disconnect operation command | MDM | HES | Meter Number, group of meters, instruction to close switch |
| 2.2 | Consumer meter re-connection / disconnection | HES | Meter | Meter number, action (reconnect/ disconnect) |
| 2.3 | Connection Status Update | Meter | HES | Meter Number, switch status |
| 2.4 | Connection Status Update | HES | MDM | Meter Number, group of meters, switch status |
| 3. | **Utility detects tampering at consumer site** | | | |
| 3.1 | High priority events captured by Meter sent to HES as and when occurred | Meter | HES | Meter Number, event date & time, event Code /description |
| 3.2 | High priority events reach MDM for further action. | HES | MDM | Meter Number, event date & time, event Code /description |
| 3.3 | Notify utility personnel for site inspection | MDM | Email/SMS Gateway | Consumer number, Meter Number, Tamper code, address |
| 3.4 | On analysis and detection of valid tamper event or malfunction, connection is disconnected. | MDM | HES | Consumer number, meter number, action to be triggered (disconnect), action date & time |
| 3.5 | HES sends disconnect command to meter | HES | Meter | Meter Number, action (disconnect) |
| 3.6 | Tamper event shared with CIS. Billing determinants are updated for tamper invoicing | MDM | CIS / Billing Determinants | Meter Number, event date & time, event Code /description |
| 3.7 | Meter re-connection order once tamper issue is resolved | MDM | HES | Meter number, action (re-connect) |
| 3.8 | HES sends re-connect command to meter | HES | Meter | Meter Number, action (re-connect) |
| 4. | **Missed interval readings** | | | |
| 4.1 | On identifying missed interval, HES will re-acquire data for the missing period from meter | HES | Meter | Meter Number, from date & time, to date & time (for which data is missing) |
| 4.2 | On receiving data request command, meter will send data to HES | Meter | HES | Meter Number, reading date & time, kW, kVA, kWh, kVAh |
| 4.3 | Missed Interval and Reads Data acquired by MDM | HES | MDM | Meter Number, readings with date & time |
| 5. | **Consumer connection outage/restoration event** | | | |
| 5.1 | Outage/restore event recorded by meter is sent to HES as and when event occurs | Meter | HES | Meter Number, Outage / restoration Date / Time, Power On or Off count |
| 5.2 | Outage / Restoration Notification | HES | MDM | Meter Number, Outage / restoration Date / Time, Power On or Off count |
| 5.3 | Sharing Outage / Restoration Notification | MDM | OMS/CIS-CRM | Meter Number, Outage / restoration Date / Time, Power On or Off count |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 5.4 | Meter read request from OMS to identify service outage / restoration | OMS | MDM → HES | Meter Number, |
| 5.5 | Meter responds to event poll from HES | Meter | HES | Meter number, Status (live/dead) |
| 6. | **Remote firmware upgrades/ meter configuration changes** | | | |
| 6.1 | Remote firmware upgrade | MDM → HES | Meter | Firmware |
| 6.2 | Configuration Commands: Change tariff parameters, Synchronize clock, Registers reset (status, max, tampering) | MDM → HES | Meter | Meter number, tariff parameters, registers status, event type and priority |
| 6.3 | Status update of Firmware / Configuration | Meter | HES → MDM | |
| 7. | **Load monitoring at demand side** | | | |
| 7.1 | When there is a load violation event recorded in the meter, the information is sent to the CC | Meter | HES → MDM | Meter Number, max demand, date & time of load violation |
| 8. | **Time synchronization** | | | |
| 8.1 | Synchronising RTCs of meters / DCUs/ACP | HES | DCU/Meter | Time Setting |
| 9. | **Metering network changes** | | | |
| 9.1 | Change / new installation in Meter / DCU Network Hierarchy | Meter / DCU | HES | Network identification info including DCUs |
| 9.2 | Change / new installation in Meter / DCU Network Hierarchy | HES | MDM | Network identification info including DCU |
| 10. | **New consumer connection** | | | |
| 10.1 | Receive pre & post-paid new consumer requests | CIS-CRM | MDM | Consumer name, address. Connection request etc. |
| 10.2 | Verify new consumer has paid as per regulation | Billing | MDM | Consumer connection request, Payment details |
| 10.3 | Generate meter installation order | MDM | CIS-CRM /WFM | Consumer ID & details |
| 10.4 | Receive meter installation report | WFM | MDM | Meter number, DT no, Feeder & reading |
| 10.5 | Requesting instant, interval & events data from meters | MDM | HES → Meter | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 10.6 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 10.7 | Once new meter remote read verification is over, confirm new connection with other applications | MDM | Billing / CIS-CRM | Consumer ID, Consumer address, Meter Number, initial reading etc. |
| 11. | **Migrate post-paid consumer to prepaid mode** | | | |
| 11.1 | Receive migration request | CIS-CRM | MDM | Migration request for post-paid consumer with profile |
| 11.2 | Get billing attributes | Billing | MDM | Billing attributes |
| 11.3 | Setup prepaid consumer profile in prepaid engine. If no change in | MDM | Prepaid Engine | Prepaid consumer profile |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| | meter is required, skip next two steps | | | |
| 11.4 | Generate prepaid meter installation order if required | MDM | CIS-CRM / WFM | Consumer ID & details |
| 11.5 | Receive meter installation report | WFM | MDM | Meter number, DT no, Feeder & reading |
| 11.6 | Enable prepaid mode in meter | Prepaid engine | HES → Meter | Engineering token |
| 11.7 | Receive activation confirmation | HES | MDM | Activation status |
| 11.8 | Request instant, interval & events data from meter | MDM | HES → Meter | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 11.9 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 11.10 | Once meter remote read verification is over, share migration request completion detail with other modules | MDM | Billing / CIS-CRM | Prepaid consumer profile |
| 12. | **Migrate prepaid consumer to post-paid mode** | | | |
| 12.1 | Receive migration request | CIS-CRM | MDM | Migration request for prepaid consumer with profile |
| 12.2 | Request meter data | MDM | HES → Meter | Meter Number, Consumer ID |
| 12.3 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) with balance credit |
| 12.4 | Send meter disconnect command | MDM | HES → Meter | |
| 12.5 | Receive connection status | HES | MDM | Disconnect status |
| 12.6 | Enable post-paid mode in meter | MDM | HES → Meter | Engineering token |
| 12.7 | Receive activation of post-paid mode | HES | MDM | Activation Status |
| 12.8 | Request instant, interval & events data from meter | MDM | HES → Meter | Meter Number, Consumer ID |
| 12.9 | Acquire instant, interval / events data from meter by HES which then reaches MDM system. | HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 12.10 | Once meter remote read verification is over, share migration request completion detail with other modules | MDM | Billing / CIS-CRM | Post-paid consumer profile and meter data along with credit balance |
| 13. | **Consumer Registration in Consumer Portal/ App** | | | |
| 13.1 | Consumer clicks on new user on consumer portal/ App, provides RMN or email ID and submits data | Portal/ App | MDM | Request for registration with RMN/email ID |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 13.2 | Utility receives request for registration and sends OTP after verification | MDM | Email/Message Gateway | OTP |
| 13.3 | Consumer submits OTP | Portal/ App | MDM | |
| 13.4 | Consumer receives registration detail | MDM | Email Gateway | Login ID and default password |
| 13.5 | Consumer submits first login request | Portal/ App | MDM | |
| 13.6 | System seeks password change | MDM | Portal/ App | |
| 13.6 | Consumer changes default password | Portal/ App | MDM | |
| 14. | **Consumer Access to Consumption, Billing & Profile Data** | | | |
| 14.1 | Consumer logs in to Portal/ App | Portal/ App | MDM | |
| 14.1 | Consumer Profile for Portal/ App | CIS-CRM | MDM →Portal/ App | Name, Account, Address, Service Points, K Number |
| 14.2 | Consumption Data | MDM | Portal/ App →UI | Consumption profile |
| 14.3 | Billing (post-paid) / Credit Balance (prepaid) | Billing → MDM | Portal/ App | Post-paid Billing history/ Current Bill, Prepaid Recharge history |
| 15. | **Prepaid Consumer Recharge** | | | |
| 15.1 | Consumer logs into Portal / Mobile App | Mob App / Portal | UI | Login |
| 15.2 | Consumer fills-in required detail in UI and requests recharge | UI→ Prepaid App | Payment Gateway | Consumer ID, Recharge amount |
| 15.3 | Consumer selects payment method | Payment Gateway | Net banking /Credit Card / Wallet etc. | |
| 15.4 | Consumer receives payment acknowledgement | Payment Gateway | Prepaid App→Portal →UI | |
| 15.5 | Calculate credit balance for prepaid consumer & update prepaid meter | Prepaid App | HES→Meter | Consumer credit balance (virtual token) |
| 15.6 | Notify credit balance to consumer | Prepaid App | Email/SMS Gateway | Credit Balance |
| 16. | **Post-Paid Consumer Bill Payment** | | | |
| 16.1 | Consumer logs into Portal / Mobile App | Mob App / Portal | UI | Login |
| 16.2 | Consumer is presented with Billing history and current outstanding Bill | Billing → MDM | Portal/ App→UI | Outstanding Bill |
| 16.3 | Consumer requests bill payment. Option to download bill | UI→Billing | Payment Gateway | |
| 16.4 | Consumer selects payment method | Payment Gateway | Net banking /Credit Card / Wallet etc. | |
| 16.5 | Consumer receives payment acknowledgement | Payment Gateway | Billing→ Portal/ App→UI | |

| Sr. | Use Case Activity Description | Source | Destination | Info Exchanged |
|---|---|---|---|---|
| 16.6 | Payment acknowledgement through email/SMS | Billing | Email/SMS Gateway | Payment acknowledgement |
| 17. | **Consumer Service Request** | | | |
| 17.1 | Consumer logs in to Portal/ App | Portal/ App | MDM | |
| 17.2 | Consumer requests for service | UI | MDM | Service request |
| 17.3 | System assigns SRN & sends acknowledgement | MDM | Portal/ App→UI, Email/SMS Gateway | |
| 17.4 | System resolves request & updates consumer records | MDM | Portal/ App→UI, CIS/CRM | |
| 17.5 | System closes SRN | MDM | Email/SMS Gateway | |
| 18. | **Consumer Complaints** | | | |
| 18.1 | Consumer logs into Portal/ App | Portal/ App | MDM | |
| 18.2 | Consumer registers complaint | UI | MDM | Specific complaint |
| 18.3 | System assigns CRN & sends acknowledgement | MDM | Portal/ App→UI, Email/SMS Gateway | |
| 18.4 | System assigns resolution based on nature of complaint | MDM | CIS / OMS / WFM | |
| 18.5 | Target system reports completion of complaint | OMS / WFM | MDM | |
| 18.6 | System updates records and closes CRN | MDM | CIS, Email/SMS Gateway | |
| 19. | **Demand read of meters from consumer premises** | | | |
| 19.1 | Requesting instantaneous, interval, load profile & events data from meters | MDM | HES→Meter | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 19.2 | Acquire instant, interval, load profile & events data from meters by HES which then reaches MDM system. | Meter→ HES | MDM | Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.) |
| 20. | **Staff User Access to Utility Portal** | | | |
| 20.1 | User logs in to Portal | Portal | MDM | Login with appropriate credentials |
| 20.2 | User selects available functions | MDM | Portal → UI | |
| 20.3 | User logs out | Portal → UI | MDM | |

The AMISP 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)]

### 2.4.1 Asset Management

a) 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.

b) 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.

c) Ability to report and log any damage / deterioration in the meter attributable to consumer /utility.

### 2.4.2 AMI Installation Support

a) 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.

b) 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.

### 2.4.3 Meter Data

a) The MDM shall accept input, process, store, and analyze Meter data from HES and meter data collected through handheld meter reading instruments and manual meter reads. In case of manual reads, provision should be there to insert associated notes such as assessed energy, etc. It would responsibility of AMISP for manual meter reading in case of any communication failure, etc. with seven (7) days of such failure.

b) The MDM should accept input, process, store, and analyze non-billing meter data such voltage and power quality data (such as under/over voltage, out of band frequency, etc.) as they are available from HES. 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.

c) The MDM shall provide storage and retrieval of all collected Meter Data, events and alarm. It shall have capacity of storing 5 years data or more (as required by the utility) via archiving.

d) The archiving of data should be done at a frequency of x and all data older than x days/hours should be archived. AMISP’s solution should describe the process of archiving and restoration from the archive.

e) Correctly track & resolve energy usage across meter changes with no loss of individual meter data.

f) 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).

g) Execute on-demand read processes.

h) Handle special metering configurations such as net metering/pre-paid metering/multiple meters at same premises.

i) The MDM shall have the ability to manage at a minimum 5-minute interval data.

j) The AMISP shall ensure data integrity checks on all metered data received from data collection systems.

2.4.4 Data Validation, Estimation, and Editing (VEE)

a) The validation and estimation of metered data shall be based on standard estimation methods (such as max/avg. of past three days, max/avg. of past X number of similar weekdays, max/avg. of similar blocks of past X numbers of similar weekdays, etc.). The MDM should also support and maintain following data-

   i. Registered Read Data including register reads, daily billing cycle, as well as derived billing determinants such as TOU

   ii. Interval Data channels with variable intervals and variable units of measure

   iii. Calculated Data that is derived or computed such as billing determinants and aggregated loads.

   iv. Event data storage of all collected event and alarm data from meters, network equipment, and MDM itself

b) 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

   i. CUM decrements within a billing cycle (except net-metering)

   ii. CUM reads increments more than configurable threshold

   iii. Future or old read dates

   iv. Number of digits exceeds number of meter dials

c) 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

   i. Register decrements (except net-metering)

   ii. Resets (to zero) (except net-metering)

   iii. CUM reads increments more than configurable threshold

   iv. Future or old read dates

   v. Erratic compared to CUM read (sum of TOU reads minus CUM read)

d) MDM shall detect, flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in Demand register reads

   i. Do not reset on cycle

   ii. Do not reset coincident with consumer move-out or move-in

iii. Reset off cycle inappropriately

iv. Too high

e) All data shall be transferred to billing system after meter data validation and estimation including transformer / feeder station wise energy audit.

f) MDM shall estimate usage for non-metered service points such as streetlights, farm lights, traffic signals, etc.

g) The MDM shall maintain both the original received raw data in a non- manipulated state, in addition to VEE data.

h) 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.

i) 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.

2.4.5 Billing Determinants Calculations

The MDM-

a) Shall allow configuring multiple TOU options (e.g. the number and duration of TOU rate periods) by consumer type, tariffs and day type (weekend, weekdays, and holidays) and by season.

b) Shall support the processing of interval data into billing determinants to include the following at a minimum:

i. Total Consumption

ii. Consumption in different time blocks for ToU billing

iii. Maximum Demand (in kW and kVA)

iv. Number of tamper counts

v. Average power factor

c) 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.

d) 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.

e) Shall have the ability to properly account for special situations including, but not limited to, curtailment requests, demand response scenarios (based on use cases provided in Annexure H) when calculating billing determinants and sending them to billing software.

f) Shall have the ability to facilitate implementation of automatic compensation payments by Utility to consumers for sustained outages when requested. Compensation calculations would require cross checking with billing and consumer

balance information to ensure that disconnection is not construed as a no supply event.

### 2.4.6 Prepaid functionality

The MDM with the help of the corresponding HES, should be able to switch the Smart Meter between prepaid and post-paid modes by a simple change in configuration of the Smart Meter firmware remotely. The following prepaid functionality shall apply

a) MDM shall use consumer attributes from Consumer Care System (CCS) and/or Utility Billing system to,

   i. enrol and setup new prepaid/ post-paid consumers

   ii. migrate existing post-paid consumers to prepaid mode and vice versa

b) The MDM should support pre-payment metering capability through interface with a pre-payment application engine.

c) The prepayment system shall ensure that payment and connection parameters are stored centrally, and the details are updated to MDM and consumer portal/ app as per Clause 2.5 of Schedule A of this Contract. Information required by consumer's Mobile App and web portal are shared in near real time.

d) Prepaid consumers shall be provided facility to recharge their account by logging on to the consumer portal/app as per Clause 2.5 of Schedule A of this Contract.

   i. The user interface shall be integrated with the present online payment gateway of the utility. Additional payment gateways shall be implemented if required

   ii. The payment gateways shall facilitate payments through on-line banking, credit cards and payment wallets

e) A prepaid mobile application functionality shall be provided as a recharge option for android OS and iOS. The consumer portal/ app, shall enable consumers to recharge as well as view recharge history, existing balance, daily usage etc.

f) In addition to billing determinants, the MDM shall share, consumer recharge and credit updates with the utility Billing system. Any re-conciliation shall be carried out in the Billing System and the same shall be shared with the MDM for use by the prepayment application.

g) The system shall periodically monitor the energy consumption of prepaid consumer and decrease the available credit based on consumption. For this purpose, the MDM shall fetch billing data (kWh/kVAh consumption and MD) at configured intervals[4] from the prepaid meter. The raw billing data shall be subjected to standard VEE rules before being used to update recharge balance with the help of applicable tariff slabs. The credit balance is updated into meter daily and at re-charge time.

h) The prepayment application shall use determinants such as minimum fixed charges, TOU tariffs, slab rates, duties & surcharge while calculating consumer credit/balance.

[4] The frequency of pre-configured intervals shall be at least every hour in addition to that at re-charge time

Fixed charge shall be deducted on daily basis irrespective of the consumption, even after disconnection of supply and adjusted in the next transaction.

i) The prepayment application should be able to automatically apply different TOU tariffs for future date lines, while calculating consumer credits.

j) The system should send connect/disconnect command based on of available credit as per notified rules & regulations.

k) The system should send low-credit notifications to the consumer when their balance approaches a pre-configured threshold. Alerts shall initiate on every recharge, low credit and load connection/disconnection. The alerts shall be posted on the consumer web Portal/ App in real time and sent through SMS and email. Consumer should also be alerted through other mechanisms such as one-time alarm / beep from the meter, LED blinking, message, etc.

l) It shall be possible to configure an “emergency” credit limit in INR as well as day terms. This emergency credit shall be used as reserved amount that is consumed when consumer credit is exhausted. The credit amount shall be adjusted in next recharge transaction.

m) It shall be possible to configure certain prepaid consumers where auto-disconnections shall not happen due to negative credit. The conditions/protocols for auto-disconnections are detailed in Annexure I.

n) MDM shall also have a facility to configure arrear recovery mechanism to recover arrears from a consumer. Some of the indicative mechanism to recover the same can be recovery of [X]% from every recharge amount while the rest goes as charging amount till all the arrears are recovered. Alternately the arrears may be settled in next [X] instalments as decided by utility such that not more than 50% of any instalment shall be adjusted towards arrear.

### 2.4.7 Net Metering

MDM shall flag, alarm and trigger an estimating process including but not limited to when the following events occur:

a) CUM decrements of forward energy within a billing cycle

b) Register decrements for Time of Use (ToU) of forward energy

c) Power generated(exported) by any net-metering consumer more than the installed capacity of solar PV rooftop system

d) Energy exported in any given day by any net-metering consumer more than the programmable threshold value

Like billing for post-paid meters, the billing for net-meters shall take place in the utility Billing server.

### 2.4.8 Exception Management

a) 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.

b) Ability to group, prioritize, filter and send system generated alarms and events to predetermined email addresses, cellular text messages to phone numbers/SMS/consumer care etc.

c) Exception Generation - MDM shall generate exceptions based on configurable business rules including but not limited to the following:

i. Meter tamper alerts

ii. Communication module health alerts for meter/DCU

iii. If the consumption is less/more than pre-defined average consumption

iv. Negative Consumption (not for net-metering)

v. Power outage indications received from the Smart Meter

2.4.9 Service Orders

a) 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.

b) 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.

c) 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.

2.4.10 Revenue Protection Support

a) 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.

b) The business rules for revenue protection alerts shall be configurable via a user-friendly interface.

c) 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.

d) The MDM shall support the analytics/investigation (i.e. view current and historical usage patterns) to validate suspected revenue protection issues.

## 2.5 Utility Interface and Consumer Portal/ App

2.5.1 Utility User Interface

User interface for utility shall have ability for at least the following functionality:

a) The interface is to be Payment Card Industry (PCI) compliant

b) Compare total energy costs on one rate schedule vs. one or many alternative rates.

c) Enable the user to see how different options within a rate affect costs.

d) Enable the user to see how adjusting load or consumption levels or shifting them to different time periods influences costs.

e) Display meter data at a user defined configurable cycle that allows authorized users to view energy usage patterns and the data behind them for selected consumers.

f) Allow authorized users to view metered data, initiate and view reports, modify configurations, and initiate and update service requests.

g) Display 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.

h) Display the energy usage profile for a single meter or group of meters according to Time of Use (ToU) tariff.

i) The UI shall support a configurable utility dashboard for Operations and Utility Management

j) Access to a minimum of three (3) years of historical energy usage and meter reads through the UI.

k) Clearly and visually distinguish between metered, estimated, allocated and substituted data.

l) User management with roles and access rights

m) GUI to provide role-based access based on user identity and user role. Shall have following types of users:

   i. Administrator

   ii. Operator

   iii. Field staff

   iv. Viewer/Guest

n) 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.).

o) Ability to set up alarm and event notifications that can be directed to a combination of configurable email addresses, cellular text messages.

p) UI shall enable viewing of the credit amount updated in MDM for prepaid consumers.

q) Option to send marketing messages and notification to select consumers or selected category of consumers

r) Facility to enable or disable existing functionalities/sections of App/Portal for consumers use.

s) Consumer views to be available to Utility consumer Service Executive also except payment card/bank information.

t) Authorised representative to be enabled for consumer engagement analytics. The analytics to be configurable/ generated with minimal database skill and nil programming requirements.

u) Representative to be able to generate various reports at different intervals the various reports as per Clause 6 of Schedule A of this Contract. It shall be also possible to export the report data in multiple formats such as XLS, CSV format, etc.

v) Provide consumer interactions history to enable efficient consumer complaints and queries resolution with consumer information in single screen.

### 2.5.2 Consumer Portal/ App

Consumer portal and mobile application shall cover all consumer categories and category specific features as applicable prior to operational Go-Live. These apps shall have provision to enable features required to facilitate consumer participation in Demand Response programs which the utility may choose to roll out in future. The consumer web portal and the mobile application (for smartphone and tablet devices using latest and commonly available browsers and operating systems and platforms) shall provide consumers, ready access to features extended by MDM. The Solution shall integrate via a user-friendly graphical interface. It shall provide for self service capabilities such as usage management, billing, service requests, participation in energy efficiency programs etc. Following features shall be supported by Portal / Mobile app:

a) The mobile app and web portal shall support all device form factors such as mobile, tablet, desktop etc. by recognising the device details automatically.

b) It shall be OS agnostic to operating system and devices (iOS, Android, etc.)

c) The interface is to be Payment Card Industry (PCI) compliant

d) It shall work on all standard browsers such as Internet Explorer (IE), Chrome, Safari, Firefox etc.

e) The application should be modular and scalable a COTS product.

f) The application should be native for better user experience.

g) It shall support multiple languages viz Hindi, English and local language(s). Also, notifications should be sent to consumers in local languages.

h) The user experience of the citizen on the Portal and App shall be similar in terms of look and feel, navigation, menu and access to preferences and other data.

i) Menu should have navigation options, not limited to, Home, Settings, Recharge, notification preferences, usage rates, change password, terms and conditions, privacy policy, sign out.

j) It shall have search functionality across all the pages.

Software patches, updates, and minor version upgrades, when they become available for general release, should be part of ongoing support and maintenance services.

#### 2.5.2.1 Functional Requirements of Consumer Portal/ App

Web portal and Mobile app for consumers should have minimum following functionalities:

a) The consumer portal/app shall have a landing Home page. This page shall provide a brief description about the Utility, any promotional features or advertisement for special programs can be placed in this page. Login Component is provided, and

registered users may login using their username and password. New Users can also register by clicking on the First Time Users Register link. The Forgot Password link helps the user to retrieve their password. New users can register by providing their personal information and setting up of security answers. Forgot passwords can be retrieved or reset using OTP through registered mobile number or through email address. The registered users can change their password and account information as well as registered mobile number through OTP feature.

b) The consumer portal/app shall provide consumers with access to consumer ID, meter ID, meter type and name plate details, besides other account information such as account name, address, balance, due, status etc. Any status message pertaining to the account/s viz. alerts/actions shall be displayed here. It shall also provide current and historical consumption in graphical formats for at least 12 months. A more detailed analysis can be provided in a tabular format listing meter reading date, reading, consumption, charges, selected period etc. Consumers shall be able to view interval data, outage flags, voltage, power quality indications, existing tariffs and incentives for selected period. Information about different consumer engagement programs shall also be displayed here.

c) The portal/app shall have the ability to provide option for registering in online/paper billing to the consumer. There shall be a bill summary page that shall display bill information in summary and also option for detailed view and download in pdf format if required by consumer. The use shall be able to pay bill for single and multiple accounts.

d) The portal/app shall be integrated with existing helpdesk of the utility and have the ability to provide option for recording service requests/complaints lodged by the consumer as new connection, disconnection, load change, category change, meter shifting etc. The user can view the service request status. The user can register complaints viz. power failure, faulty meter, streetlight outage etc. Option to track status of service requests and send the notification through SMS, online messaging platforms such as WhatsApp, Email and IVR and should support multiple languages – English / Hindi / regional languages.

e) Mobile App and Web Portal shall facilitate Chat-bot functionality. The portal/ App shall support communication preferences for notification via email/ SMS/ message/ automated call (through utility IVRS), of configured alarms & events to selected users.

f) The information on consumer identification no., meter ID, name plate details, make, type i.e. 1 Phase or 3 Phase, etc. (as per requirement of Utility) shall be updated in HES, MDM, and the consumer portal/app.

g) The consumer Portal/ App shall have the ability 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/ App shall support the view for past electricity usage, last week's, yesterday's, current days or other period etc. as per selection as well as voltage and power quality indications. The portal/ app shall provide user friendly access to consumer for their data via graphs and charts and can download the data into a spreadsheet.

h) The portal/app shall provide option to the consumer to view/download online bill. There shall be a bill summary page that shall display bill information in summary and option for detailed view and download in pdf format. The user shall be able to pay bill for single and multiple accounts.

i) The portal/app shall also provide platform for implementation of peak load management functionality by providing existing tariff & incentives rates, participation options etc. The portal/app shall also can provide consumers with interval data, flags, voltage, power quality indications etc. Show outage information in map view.

j) There should be different UI and landing pages for different type of consumers as per the need of utility.

k) User interface to consumer Portal/ App to access consumer's data from MDM for all authorized consumers shall have ability for at least the following functionality:

i. View metered data, monthly average usage, current monthly consumption, maximum demand and other reports

ii. View data according to Time of Use (ToU), day, week, month, year and season etc.

iii. Update profile information such as mobile number/email etc.

iv. Guest user account/multi-user account access facility for consumer convenience

v. Initiate request for connection/disconnection

vi. Initiate request to switch between pre-paid and post-paid mode

vii. Initiate service requests for maximum demand updating, meter checking etc.

viii. Initiate complaints such as Meter not working, supply off etc.

ix. In case on net-metering consumers, user can view data for both import & export data

x. Can view recharge history, present balance, next possible recharge date and amount etc.

xi. Historical energy consumption and energy charges during the desired time period

xii. Facility to recharge their account through the payment gateway facilitated by the utility.

## 2.6 Network Operation & Monitoring Centre

The Network Operations and Monitoring Centre shall cater to the needs of the,

- Project Management Team and the
- AMI network operations team

The Network operation and monitoring centre shall be created in the utility premises by the AMISP, for which suitable built up space shall be provided by the utility. The built-up space to be arranged by the utility, shall be properly air conditioned, illuminated, and adequate for at least five operator workstations and one cabin for a supervisor.

The AMISP is required to suggest a suitable architecture for the Network Operation & Monitoring Centre, taking care of the security requirements as described in this document. AMISP shall establish connectivity between the workstations located at the NOMC with that of the cloud-based MDM-HES system. In addition, the AMISP shall establish connectivity between the cloud-based MDM system with utility's existing Billing system. This will necessitate creation of a VPN tunnel between the two unless it is decided to migrate the Billing system to the same cloud data centre.
The AMISP must submit the details of the supplied hardware along with the Bid. The AMISP shall asses 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.

### 2.6.1 General Requirements for NOMC 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 AMISP. All hardware components shall be new and suitable for the purposes specified.
All workstations and network equipment (routers, firewall etc.) shall be compatible for remote monitoring using secure Simple Network Management Protocol (SNMP) Ver. 3.0. All hardware shall support IPv6 simultaneously.
The AMISP 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 the 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 Utility for review and approval.
d) Changes/updates proposed will be at no additional cost to the Utility.
e) The porting of software shall be at no additional cost in case of replacement of hardware during the contract period.

### 2.6.2 Minimum Technical Requirements for NOMC Hardware

The network operation and monitoring centre shall be equipped with the following minimum hardware components:

a) Six numbers 17" Operator workstations including one for Supervisor
b) A dual redundant 1 Gbps local area network
c) Internet router with at least 48 no's 1 Gbps LAN ports and redundant at least 2 Gbps internet ports supporting IPsec, and SSLVPN capability
d) Firewall and intrusion protection system
e) One video display system of at least 70-inch diagonal with laser light source HD cube (DLP technology) supported by,
    i. Dual power supply
    ii. IP based control options and
    iii. Display Port, DVI, HDMI and Analog D-Sub signal interfaces
f) One A3/A4 size laser jet B/W printer with LAN interface

g) One A4 size ink jet colour printer with LAN interface
h) One dual redundant online UPS to support the load of the above-mentioned equipment with minimum 2 hours backup
i) 2 Gbps internet connectivity

The minimum technical specification and requirement to be followed for hardware equipment is as per the table below. < *Hardware Requirements and minimum specification to be defined as per utility requirement*>.

| Hardware Item | Minimum Specification | Quantity |
|---|---|---|
| Firewall | | [X] |
| WAN Router | | [X] |
| Workstation Console | | [X] |
| Printers | | [X] |

## 2.7 System Software Requirements

This section describes the standards and 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 AMISP and the original software manufacturer as necessary to support the functioning of AMI Applications systems. All the system software to be used for the present scope of work shall have valid license(s).

### 2.7.1 Software Standards

All software provided by the AMISP under this 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 Open Software Foundation (OSF) and X/Open. The AMISP shall commit to meet the "open systems" objective promoted by industry standards groups.

#### 2.7.1.1 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 colour selections and other individual display attributes.

When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user

#### 2.7.1.2 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 (as mentioned in this RFP) and Annexure E.

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 & Interoperabilit**y: 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 Relational Database Management Systems (RDBMS) 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.

#### 2.7.1.3 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 AMISP and shall be valid throughout the contract period.

#### 2.7.1.4 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 Network Time Protocol (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.

#### 2.7.1.5 Remote Diagnostic

Remote Diagnostic facility with necessary hardware as required shall be provided for communication between the AMI application system at the cloud data centre and the NOMC for the diagnosis of hardware & software problems. The login shall be protected by a username & password entry. An automatic logging and intimation shall be provided to inform authorized person from AMISP/utility on such events of remote access and diagnosis.

#### 2.7.1.6 Development System as a Test Bench

A Development system independent of the production environment shall be defined at the cloud data centre 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 VLAN separated from the production VLAN and shall be self-sufficient to carryout testing of changes/ modifications.

### 2.7.2 Network Communication

The network communications software shall use a standard network protocol such as TCP/IP, UDP etc. and shall support IPv6. The software shall link dissimilar hardware nodes such as local and remote workstations and peripheral devices into a common data communication network allowing communications among these devices. The network communication software, shall include—network security, security management, patch management and network services of the AMI system. Network communication software shall have scalability feature as envisaged.

### 2.7.3 Cloud Service Providers (CSP)

This section mentions key requirements from the Cloud Service Provider (CSP). AMISP shall be responsible to provide the services of CSP.

#### 2.7.3.1 General Conditions

The cloud data centre shall have to comply with requirements of tier III category which applies to a concurrently maintainable site infrastructure with redundant capacity components and multiple independent distribution paths serving the critical environment. All IT equipment shall be dual powered. The following general conditions will apply:

a) Only GI (MeghRaj) cloud services or Meity empanelled Cloud services should be used. The Cloud Service Provider (CSP), empanelled by MeitY, should be audited by STQC.

b) One of the most critical issues in the Cloud Service implementation is the security of the data. It is the responsibility of the AMISP to define the security services that need to be implemented for their workloads depending on the nature of the applications / data hosted on the cloud.

c) AMISP need to ensure that the CSPs facilities/services are compliant to various security standards (as mentioned in Clause 2.7.3.4 of Schedule A of this COntract) and should be verified by third party auditors.

d) CSP should suitably address all the potential risks and issues in cloud implementation including data security and privacy, increased complexity in integration with existing environments, vendor lock-in, application portability between different platforms, exit management / Transition-Out Services etc.

e) The AMISP shall be responsible for providing the cloud data centre services. It shall be up to the AMISP, to identify the critical service agreements with the concerned cloud data centre provider in order that the AMISP can meet and sustain the SLA for the AMI project as per Clause 7.7 of Schedule A of this Contract.

f) All Services including data should be hosed in India

g) Exit Management / Transition-Out Services -The responsibilities of the CSP during the Exit Management Period need to be agreed upon with the Utility and they should assist the Utility in migrating the data etc.

h) The responsibilities of CSP include migration of the data, content and any other assets to the new environment or on alternate cloud service provider's offerings and ensuring successful deployment and running of the Utility's Solution on the new infrastructure

i) The ownership of the data generated upon usage of the system, at any point of time during the contract or expiry or termination of the contract, shall rest absolutely with the Utility.

The AMISP may also choose to procure the following Managed Services (O&M – Cloud Services) from a Managed Service Provider (MSP) in addition to the cloud services to handhold the department in managing the operations on the cloud. The scope of MSP may include:

a) Migration of Existing Applications to Cloud / Deploying of new applications;

b) Operations & Maintenance Services on Cloud (e.g., Resource Management, User Administration, Security Administration & Monitoring of Security Incidents, Monitoring Performance & Service Levels, Backup, Usage Reporting and Billing Management)

c) Exit Management & Transition-out Services, etc.

#### 2.7.3.2 MeitY's Guidelines

While the security, storage, data and compliance tools are provided by the CSP, it is the AMISP's responsibility to ensure that the CSPs facilities/services are certified to be compliant to standards.

In the MeitY's guidelines to Government Departments on Adoption / Procurement of Cloud Services, the following are included as essential certification by CSP. AMISP also needs to ensure that the CSPs facilities/services are certified to be compliant to the following standards (indicative list provided below):

a) ISO 27001 - Data Center and the cloud services should be certified for the latest version of the standards towards information security management system

b) ISO/IEC 27017:2015-Code of practice for information security controls based on ISO/IEC 27002 for cloud services and Information technology

c) ISO 27018 - Code of practice for protection of personally identifiable information (PII) in public clouds.

d) PCI DSS - compliant technology infrastructure for storing, processing, and transmitting credit card information in the cloud

#### 2.7.3.3 Functional Requirements of the CSP

##### 2.7.3.3.1 Operational Management

a) CSP should provide access of cloud virtual machines either by SSH in case of Linux and RDP in case of Windows servers.

b) CSP should enable Utility to get console access of cloud virtual machine from portal and perform operations.

c) CSP should upgrade its hardware time to time to recent configuration to delivery expected performance for this Project.

d) Investigate outages, perform appropriate corrective action to restore the hardware, operating system, and related tools.

e) CSP should manage their cloud infrastructure as per standard ITIL framework in order to delivery right services to Project.

f) The CSP should allow different users with different level of access on CSP portal. For example, billing user should not be able to provision resources or delete any resources

g) The CSP should allow quota management for each department/ISV/Group. The resources to specific department/group/ISV should be as per allocated quota only. If there is any request for more than quota request, then it should be sent as request to admin.

#### 2.7.3.3.2 Compatibility Requirements

a) CSP must ensure that the Virtual Machine (VM) format is compatible with other cloud provider.

b) CSP should give provision to import cloud VM template from other cloud providers.

c) CSP should ensure connectivity to and from cloud resources used for this project is allowed to/ from other cloud service providers if required.

#### 2.7.3.3.3 Cloud Network Requirement

a) CSP must ensure that the non-production and the production environments are in separate VLANs in the cloud so that users of the two environments are separated.

b) CSP must ensure that cloud VM are having private IP network assigned.

c) CSP must ensure that all the cloud VMs are in same network segment (VLAN) even if they are spread across multi data centres of CSP.

d) CSP should ensure that cloud VMs are having Internet and Service Network (internal) vNIC cards.

e) CSP should ensure that Internet vNIC card is having minimum 1 Gbps network connectivity and service NIC card is on 10 Gbps for better internal communication.

f) In case of scalability like horizontal scalability, the CSP should ensure that additional require network is provisioned automatically of same network segment.

g) CSP must ensure that public IP address of cloud VMs remains same even if cloud VM gets migrated to another data centre due to any incident.

h) CSP must ensure that public IP address of cloud VMs remains same even if cloud VM network is being served from multiple CSP data centres.

i) CSP must ensure that the public network provisioned for cloud VMs is redundant at every point.

j) CSP must ensure that cloud VMs are accessible from Utility private network if private links P2P/MPLS is used by Utility

k) CSP must ensure that there is access to cloud VMs if Utility requires to access it using IPSEC/SSL or any other type of VPN.

l) CSP should ensure that cloud VM network is IPV6 compatible.

m) CSP should ensure use of appropriate load balancers for network request distribution across multiple cloud VMs.

#### 2.7.3.3.4 Cloud data centre specifications

a) All the physical servers, storage and other IT hardware from where cloud resources are provisioned for this project must be within Indian data centres only.

b) Selection of DC-DR site architecture shall be in accordance with applicable laws including but not limited to the “Disaster Recovery Best Practices” guidelines issued by the Ministry of Electronics & Information Technology (MEITy) and as amended from time to time”.

c) The CSP data centres should have adequate physical security in place.

d) The Data Centre should conform to at least Tier III standard (preferably certified Uptime Institute certifications by a 3rd party) and implement tool-based processes based on ITIL standards.

#### 2.7.3.3.5 Cloud Storage Service Requirements

a) CSP should provide scalable, dynamic and redundant storage.

b) CSP should offer provision from self-provisioning portal to add more storage as and when require by respective Utilities.

c) CSP should clearly differentiate its storage offering based on IOPS. There should be standards IOPS offering per GB and high-performance disk offering for OLTP kind of workload.

d) CSP should have block disk offering as well as file/object disk offering to address different kind of Project needs.

#### 2.7.3.3.6 Cloud Security Requirements

a) CSP should ensure there is multi-tenant environment and cloud virtual resources of this project are logically separated from others.

b) CSP should ensure that any OS provisioned as part of cloud virtual machine should be patched with latest security patch.

c) In case, the CSP provides some of the System Software as a Service for the project, CSP is responsible for securing, monitoring, and maintaining the System and any supporting software.

d) CSP should implement industry standard storage strategies and controls for securing data in the Storage Area Network so that clients are restricted to their allocated storage

e) CSP should deploy public facing services in a zone (DMZ) different from the application services. The Database nodes (RDBMS) should be in a separate zone with higher security layer.

f) CSP should give ability to create non-production environments and segregate (in a different VLAN) non-production environments from the production environment such that the users of the environments are in separate networks.

g) CSP should have built-in user-level controls and administrator logs for transparency and audit control.

h) CSP cloud platform should be protected by fully managed Intrusion detection system using signature, protocol, and anomaly-based inspection thus providing network intrusion detection monitoring.

#### 2.7.3.3.7 Data Management

a) CSP should clearly define policies to handle data in transit and at rest.

b) CSP should not delete any data at the end of agreement without consent from Utility.

c) In case of scalability like horizontal scalability, the CSP should ensure that additional generated data is modify/deleted with proper consent from Utility.

#### 2.7.3.3.8 Managed Services

a) Network and Security Management:

i. Monitoring & management of network link proposed as part of this Solution. Bandwidth utilization, latency, packet loss etc.

ii. Call logging and co-ordination with vendors for restoration of links, if need arises.

iii. Addressing the ongoing needs of security management including, but not limited to, monitoring of various devices / tools such as firewall, intrusion protection, content filtering and blocking, virus protection, and vulnerability protection through implementation of proper patches and rules.

iv. Ensuring that patches / workarounds for identified vulnerabilities are patched / blocked immediately

v. Ensure a well-designed access management process, ensuring security of physical and digital assets, data and network security, backup and recovery etc.

vi. Adding/ Changing network address translation rules of existing security policies on the firewall

vii. Diagnosis and resolving problems related to firewall, IDS/IPS.

viii. Managing configuration and security of Demilitarized Zone (DMZ) Alert / advise Utility(s) about any possible attack / hacking of services, unauthorized access / attempt by internal or external persons etc.

b) Server Administration and Management:

i. Administrative support for user registration, User ID creation, maintaining user profiles, granting user access, authorization, user password support, and administrative support for print, file, and directory services.

ii. Installation/ re-installation of the server operating systems and operating system utilities

iii. OS Administration including troubleshooting, hardening, patch/ upgrades deployment, BIOS & firmware upgrade as and when required/ necessary for Windows, Linux or any other O.S proposed as part of this solution whether mentioned in the RFP or any new deployment in future.

iv. Ensure proper configuration of server parameters, operating systems administration, hardening and tuning

v. Regular backup of servers as per the backup & restoration

vi. Managing uptime of servers as per SLAs.

vii. Preparation/ update of the new and existing Standard Operating Procedure (SOP) documents on servers & applications deployment and hardening.

#### 2.7.3.3.9 Business Continuity Plan & Backup Services

As part of a business continuity plan, the Utility has made a business impact analysis in the event of loss of AMI applications running in the cloud and consequent loss of data to come up with a management plan for the associated risk to business operations. Central to this risk management strategy, the Utility has defined the following target objectives:

**a) Recovery Time Objective (RTO):** Duration of time and a service level within which a business process must be restored after a disruption in order to avoid unacceptable consequences associated with a break in continuity of service. The RTO of [12 hours] shall be met by infrastructure redundancy and failover.

**b) Recovery Point Objective (RPO):** Interval of time that may pass during a disruption before the quantity of lost data during that period exceeds the business continuity plan's maximum allowable threshold. The RPO of [4 hours] shall be met by a suitable backup and replication strategy of operational data / application. The RPO shall define how fast the replicated

data / application can be made available to the target system after a disruption strikes.

With these two objectives, the CSP shall provide the following:

a) CSP must provide backup of cloud resources. The backup tool should be accessible

b) To perform backup and restore management as per policy & procedures for backup and restore, including performance of daily, weekly, monthly, quarterly and annual backup functions (full volume and incremental) for data and software maintained on the servers and storage systems using Enterprise Backup Solution.

c) Backup and restoration of Operating System, application, databases and file system etc. in accordance with defined process / procedure / policy. Monitoring and enhancement of the performance of scheduled backups, schedule regular testing of backups and ensure adherence to related retention policies

d) Ensuring prompt execution of on-demand backups & restoration of volumes, files and database applications whenever required.

e) Real-time monitoring, log maintenance and reporting of backup status on a regular basis. Prompt problem resolution in case of failures in the backup processes.

f) Media management including, but not limited to, tagging, cross-referencing, storing (both on-site and off-site), logging, testing, and vaulting in fireproof cabinets if applicable.

g) Generating and sharing backup reports periodically

h) Coordinating to retrieve off-site media in the event of any disaster recovery

i) Periodic Restoration Testing of the Backup

j) Maintenance log of backup/ restoration

k) CSP should provide network information of cloud virtual resources.

l) CSP must offer provision to monitor network uptime of each cloud VM.

#### 2.7.3.3.10 Web Application Firewall (WAF) as Service

a) Cloud platform should provide Web Application Filter for OWASP Top 10 protection

b) CSP WAF should be able to support multiple website security.

c) CSP WAF should be able to perform packet inspection on every request covering the 7th layers.

d) CSP WAF should be able to block invalidated requests.

e) CSP WAF should be able to block attacks before it is posted to website.

f) CSP WAF should have manual control over IP/Subnet. i.e., Allow or Deny IP/Subnet from accessing website.

g) The attackers should receive custom response once they are blocked.

h) CSP must offer provision to customize response of vulnerable requests.

i) CSP WAF should be able to monitor attack incidents and simultaneously control the attacker IP.

j) CSP WAF should be able to Grey list or Backlist IP/Subnet.

k) CSP WAF should be able to set a limit to maximum number of simultaneous requests to the web server & should drop requests if the number of requests exceed the threshold limit.

l) The WAF should be able to set a limit to maximum number of simultaneous connections per IP. And should BAN the IP if the threshold is violated.

m) CSP WAF should be able to set a limit to maximum length of path to URL.

n) CSP WAF should be able to limit maximum size of request to Kilobytes.

o) CSP WAF should be able to limit maximum time in seconds for a client to send its HTTP request.

p) CSP WAF should be able to BAN an IP for a customizable specified amount of time if the HTTP request is too large.

q) CSP WAF should be able to limit maximum size of PUT request entity in MB

r) The WAF should be able to close all the sessions of an IP if it is ban.

s) CSP WAF should be able to ban IP on every sort of attack detected and the time span for ban should be customizable. There should be a custom response for Ban IP.

t) The Dashboard should show a graphical representation of

   i. Top 5 Attacked Websites.

   ii. Top 5 Attacking IP.

   iii. Top 5 Attack types.

   iv. Top 5 Attacked URLs.

u) For analysis purpose the Dashboard should contain following information:

   i. Number of requests to web server.

   ii. Number of attacks.

   iii. Number of Attackers.

   iv. Types of error messages and on. Of error messages sent to the users.

   v. Total Bytes sent during transaction

#### 2.7.3.3.11 Database support service

a) Installation, configuration, maintenance of the database (Cluster & Standalone).

b) Regular health check-up of databases.

c) Regular monitoring of CPU & Memory utilization of database server, Alert log monitoring & configuration of the alerts for errors.

d) Space monitoring for database table space, Index fragmentation monitoring and rebuilding.

e) Performance tuning of Databases.

f) Partition creation & management of database objects, Archiving of database objects on need basis.

g) Patching, upgrade & backup activity and restoring the database backup as per defined interval.

h) Schedule/review the various backup and alert jobs.

i) Configuration, installation and maintenance of Automatic Storage Management (ASM), capacity planning/sizing estimation of the Database setup have to be provided and taken care by the AMISP.

j) Setup, maintain and monitor the 'Database replication' / Physical standby and Asses IT infrastructure up-gradation on need basis pertaining to databases

### 2.7.3.4 Security

Further, commercial CSPs offer cloud services to multiple consumers. In such an environment, the security controls and compliance to various standards (Including ISO 27001, ISO 27017, and ISO 27018) should be verified by third party auditors. Third-party certifications and evaluations provide assurance that effective physical and logical security controls are in place.

Although, the Cloud Service Providers (CSPs) offer assurances of effective physical and logical security controls through the third-party certifications such as ISO 27001, ISO 27017, ISO 27018, etc. and also may provide a host of security services such as encryption, web application firewall, etc., it is the responsibility of the AMISP to define the security services that need to be implemented for their workloads depending on the nature of the applications / data hosted on the cloud.

Now a days, CSPs offer tools and features to help consumers to meet their security objectives concerning visibility, auditability, controllability, and agility. These tools and features provide basic but important security measures such as Distributed Denial of Service (DDoS) protection and password brute-force detection on CSP's accounts.

However, the following basic security features should be ensured by any CSP-

a) Strong encryption capabilities for data in transit or at rest

b) Firewalls – instance and subnet levels

c) Identity and Access Management (IAM): Control users' access to cloud services. Create and manage users and groups, and grant or deny access

d) Managed Threat Detection: Managed threat detection service that provides you with a more accurate and easy way to continuously monitor and protect your cloud accounts and workloads

e) Managed DDoS Protection: Managed Distributed Denial of Service (DDoS) protection service that safeguards web applications running on cloud.

f) Web Application Firewall: Helps protect your web applications from common web exploits that could affect application availability, compromise security, or consume excessive resources.

g) Key Management Service (KMS): Managed service that makes it easy for you to create and control the encryption keys used to encrypt your data

h) Certificate Manager: Easily provision, manage, and deploy Secure Sockets Layer/Transport Layer Security (SSL/TLS) certificates.

i) Cloud HSM: Meet regulatory compliance requirements for data security by using dedicated Hardware Security Module (HSM) appliances within the Cloud.

j) Inspector: Automated security assessment service that helps improve the security and compliance of applications deployed on cloud

k) Organizations: Policy-based management for multiple consumer accounts. With Organizations, you can create groups of accounts and then apply policies to those groups.

CSPs also offers access to additional third-party security tools (e.g., IDS / IPS, SIEM) to complement and enhance the consumers' operations in the Cloud. The third-party security tools complement existing Cloud services to enable consumers to deploy a comprehensive security architecture. These security tools on cloud are equivalent and identical to the existing controls in an on-premises environment.

The AMISP needs to review and validate the security configurations, review the notifications and patches released by the CSP and validate that the same is being taken into consideration during operations, confirm that the audit trails (e.g., who is accessing the services, changes to the configurations, etc.) are captured for supporting any downstream audits of the projects by the finance or audit organization such as STQC.

#### 2.7.3.5 Reporting

Further, the AMISP should insist on the following regular reporting by CSP during the contract:

a) Availability of the cloud services being used

b) Summary of alerts that are automatically triggered by changes in the health of those services.

c) Summary of event-based alerts, providing proactive notifications of scheduled activities, such as any changes to the infrastructure powering the cloud resources

d) Reports providing system-wide visibility into resource utilization, application performance, and operational health through proactive monitoring (collect and track metrics, collect and monitor log files, and set alarms) of the cloud resources

e) Auto-scaling rules and limits

f) In case of any un-authorized access, the Agency should provide logs of all user activity within an account , with details including the identity of the API caller, the time of the API call, the source IP address of the API caller, the request parameters, and the response elements returned by the cloud service. This is required to enable security analysis, resource change tracking, and compliance auditing

g) Report of all the provisioned resources and view the configuration of each.

h) Summary of notifications, triggered each time a configuration changes

i) Incident Analysis in case of any un-authorized configuration changes.

j) Summary of alerts with respect to security configuration gaps such as overly permissive access to certain compute instance ports and storage buckets, minimal use of role segregation using Identity and Access Management (IAM), and weak password policies

k) Summary of security assessment report that identifies the possible improvements (prioritized by the severity) to the security and compliance of applications deployed on cloud

l) Report on upcoming planned changes to provisioning, either possible optimizations, if any, indicating how the underutilized services can be reduced to optimize the overall spend, or required enhancements (e.g., upgrade to additional storage) to meet the service levels defined in the RFP.

### 2.7.4 Database

#### 2.7.4.1 Initial Database Generation

Development Tools

The AMISP shall provide all necessary software tools for the development and maintenance of the databases required for AMI application.

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.

#### 2.7.4.2 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.

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 AMISP shall be required to provide whether they require or impose any particular hardware and database management techniques to achieve above functionality.

#### 2.7.4.3 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.

#### 2.7.4.4 Integration

The System should support exchange of data from utility's computerized billing & collection, consumer indexing and asset mapping systems residing at different servers.

### 2.7.5 Display Generation, Management and Integration (Display Management and Reporting)

The AMISP 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.

### 2.7.6 Software Utilities

AMISP shall supply all software utilities used to develop and maintain these softwares, 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.

#### 2.7.6.1 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 the entire duration of contract period. 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 as 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 from backup.

#### 2.7.6.2 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.

#### 2.7.6.3 Data Exchange Utilities

Facility of data export and import between this system and external systems shall be provided through web services.

#### 2.7.6.4 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 AMISP 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) Online 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 AMISP shall be responsible for the maintenance & update of the antivirus software during the contract period.

f) Software Upgrade-The AMISP 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 the contract 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.

### 2.7.7 Cyber Security – General Guidance

Cyber security governance problems are unique as well as evolving therefore, they cannot be dealt with a traditional approach. For establishing secure and resilient Smart Meter systems, a standardized cybersecurity framework should be adopted by the AMISP in consultation with the Utility and relevant stakeholders. The key elements of the cyber security framework must include:

a) Differentiation of stakeholders into broad categories to aid in proper distribution of responsibilities among stakeholders and avoid overlapping
b) Defined set of responsibilities for each stakeholder group. As a result, the decision-making process is streamlined, and proper management hierarchy is established for handling the reported cyber-attacks. The roles and responsibilities are divided into two groups:
    i. **Cyber – strategy and governance:** The responsibilities under this group relates to the policy and decision-making aspects of cyber security framework
    ii. **Cyber security – risk, operations and compliance:** This group comprises of responsibilities relating to the operational parts of implementing cyber security policies
c) Standardization of security practices and abundant guidance from knowledge bodies while implementing security controls and processes. There are multiple global security standards and Indian standards that are relevant in context of underlying technologies used in smart meters:
    i. National Institute of Standards and Technology (NIST) has developed a framework for Cyber Physical Systems (CPS). The Framework provides a taxonomy and organization of analysis that allow the complex process of studying, designing, and evolving CPS to be orderly and sufficiently encompassing.
    ii. Department of Electronics and Information Technology (DeitY), Government of India has developed a National Cyber Security Policy. It aims at protecting the public and private infrastructure from cyber- attacks. The policy also intends to safeguard "information, such as personal information (of web users), financial and banking information and sovereign data”.
d) Cyber security incident management: The ISO/IEC Standard 27035 outlines a five-step process for security incident management, including:
    i. Prepare for handling incidents.
    ii. Identify potential security incidents through monitoring and report all incidents.
    iii. Assess identified incidents to determine the appropriate next steps for mitigating the risk.
    iv. Respond to the incident by containing, investigating, and resolving it
    v. Learn and document key takeaways from every incident

Notwithstanding the measures suggested above, the following guidelines/strategies shall be taken care of by the AMISP for making the entire AMI system including the NOMC immune to Cyber Attacks.

a) All the Hardware, OS and application software shall be hardened.
b) Application, scanning and hardware scanning tools shall be provided to identify vulnerability & security threats.
c) Data shall be encrypted at system/device/technology level.

d) Network Zoning shall be implemented as per the proposed architecture. However, the AMISP may suggest other methods of network architecture without compromising the security of the System.
e) Internal user shall be allowed to access all adjacent zones. However, they will not have access to remote network zone.
f) While procuring cyber security items testing must be done and the system must be secure by design.
g) Residual information risk shall be calculated by AMISP and same shall be submitted to the Utility for approval.
h) All default user id & passwords shall be changed.
i) All log in/out and cable plugs in/ out shall also be logged in Central Syslog server.
j) Penetration & Vulnerability assessment test from certified auditors during FAT, SAT & Operations and Maintenance period.
k) Auditing by third party during FAT, SAT and annually during operations and maintenance period shall be in the scope of AMISP.
l) As the computer system in NOMC has access to external environment the AMISP shall document and implement Cyber Security Policy/Plan in association with the Utility to secure the system.
m) Latest Cyber Security Guidelines issued by CERT-In specified at http://www.cert-in.org.in/, Ministry of Power (including "Testing of all equipment, components, and parts imported for use in the power Supply System and Network in the country to check for any kind of embedded malware /trojans/ cyber threat and for adherence to Indian Standards – Regarding" vide Order No. No.9/16/2016-Trans-Part(2) published by Ministry of Power, Government of India dated 18 November 2020 and amended from time to time) or any other competent authority shall be followed.
n) AMISP shall adhere with the appropriate security algorithm for encryption and decryption as per established cyber security guidelines. For smooth functioning of the entire system, it is essential that the AMISP shall provide in the form of a document enough details of such algorithm including the mechanism of security key generation to the Utility. In case of proprietary or secret mechanism, the same shall be kept in a secured escrow account.

### 2.7.8 Data Privacy

AMISP should describe ensure that the system is compliant with the applicable provisions of the "Reasonable security practices and procedures and sensitive personal data or information Rules, 2011 (IT Act)" as well as shall be committed to work with Utility for compliance to Personal Data Protection requirements. In this regard, the general elements of the data privacy framework may include:

1. The Utility shall be the sole custodian of the Smart Meter data. The AMISP and its contracted vendors will have limited need basis access to the data. In case of pre-mature termination or at the end of contract, the AMISP and the contracted vendors should relinquish all access to the data and transfer the same to the Utility.
2. AMISP is required to prepare and submit a "Privacy by Design" document to the Utility which details out all the policies, practices, processes and technologies employed to manage, and process the Smart Meter data in a secure manner. This should also include the details on methods of anonymization applied to the personal Smart Meter data based on data types defined below:

i. Aggregated Data: No identification individually and at neighbourhood level unless explicitly required to report
ii. Anonymised Data: A data set which has individual Smart Meter data but without any personally identifiable information like consumer name, account number, address etc.
iii. Personal Data: A data set with Smart Meter data tagged with personally identifiable information.

3. AMI system should enable the Utility to get the consumer consent on sharing and processing of Smart Meter data based on following criteria
   i. Consumer consent not required
      1) If any type of Smart Meter data is processed by the Utility or a third party on behalf of Utility for the purpose of generating bills, identifying theft, network planning, load forecasting or any related activities that can enable the Utility to fulfil its duty as a licensee.
      2) If any type of Smart Meter data is requested by the law enforcement agencies.
      3) If aggregated or anonymised data is shared with not-for-profit academics, policy research, civil society entities for research that can benefit the sector in general.
   ii. Opt-out consumer consent
      1) If any type of smart meter data is shared with or processed by any third-party commercial entity to provide services other than as enabled by regulation. In this case, the AMI system should enable the Utility to conduct the following consumer consent process
         - Consumer should be notified and given a time to opt-out
         - Consumer should have the right to change his/her option through the app/web account/direct communication to Utility.
4. AMI system should enable following Data sharing protocol
   i. Data should be shared by providing finite and secure access to the system. The access can be modified or terminated as need be.
   ii. Sharing of part/full database shall be subject to review and consent of Utility.
5. All data sharing shall be recorded and periodically submitted to utility for review / regulatory requirement
6. AMISP should have a data breach response plan and should communicate to the utility and consumers in case of any data breach from AMI system
7. AMISP is responsible to conduct 3rd party data privacy audit at least once every year based on evaluation criteria pre-identified by the Utility in consultation with data experts. The audit report should be made available to Utility. AMISP to take necessary actions on audit observations in consultation with the utility.

## 3. AMI System Integrations

The MDM will act as the bridge to integrate the AMI system with other utility IT/OT systems. These IT/OT systems may be already existing or those which the Utility have planned. The IT/OT systems may include but not be limited to the following:

a) Billing, CIS, IVRS, CRM systems
b) Legacy Data Collection Systems
c) HHU/CMRI or manual reading system etc.

d) Consumer Portal/ App
e) GIS
f) SCADA, OMS
g) PLM, DRMS
h) Asset Management System
i) Work Force Management System
j) DT Monitoring System
k) EVSE

The details of the existing integration infrastructure, including specificity in implementation, interface and services available for each of the existing enterprise applications which the AMISP has to integrate with the AMI system, has been provided in Annexure L of Schedule A of the AMISP Contract.

For those IT/OT systems which the Utility have planned in future, the AMISP shall publish document on available standard interfaces to enable their integration.

### 3.1 AMI Integration with Utility Legacy Systems

It will be necessary to integrate the MDM with the utility legacy systems following robust industry standard mechanisms.

MDM shall interface with other utility legacy systems as well as the HES on standard interfaces. The data exchange models and interfaces shall comply with CIM-XML-IEC 61968 / IEC 61968-100 / Web Services / MultiSpeak. MDM solution shall be ESB-SOA enabled.

The HES shall follow the integration protocol established by IS 15959 (DLMS-COSEM) and make use of ACSE and xDLMS services to communicate with southbound field devices (DCUs and Smart Meters) irrespective of the physical communication layer.

The aim of the above interface standards is to ensure generic two-way interfacing of the MDM with other applications. This effort shall be guided by the methodology whose details are outlined in the approach paper set out in Project Implementation Plan.

### 3.2 Integration with national level reporting platform

The AMI system put in place should provide a seamless exchange of data with a national level data portal without any manual interface including NFMS. In this regard, the MDM shall have an out-bound interface to facilitate data transfer through API-based model/ service bus to a central platform as and when made available. An indicative data list will be provided by the Utility for sharing with the national level reporting platform during contract period. The technical interface (such as web services, published APIs, DB table schemas etc.) for enabling this integration, will be defined accordingly. However, the AMISP needs to ensure the following:

a) Any reports / analytics / graphics from system would provide opportunity to anonymize/ remove traceability to individual consumers to maintain privacy
b) Reports/data made available in the public domain for public consumption should be always sufficiently aggregated/ anonymized so as to protect consumer privacy.

## 4. Consumer Indexing

Consumer indexing will be carried out/verified for the incoming population of smart meters for end-to-end metering at contiguous electrical locations in the selected AMI Project Area only. The responsibility for consumer indexing for dispersed metering at non-contiguous electrical locations in the selected AMI Project Area shall lie with the Utility. For this a door-to-door survey shall be required for each meter installed and tallying it with the consumer related records (physical, electrical and commercial) available with the Utility. In establishing the linkage of the consumer meter to the electric network, the asset (including the meter) codification as used by the utility GIS (or as per standards set by the utility) shall be strictly followed. If the GIS asset database is available, the verified consumer data shall be uploaded into the GIS database for a single point of truth, presentation and secondary evaluation. If GIS is not available, then the AMISP is required to create a standalone consumer indexing database. This database of electrical indexing shall have the following broad parameters:

- Energy Meter name plate details
- Meter clustering if any
- Sealing Status
- Installation Date
- Start Reading (New Meter) and Last Reading (Old Meter)
- Geo Location
- Customer Name
- Username
- Postal Address / Telephone / Email
- Sanctioned Load
- Pole/DT/Feeder Code

Either of the following checks may be done to establish the correctness of the indexing database. The selection of these methods or any other equivalent method shall be at the sole discretion of the AMISP vendor.

1. Correlation of DT wise energy loss with load flow studies; or
2. Selective demand trip of DT to identify meters under outage

## 5. Consumer Engagement

5.1 AMISP shall develop a consumer engagement plan for smooth implementation of AMI system. The plan at the minimum should include consumer engagement activities to be undertaken at Utility's headquarter, division and sub-division level as well as communication and media plan for the same. The plan should include educating consumers about the pre-paid recharge mechanism, benefits of pre-paid meters, potential usage of Smart Meters data for consumers, etc;

5.2 Utility shall provide necessary inputs for developing a comprehensive consumer engagement plan;

**5.3 The Utility shall implement consumer engagement plan with support of AMISP. This would include running media campaign to raise awareness and counter myths around smart metering prior to installation, etc.**

## 6. Analytics and Reports

### 6.1 Analytics including Energy Audit

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

a) **Energy Audit:** Perform DT/Feeder/ Sub-Division/ Division/ Circle wise energy audit for configurable period. These energy audit reports shall clearly bring out the technical and commercial losses through detailed analysis of supply side energy data and corresponding aggregated consumption data of connected consumers. In this analysis it must factor in data of energy export from net-metered consumers. The automated audit should include but not limited to:

   I. A daily automatic feeder loss (Feeder Head reading minus summation of all DT meters readings)
   II. Automatic LT Energy loss (DT meter reading minus summation of readings of all those consumer meters served by the selected DT) would be reported
   III. Billing and collection efficiency
   IV. Identify the top [X] best as well as worst performing feeders and DTs

b) 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, consumer type (hospitals, schools, govt. offices, multiplexes, commercial, residential, industrial etc.), or any user specified collection of meters.

c) Generate peak & off-peak load patterns by aggregating all loads of consumer group/consumer type/DT/Feeder over configurable period/day type.

d) Perform load analysis for different groups and categories of consumers in different weather conditions.

e) Ability to provide the data to load forecasting, load research or demand response applications (based on use cases provided in Annexure H) and perform error management such as missed reads and intermittent meter reads before sharing data with load forecasting, load research or demand response

f) 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.

g) Analyzing data to identify new patterns of usage, Setting fraud alert / transformer overload alerts / demand – supply gap alert etc.

h) Ability to receive and store outage and restoration event data from Smart Meters and outage systems and to log all such events for analysis and also support calculation of compensation payments for sustained outages. Five reliability indices shall be calculated,

   i. System Average Interruption Duration Index (SAIDI), which is sum of all consumer interruption durations in a given period over total number of consumers served.

   ii. System Average Interruption Frequency Index (SAIFI), which is the total number of sustained interruptions in a given period over total number of consumers served.

   iii. Consumer Average Interruption Duration Index (CAIDI), which is sum of all consumer interruption durations in a given period over the total number of sustained interruptions in that given period

   iv. 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

   v. Momentary Average Interruption Frequency Index (MAIFI), which is the total number of consumer interruptions less than the defined time (1 or 5 minutes) over the total number of consumers 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.

i) 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.

j) Identify & visualize poor performing assets such as feeder/DT on multiple criteria such as energy losses, outage duration etc. through appropriate colour coding depending on severity thresholds.

k) Analyze data of net-metering consumers to identify patterns of energy export to grid on hourly/weekly/monthly/yearly basis.

## 6.2 Reporting Function

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 through GUI of Utility user interface (refer to Clause 2.5.1 of Schedule A of this Contract for more details). The AMISP 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.

6.2.1 The MDM shall generate following reports (an indicative list only). Utility may request for additional reports as well during the contract period.

i. Daily data collection report

ii. Usage exceptions

iii. VEE validation failures

iv. Missing interval Read date and times (on hourly, daily, weekly & monthly basis) and their trends

v. Physical meter events (install, remove, connect, disconnect) & meter reset report

vi. Meter flags

vii. Meter inventory

viii. Defective meters

ix. AMI performance measurements

x. Threshold exception

xi. MIS reports and analytical reports including but not limited to following:

1) Payment collection summary and details in a day/week/month/year or as per user selectable period and trends

2) Number / list of disconnected consumers due to inadequate prepaid account balance

3) Prepaid consumers running low on account balance

4) Connected consumers

5) Critical notifications sent to consumers

6) Revenue analytics as per consumption pattern of consumers (in terms of money and energy units). This shall also include automatic compensation payments by Utility to consumers for sustained outages, if implemented

6.2.2 Following high level reports for Utility Management shall be generated automatically at specified frequencies to help management with business decisions. *<Below is an example of reports5 that may be generated. These reports should be defined and agreed by the utility>*

| Category | Report | Frequency |
|---|---|---|
| Energy Audit | Energy Audit Report (DT/ Feeder / Sub-Division/ Division/ Circle wise):<br>• A daily automatic feeder loss report (Feeder Head reading minus summation of all DT meters readings)<br>• 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<br>• Billing and collection efficiency | Daily, Monthly and User Selectable Time Period with configurable near real time alerts for exceeding defined loss threshold |

[5] These reports shall be generated provided the corresponding DT/ Feeder data is available as part of the AMI system being installed.

| Category | Report | Frequency |
|---|---|---|
| | • Identify the top [X] best as well as worst performing feeders and DTs | |
| Reliability Indices | 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 |
| Load Management | 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) and load rise trend | Monthly and User Selectable Time Period |
| POWER QUALITY | 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 |
| Loss Analytics | 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> |

5.2.3 The utility interface should have ability to generate reports on critical and non-critical information directly from the HES as per Clause 2.3.3 of Schedule A of this Contract.

5.2.4 The utility interface shall have feature to generate report related to SLAs being mentioned in Clause 7.7 of Schedule A of this Contract.

5.2.5 Ability to generate various analytics reports as per Clause 6.1 of Schedule A of this Contract.

5.2.6 AMIS shall submit a detailed report on data being shared as per Clause 2.7.8 on a yearly basis. AMISP shall submit detailed report on any exception in general data

sharing on monthly basis. Further, AMISP shall also submit a detailed report for any other time period as requested by utility.

## 7. Operation and Maintenance

### 7.1 Scope and period

The operation, maintenance, and support services start after the successful completion of the operational go-live of the system as per Clause 9.6 of Schedule A of this Contract. Operation, maintenance and support services shall extend up to end of [X] meter-months from operational go-live. The scope of work under operation and maintenance services shall include,

a) Comprehensive maintenance of all the software (including licensing and annual technical support cost)
b) Comprehensive maintenance of all hardware at the Operation and Monitoring Centre, along with field devices (like Smart Meters, DCUs etc.) provided by AMISP under the project
c) Comprehensive maintenance of all equipment under leased service like cloud data centre, MPLS band width etc.
d) Comprehensive maintenance of NAN / WAN communication infra between field devices and the cloud data centre
e) Day to day operations of the AMI system under supervision and authority of the Utility. These shall include among others,
    i. New meter installation
    ii. Changeover of consumer meters from post-paid to prepaid mode and vice versa
    iii. Firmware update of remote devices (Meters and DCUs) as required
    iv. Update of tariff slabs
    v. Ensuring completion of recharge cycle of prepaid consumer meters
    vi. Connecting, disconnecting or reducing consumer's licensed load under approval from the Utility
    vii. Initiating resolution of consumer trouble tickets raised by utility CCS
    viii. Ensuring availability of BP, LP, interval data and event notifications from meters in time schedules as agreed with the utility
    ix. Ensuring scheduled completion of billing determinant calculations
    x. Ensuring daily reports from the AMI system as per agreed list, are made available to utility
    xi. Ensuring Consumer Portal is kept updated
    xii. Ensuring smooth data traffic between the MDM and utility systems
    xiii. Patch management of AMI applications at cloud data centre
    xiv. Provide backup data to support SLA and AMISP invoicing
    xv. Carry out performance checks of various functions as per agreed schedule or on demand

As part of their Operation and Maintenance responsibilities, the AMISP shall develop a compendium of Operation and Maintenance Manuals covering the areas mentioned in serial number e), Clause 7.1 of Schedule A. These manuals shall be kept updated as often as necessary to reflect best practices being employed in the project.
The AMISP is to hand hold the Utility team to take over operation, maintenance and support services after completion of contract 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.

## 7.2 AMISP's Responsibilities under Operation & Maintenance Services

The AMISP shall make available the following man-power resources at the utility's Network Operations cum Monitoring Centre,

a) One resident Project Manager cum Supervisor,
b) [Three] numbers operations staff
c) [One] support engineer for each category of hardware supplied and
d) [One] software specialists for each domain.

The above-mentioned operation and support staff shall be made available as required to meet the SLA and system availability requirements. Re-distribution of any support engineer/specialist at the cloud Data Centre shall be at the discretion of the AMISP.

## 7.3 Maintenance Practices

For all third-party equipment (Hardware & Software) AMISP shall have back to back support along with supply of spare with appropriate response time from OEM/OEM Authorized representatives. AMISP shall be responsible for coordination with the OEM for all matter related to equipment.
The maintenance practice followed by AMISP shall be in accordance with best industry practices and must include the following:

a) Scheduled preventive maintenance, performance monitoring, system backup, hardware & software maintenance and update, field & network devices firmware update, emergency response and troubleshooting etc.
b) Maintaining adequate spares for maintenance.

### 7.3.1 Preventative Maintenance Activity

The preventive maintenance activities shall be performed by the AMISP to keep the system running at optimum level by diagnosis and rectification of all hardware and software failures and would broadly include:

a) Repair / replacement of defective equipment
b) Configuration of the replaced hardware and software, periodic routine checking as part of a preventive maintenance program
c) Monitoring of the performance of the system and doing necessary tuning for optimum performance to accommodate any changes such as addition of new components
d) Providing all necessary assistance to the Utility for addition and modification of utility user interface, consumer Portal/ App displays, and Database
e) Ensure Backup of the system at regular interval which is mutually decided during system design
f) Restoration of the systems upon its failure and to restore the functioning of the various application / systems at the cloud data centre. Towards this, the RPO and RTO shall have to be measured no less than once a month.

### 7.3.2 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 AMISP and shall be part of the maintenance activities.

#### 7.3.3 Spares inventory

As part of project implementation plan, the AMISP shall detail the spares inventory that shall be maintained for the AMI Project. These spares shall be used as and when required by the AMISP for the project and no separate charges shall be payable. The AMISP shall decide the items and components to be maintained as spare

## 7.4 Monitoring

The operation and performance of the various systems shall be monitored on a continuous basis. The AMISP shall conduct at least the following monitoring:

a) MDM / HES system error history logs or selected day
b) Field & Network device failure – rate and trends
c) Availability of various communication links
d) Missing meter data – rate and trend
e) Reviewing resource information
f) Cyber Security

During monitoring if any defect/ abnormality is found, the AMISP shall undertake corrective maintenance for the same. The Utility's UI shall be kept updated with a summary of such monitored data

#### 7.4.1 System Cyber Security Monitoring

The AMISP shall also be responsible for monitoring of the system from cyber security prospective. The logs of the system shall be analyzed for exceptions and the possible incident of intrusion/trespass shall be informed to the Utility and analysed to discover root cause. The monitoring shall encompass all cyber security devices installed at the cloud data centre as well as at the NOMC such as firewalls, all types of Intrusion prevention system, routers etc.

The Cyber security system shall also be subjected to Annual Security Audit from CERT-In listed auditors at the cost of the AMISP during the contract period. AMISP shall share with Utility such audit reports and implement the recommendations/remedial actions suggested by the Auditor.

## 7.5 Meter Accuracy Tests

In case a Consumer complains about meter accuracy post operational go-live and same isn't reasonably resolved through past consumption trend, Transformer Energy Audit, Check Meter (by Utility), etc. AMISP will be obliged to facilitate the meter testing. In this regard, AMISP shall handover the meter for testing to Utility Lab and install a temporary meter till the period of removal and replacing meter, if found inaccurate or reinstall if found accurate.

## 7.6 Physical Maintenance

The AMISP shall undertake physical maintenance of all equipment/modules under the scope of this contract, in accordance with the schedule as indicated by AMISP in project implementation plan. 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.

## 7.7 Service Level Agreement (SLA)

Service Level Agreement (SLA) shall be monitored as mentioned in the following table. It is expected that the AMI system shall meet the minimum threshold of service defined against each lever. Any degradation below this minimum threshold will attract penalties as per bands of service level met. The idea is that it triggers a proper review of any defect / failure / performance that had been agreed upon for the project, and to find resolutions in keeping with the highest standards of service excellence. The total penalties under SLA categories is capped at [20%] of AMISP Service Charge. AMISP shall ensure that the data collection and computation for the purpose of SLA penalties (as mentioned in the following table) should be automated and visualised in Utility Interface as per Clause 2.5 of Schedule A of this Contract. For this purpose, each of the designated scheduled tasks in the following table, shall signal[6] the SLA computation application to record the start time. The same designated tasks shall generate mile-stone signals[7] in order that the SLA application is able to record times when various thresholds (as indicated in the table) of meter population have responded. For system level availability, the SLA computation application shall offer a ticketing system which shall be used by the Utility &/or AMISP to raise an incident against any line item at corresponding severity level. The incident originator shall select the severity level followed by selecting the incident description (as per Annexure J) available as a drop-down list within the SLA application. The ticketing system shall follow a process flow such that,

a) The AMISP's response along with time of response are recorded. This 'response' may be a simple acknowledgement of the incident or a rejection of the incident as not being part of its 'scope of work' with adequate explanation.
b) Utility's acknowledgement or rejection of AMISP 'response' along with time are recorded. If utility acknowledges the incident to be irrelevant to AMISP's scope of work, then the incident is immediately closed, and no further records are maintained for this incident[8].
c) Resolution &/or workarounds are recorded and submitted by AMISP along with time
d) In case of enhancements and change requests, AMISP's Plan of Action (POA) and schedule are recorded
e) AMISP's POA and schedule (for enhancements and change requests) are approved by utility
f) Resolution as submitted by AMSIP is approved by utility and the incident closed. In case of rejection of resolution, the incident shall remain live and shall have to be re-worked by the AMISP.
g) All submittals, acknowledgements, approvals/agreements shall have system generated time stamps by default. There shall be also provision for a separate manual entry of time stamps.

[6] This signal shall be always automated, and the SLA Application would know precise number of meters involved.
[7] Alternate provision may be kept for manual entry of time for such mile-stone signals but with proper backup monitoring report made available.
[8] The first two process steps in the ticketing system of the SLA App shall ensure complete agreement between Utility and AMSIP, before an incident is accepted for resolution.

| Data Type | Performance Requirement (Averaged over a month)[9] | Penalty | SLA Penalty Calculation (For understanding purpose only) |
|---|---|---|---|
| **A. Scheduled Tasks** | | | |
| **1. Scheduled Interval data readings** | | | |
| Periodic collection of the interval load profile data for the day[10] | From 95% of meters within 8 hours | Deduction of 0.2% of AMISP Service Charge for every 1% or part there of capped at 1% penalty | Maximum Penalty of 1% if action takes place for <91% of meters |
| **2. Scheduled Interval data readings** | | | |
| Periodic collection of the interval load profile data for the day[11] | From 98% of meters within 12 hours | Deduction of 0.2% of AMISP Service Charge for every 1% or part there of capped at 1% penalty | Maximum Penalty of 1% if action takes place for <94% of meters |
| 3. **Scheduled daily meter readings** | | | |
| Previous days'[12] interval energy and total accumulated energy | From 99.9% of meters within 24 hours after midnight | Deduction of 0.2% of AMISP Service Charge for every 1% or part there of capped at 2% penalty | Maximum Penalty of 2% if action takes place for <90.9% of meters |
| **4. Scheduled billing profile data for the bill period** | | | |
| Collection of billing data for the bill period | From 100% of meters within 72 hours of the scheduled periodic collection/ end of the billing period. Please refer to Annexure K for the billing schedule | Deduction of 0.5% of AMISP Service Charge for every 0.5% or part there of capped at 3% penalty | Maximum Penalty of 3% if action takes place for <97.5% of meters |
| **5. Scheduled energy audit and reliability indices report[13] (DT wise)** | | | |
| Generation of monthly energy audit and reliability indices report | From 100% of DT installed meters within 384 hours (16 days) | Deduction of 0.1875% of AMISP Service Charge for every 1% or part there of capped at 1.5% penalty | Maximum Penalty of 1.5% if action takes place for <93% of meters |

[9] Local intervention allowed to achieve SLAs

[10] Assuming interval of 30 minutes. <In case, Utility aims to change the interval, accordingly the performance requirement may need to be changed>

[11] Assuming interval of 30 minutes. <In case, Utility aims to change the interval, accordingly the performance requirement may need to be changed>

[12] All previous days from the last billing cycle

[13] As defined in Clause 6 of Schedule A of this Contract. Unless both energy audit and reliability indices report (DT wise) are generated at scheduled periodic interval, AMISP shall be considered non-compliant to the defined SLA and shall be liable to penalties.

| Data Type | Performance Requirement (Averaged over a month)[9] | Penalty | SLA Penalty Calculation (For understanding purpose only) |
|---|---|---|---|
| **6. Scheduled energy audit and reliability indices report[14] (Feeder wise)** | | | |
| Generation of monthly energy audit and reliability indices report | From 100% of installed Feeder meters within 384 hours (16 days) | Deduction of 0.25% of AMISP Service Charge for every 0.5% or part there of capped at 1.5% penalty | Maximum Penalty of 1.5% if action takes place for <97.5% of meters |
| **B. Remote Actions / tasks performed by AMI System** | | | |
| **7. For remote connect/disconnect with acknowledgement/ response for selected meters** | | | |
| Remote connect / disconnect of the AMI meters | Action performed at 90% of meters within 15 minutes | Deduction of 0.5% of AMISP Service Charge for every 0.5% or part there of capped at 2.0% penalty | Maximum Penalty of 2.0% if within 15 minutes, delivery takes place for <88.5% of meters |
| **8. For remote connect/disconnect with acknowledgement/ response for selected meters** | | | |
| Remote connect / disconnect of the AMI meters | Action performed 99.9% of meters within 6 hours | Deduction of 0.5% of AMISP Service Charge for every 0.5% or part there of capped at 2.0% penalty | Maximum Penalty of 1.0% if within 6 hours, delivery takes place for <98.4% of meters |
| 9. **Remotely top-up amount (for pre-paid application only)** | | | |
| Delivery of top up amount/ credit recharge in case of prepayment post successful transaction from payment gateway up to consumer interface[15] | 99.9% meters within 30 minutes (delivered and intimated to consumer) | Deduction of 0.5% of AMISP Service Charge for delay of every 0.5% or part there of capped at 3.0% penalty | Maximum Penalty of 3.0% if within 30 minutes, delivery takes place for <97.4% of meters |
| **C. System Availability** | | | |
| **10. Availability of AMI System per month** | | | |
| Availability of AMI System per month | ≥99.5% | Deduction of 0.6% of AMISP Service Charge for every 0.5% or part there of reduction in availability capped at 6.0% penalty | Maximum penalty of 4% shall be deducted when system availability is <95.0% |

[14] As defined in Clause 6 of Schedule A of this Contract. Unless both energy audit and reliability indices report (Feeder wise) are generated at scheduled periodic interval, AMISP shall be considered non-compliant to the defined SLA and shall be liable to penalties.

[15] Delay in delivery of credit recharge information to payment gateway or Utility Billing System excluded from the SLA measurement

**Notes:**

1. Maximum Penalty out of the above shall be restricted at 20% of AMISP Service Charge . The deduction shall be computed as AMISP Service Charge X penalty % as computed in above table
2. The penalty, as mentioned above, shall be computed as per the performance deviated from the performance requirement. For instance, for SLA “Periodic collection of the interval load profile data for the day”, if within 8 hours, data is received from only 94.6% meters which means deviation of 0.4%, then the penalty shall be computed as $\left(\frac{\max(0.4\%,1\%)}{1\%}\text{X } 0.1\%\right)$ = 0.1%.
3. Averaged over a month means weighted average performance from meter population over a predefined time interval. For instance,
    a. Assuming on $i^{th}$ day or event, action was done on $y_i$% of total meters and within stipulated time, data was received from $z_i$% of $y_i$% meters. So, the average SLA over the month shall be computed as $\frac{\sum z_i \times y_i}{\sum y_i}$
    b. For system availability, the availability is computed as $\frac{\text{THM}-(\text{S1 X } 1+\text{S2 X } 0.8+\text{S3 X } 0.5)}{\text{THM}}$; Where THM is total hours in the month when power supply to AMI system is available, S1/S2/S3 is the total non-available hours in Severity Level-1/Level-2/ Level-3. Please refer to Annexure-I for more details on the same.
4. AMISP shall submit AMI generated reports for cases mentioned above based on data available in HES/MDM
5. Exclusions: Power Outages, Meter bypass by consumers, Local Temporary/ Permanent disconnection by Utilities, Meter burnt shall be excluded from above SLA calculations. For these cases, joint visit of AMISP and Utility officials shall be carried out and field inspection report shall be submitted by AMISP to Utility for suitable action.
6. For the purpose of joint visit, AMISP shall put a request to Utility who should allocate manpower for joint visit within 1 working day. In case of non-allocation/ non-availability of manpower from Utility, the report submitted by AMISP shall be final and actionable by Utility.
7. The penalties would be computed on the basis of performance of AMISP for a calendar month.
8. AMISP shall be responsible for collection of billing data for all Smart Meters within a week of the scheduled periodic collection/ end of the billing period.

## 7.8 Duties of Utility and AMISP during Operations and Maintenance Phase

The table in this section provides a summary definition of the roles and responsibilities of the AMISP and the Utility during operation and maintenance phase of the AMI Project.

Legend:

- This indicates who has primary responsibility to perform this function

A: This indicates who will provide assistance

F: Feedback

| Item | Task | Utility | AMISP |
|---|---|---|---|
| **1.0** | **Problem Identification** | | |
| **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. | A | • |
| **2.0** | **Software Problem Resolution** | | |
| **2.1** | Report problem and assist with problem identification | F | • |
| **2.2** | Provide or recommend corrections, temporary patches, workarounds or other fixes to system problems | F | • |
| **2.3** | Install and test corrections, temporary patches, workarounds or other fixes to system problems | F | • |
| **3.0** | **Routine Software (including MDM, HES, Utility Interface, Consumer app/portal) Support** | | |
| **3.1** | Build and maintain database, displays and reports | F | • |
| **3.2** | Perform system back-ups | F | • |
| **3.3** | Restore or reinstall software from back-ups | F | • |
| **3.4** | Monitor system logs (part of remote monitoring service) | F | • |
| **3.5** | Maintain system logs | F | • |
| **3.6** | Maintain user accounts | A | • |
| **4.0** | **Hardware (including meter, DCUs, routers, network operation and monitoring center etc.) 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 | F | • |

| Item | Task | Utility | AMISP |
|---|---|---|---|
| **4.3** | Identify failed component, replace failed components in the system using parts from spares inventory | F | • |
| **4.4** | Restore operation of repaired/replaced equipment | A | • |
| **5.0** | **Hardware Spare Parts** | | |
| **5.1** | Manage local spares inventory | F | • |
| **5.2** | Replenish local spares inventory | F | • |
| **6.0** | **Integration and Database Work At NOMC End** | | |
| **6.1** | Field Device Integration | A | • |
| **6.2** | Other System Integration | A | • |
| **7.0** | **Cyber Security Monitoring** | | |
| **7.1** | Patch Updates | F | • |
| **7.2** | Cyber Security Monitoring | F | • |
| **7.3** | Annual Audits | F | • |
| **7.4** | Implementation of Recommendations during Audit | F | • |
| **8.** | **Manual Meter Read Through HHU In Case of Non-Communication Of Smart Meters** | A | • |

# 8. Training Requirements

## 8.1 Training Categories

The AMISP is required to organize following categories of training for the Utility personnel:

a) **Professional Training** - This is the training for the core group of implementation team of the Utility. 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 AMISP to deliver this training. Standard curriculum designed and agreed by the Utility for hardware, software and network preferably shall be arranged by the AMISP for each group. The Utility will prefer if a portion of the training is conducted on-site.

b) **End User Training** - The AMISP 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 classrooms, etc.

## 8.2 Training modules

The training modules shall include but not be limited to <Utility to update the list of training as required>:

a) AMI Administration & Configuration
b) AMI Installation and troubleshooting
c) Application Management and Operations
d) Database and Data Analysis Reports
e) Cyber Security
f) Smart Meter and communication technology

An indicative list of training is as provided below.

| Item No. | Description | No. of Trainees | Duration in weeks | | Total Man-weeks | |
|---|---|---|---|---|---|---|
| | | | At Utility's facility | At AMISP's facility | At Utility's facility | At AMISP's facility |
| 1 | Smart Grid components Hardware and Software Course | 30 | 1 | 1 | 30 | 30 |
| 2 | Database, Report and Analytic Building Course | 10 | 1 | 1 | 10 | 10 |
| 3 | Application Software | 20 | 1 | 2 | 20 | 40 |

| Item No. | Description | No. of Trainees | Duration in weeks | | Total Man-weeks | |
|---|---|---|---|---|---|---|
| | | | At Utility's facility | At AMISP's facility | At Utility's facility | At AMISP's facility |
| 4 | Operator training & Maintenance course | 40 | 1 | 0 | 40 | 0 |
| 5 | Smart Meter & Communication network | 15 | 1 | 0 | 15 | 0 |
| 6 | Cyber Security Training course | 5 | 0 | 1 | 0 | 5 |
| Total | | 120 | 5 | 5 | 115 | 85 |

## 8.3 Training Schedules

As part of the project implementation plan (refer Clause 10.1 of Schedule A), the AMISP shall draw up a training schedule in consultation with the Utility. This will enable the Utility representatives gain knowledge and understanding of the activities during the following stages of the project implementation, so that they may discharge effective oversight and witness capabilities.

1. Pre-FAT
2. Pre-Operation Go-Live
3. Operation and Maintenance
4. End of Contract

The training modules as described in Clause 8.2 shall be distributed among these phases of the training schedule and mutually agreed.

## 8.4 General Requirements

General requirement for training to be imparted is as follows:

a) Training shall be conducted by AMISP personnel who are experienced instructors and speak understandable [language name].
b) The AMISP shall provide training to various user groups nominated by the Utility. The AMISP shall provide the Training Approach in the response
c) All necessary training material shall be provided by the AMISP. 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 the Utility. The Utility reserves the right to copy such materials, but for in-house use only.
e) For all trainings the travel expenses of the Utility will be borne by the Utility.
f) 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. Training shall be done in batches comprising of Introduction, Basic and Advanced categories.

g) The training will consist of a curriculum of courses to address the issues of system operation, system troubleshooting, business-wide application, changed business processes and general use of the new system.

h) Representatives from the AMISP, Utility'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.

i) Two Engineer's from the Utility shall be stationed at the AMISP's works during development/customization of solution as per the RFP. The deputed utility engineers shall be involved with the project till its completion.

# 9. Tests, Inspections and Management of the Quality Assurance / Quality Control Program

## 9.1 Responsibility of Tests and Inspection

Test and inspections are in the complete purview of the AMISP and its sub-vendors. It shall be ensured that there are no conflicts in roles played between AMISP personnel carrying out tests / inspections, and those assigned responsibilities of quality assurance (QA) and quality control (QC).

The QA/QC organization of the AMISP shall be an independent administrative and functional structure reporting via its manager to the AMISP'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 when actual quality deviates from that stated in the Work Statement. 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 Manager designate for the project shall be the custodian of all inspection and test records/certificates. QA/QC Manager either directly or through its authorised representative shall be responsible for all witness testing, approval of test records and in general, management of the QA/QC program of the project.
The responsibility for inspections and tests is borne by the Inspections and Tests Manager. This team is responsible for creating the various inspection and test procedures and under the general supervision of the QA/QC Manager, conducts the tests.
In the event any imports are required for the purposes of this AMISP Contract, such imports shall be in accordance with all applicable laws including those issued by Ministry of Power (Order No. No.9/16/2016-Trans-Part(2) dated 18 November 2020; as amended and/ or modified from time to time) for testing of imports including those from prior reference countries.

## 9.2 In-Process Inspection

### 9.2.1 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 product to this specification. Type Testing shall comply with the following.

a) The QA/QC Manager shall document, within scheduled period as per project plan, copies of test reports and certificates for all the Type Tests that are specified in the specifications and that have previously been performed. These certificates shall apply to items and equipment that are essentially identical to those due to be delivered under the Contract and test procedures and parameter values shall be identical to those specified in this specification. The type tests shall be carried out at nationally/Internationally accredited labs.

b) Type Tests shall be performed for all equipment types for which certification is not provided as required above. If any of the type tests are required to be carried out, the same shall be carried out by the AMISP.

c) For pluggable NIC modules, the type tests shall be carried out with the NIC module integrated in the field device, that is meters and DCUs being supplied under the project.

d) Type Tests shall be certified or performed by nationally/internationally reputed laboratories using material and equipment data sheets and test procedures that have been developed for the project. The test procedures shall be formatted as in the specifications and shall include a complete list of the applicable reference standards before commencement of test (s).

e) The AMISP shall prepare a detailed schedule for performing all specified type tests.

f) The AMISP shall ensure that all type tests can be completed within the time schedule offered in its Technical Proposal.

g) In case of failure during any type test, the AMISP 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.

h) Documentation for all factory, field, and availability tests that apply to the AMI system shall be provided in accordance with the requirements defined in this section of specification

### 9.2.2 Quality Assurance and Quality Control Program

The QA/QC Manager 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 AMISP'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 program shall provide for prevention and ready detection of discrepancies and for timely and positive corrective action. The QA/QC Manager shall document objective evidence of quality conformance.

Instructions and records for quality assurance shall be controlled and maintained at the system levels. The AMISP shall outline its QA/QC program plan along with any supporting documents in the Technical Proposal and update the QA/QC program document following site the survey.

A Quality Assurance Program of the AMISP 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-contractors' 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.

The QA/QC Manager shall be required to make available to the Inspection and Testing Team, all the Quality Assurance Documents as stipulated in the Quality Plan at the time of inspection of equipment/materials.

### 9.2.3 Scope and Duties of QA/QC Program Manager

The QA/QC Manager of the AMI Project shall have the right to carry out Quality Audit and Quality Surveillance of the systems and procedures of the AMISP's/his vendor's Quality Management and Control Activities. The scope of the duties of the QA/QC Manager, pursuant to the Contract, will include but not be limited to the following:

a) Review of all the AMISP's drawings, engineering data etc.

b) 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.

c) Inspect, accept or reject any equipment, material and work under the Contract in accordance with the specifications.

d) Issue certificate of acceptance

e) Review and suggest modification and improvement in completion schedules from time to time; and

f) Monitor the Quality Assurance program implementation at all stages of the works.

### 9.2.4 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, and the equipment has been approved for shipment by the QA/QC Manager

Documents identified in the hardware and software quality assurance plan and procedures shall be inspected to verify that the required quality assurance activities have been performed in the manufacturing process of hardware and software.

Inspections will include visual examination of hardware, enclosure cable dressings, and equipment and cable labelling.

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 AMISP 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 filed; (c) QA/QC Manager acknowledges in writing the successful completion of the test.

#### 9.2.4.1 Test Plans & Procedures

Test plans shall be provided by the QA/QC Manager, for all tests to ensure that each factory and field test is comprehensive and verifies all the features of the equipment are tested.

The Inspection and Test Manager in AMISP shall prepare detail testing procedure in line with specification. 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.

#### 9.2.4.1.1 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 test engineer and QA/QC 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.

#### 9.2.4.1.2 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.

#### 9.2.4.1.3 Test Records

The complete record of all factory and field acceptance tests results shall be maintained by the designated QA/QC Manager of AMISP. The records shall be maintained in a logical form and shall contain all the relevant information. The test reports shall be signed by the inspection & testing engineer and the QA/QC representative 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 AMISP's test engineer and QA/QC representative.

f) Provision for comments by test engineer and QA/QC representative

g) Copies of any variance reports generated

h) Copies of reports, display copies, and any other hardcopy generated as part of the test.

#### 9.2.4.1.4 Reporting of variances

Starting from the dry run test period, a variance report shall be prepared by the inspection and testing engineer 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. Record of all such variances and their resolution shall be maintained by the QA/QC Manager.

However, at any stage if QA/QC Manager 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.

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 testing and QA/QC 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 QA/QC and test 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 AMISP 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 AMISP 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 between QA/QC Manager and the Inspection and Testing Manager.

The class shall be assigned by the QA/QC representative.

The QA/QC Manager 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).

All actions taken to correct variances shall be documented on the variance report by the AMISP. Sufficient information shall be recorded to enable QA/QC representative to determine the need for and extent of retesting, the need for testing interactions of the correlation 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 satisfactorily and the test engineer and QA/QC representatives have acknowledged correction of the variance on the variance report.

#### 9.2.4.2 Test Initiation

The following conditions must be satisfied before starting any test

a) All test plans and procedures for the test shall be available.

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 available.

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 demonstrable.

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 AMISP using the test plans and test procedures.

#### 9.2.4.3 Test Completion

A test shall be deemed to be successfully completed only when:

a) All variances have been resolved

b) All test records have been documented and issued

c) QA/QC acknowledges, in writing, successful completion of the test.

### 9.2.5 Factory Acceptance Test (FAT)

The factory tests shall be conducted on all the equipment to be supplied under the project. FAT[1] 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, labelling, documentation and completeness of the hardware

Arrangements shall be made to carry out the tests for pluggable NIC modules integrated into three different meter makes, including the make(s) of meter being supplied by the AMISP. The slot for plugging the NIC modules in the meter shall conform to this specification. The FAT shall be carried out on the meter and/or DCU integrated with the NIC modules. If any on-line communication failover has been agreed between the Utility and the AMISP, tests shall be carried out to check a seamless failover of communication. The three makes of meters shall be

[1] It is expected that the FAT for equipment supplies shall happen in phases of delivery. For this a test cum development system environment shall have to be created for the AMI system, with the HES, MDM and Database application servers installed in the target cloud data centre. This test / development system environment shall be separate from the production environment and shall continue to serve the purpose of development system beyond the FAT phase, for the total duration of the project

checked with NIC modules for all type of communication technologies selected for the project.

Before the start of factory testing, the QA/QC Manager 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 enable proper verification of operation of the equipment under conditions not specifically tested in the above structured performance test. All special test facilities used during the structured performance test shall be made available for use during unstructured testing. On the approval of the QA/QC Manager, The Project Manager of the AMISP to inform the schedule of FAT to Utility as soon as finalised, with changes, if any. If the Utility so desires, it may choose to witness the FAT at its own cost.

#### 9.2.5.1 Factory Test Requirements

a) The database displays and the report formats developed for the central system by the AMISP shall be demonstrated and verified at the start of factory testing.

b) All Field Device, AMI functions, communication & networking systems as well as performance shall be tested and demonstrated.

c) The AMISP shall also carry out testing of the standard protocol implementation for successful integration before the FAT starts.

d) All hardware and software associated with AMI Systems shall be staged and completely tested with simulated data at the AMISP's facility.

e) The Tests and Inspection Manager of the AMISP is responsible for conducting all factory tests.

f) 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.

#### 9.2.5.2 Hardware Integration Test

The hardware integration test shall confirm that the computer hardware conforms to this Specification and the AMISP-supplied hardware documentation. The hardware integration test shall be performed when the computer hardware has been installed in the AMISP'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.

#### 9.2.5.3 Functional Performance Test

The functional performance test shall completely verify all features of the AMI Systems hardware and software. This shall mean the suit of application software shall be made to run on the actual CSP infrastructure integrated with the field level hardware components, using selected communication paths. 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 (with failover if any) and data link interfaces with other central systems. This shall include the tests of three makes of meters with different types of NIC modules.

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 performance requirements

m) Verification of the accuracy of hardware and software documentation via random tests

n) Sample check of meter calibration accuracy and testing of spare parts.

#### 9.2.5.4 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 AMISP-supplied equipment shall operate for a continuous 100-hour period. This

minimum level of activity may be augmented, by other activities that represent normal day-to-day operation of the system as long as these activities are conducted in accordance with the 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 ensure 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, un-commanded 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.

#### 9.2.5.5 Unstructured Testing

Periods of unstructured testing shall be allocated to allow AMISP to verify proper operation of the systems under conditions not specifically included in the 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

b) The AMISP's Tests & Inspection Manager along with the QA/QC representative shall be present 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 available for 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 the discretion of QA/QC Manager both at the end of a structured test segment and after completion of the functional performance test.

#### 9.2.5.6 Despatch of Material to Site

The Material Inspection Clearance Certificate (MICC) for all hardware shall be issued by Utility only after successful completion of FAT as per specification. For this the QA/QC Manager of the AMISP is obliged to submit a comprehensive FAT clearance report to the Utility. At least 10 Field Devices for each protocol shall relate to 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.

All Equipment Suppliers/OEMs to the project shall make use of categorised Interim Inspection Reports (CIP Clearance) from Utility to ship materials to site after completion of FAT. CIP shall be issued subject to specific FAT report carried out under the responsibility of the QA/QC Manager. Interim Inspection Report with the lowest category would mean a complete failure of FAT and hence rejection of material. Interim Inspection Reports issued with a category between the lowest and the highest, shall mean pending actionable points of minor nature, but material deemed fit for dispatch to site. In case where CIP is issued with the highest category (with no pending actionable points in FAT), a Material Inspection Clearance Certificate (MICC) shall be issued. The category of CIP shall be authorised by the QA/QC Manager.

## 9.3 Field Installation and Integration Test (FIIT)

Before the start of the FIIT, the following steps have to be completed:

a) All field level hardware which have undergone FAT shall be installed at the site and the installation report signed off.
b) Before the delivery of the first lot of field devices (meters/DCUs etc.),
    a. The production hardware (servers, WS, LAN/Routers, FW, etc.) and software shall be provisioned at the cloud data centre.
    b. The IT hardware shall be installed and made functional at the NOMC with requisite connectivity to the cloud data centre.
c) The installed field hardware shall be configured and registered in the production environment of the cloud data centre.
d) It shall be ensured that the smart meter deployment follows a contiguous area coverage plan. This is to mean for each installation of DT meter, attempt shall be made to prioritize deployment of all downstream consumer meters and for each installation of feeder meter, similar effort shall be made to prioritize deployment of all downstream DT/Boundary meters. However, this requirement of contiguous area coverage plan may exclude dispersed metering for certain industrial, commercial and government consumers at non-contiguous electrical locations as per the scope of work

It shall be the responsibility of the AMISP to devise the FIIT tests regime. The tests regime so developed shall be shared with the Utility for comments and such comments shall be addressed within the FIIT. At the minimum the following tests shall be performed.

a) Proper registration of the incoming population of field devices
b) Checking of user interface linkages with database
c) Remote configuration downloads and reading of profiles
d) If required checking of new meter readings with existing meter readings.
e) Forced event creation and communication of such events
f) Performance tests of device communication links
g) Device communication link failover

h) Integration tests with the MDM in line with a use case table to be drawn up by the AMISP. A use case table is provided in Clause 2.4 of Schedule A of this Contract for reference purpose

## 9.4 Site Acceptance Test (SAT)

SAT shall be carried out with Smart Meters/DCUs in lots as these are delivered and passes through the Field Installation and Integration tests. The first lot to be subjected to SAT shall consist of the complete cloud data centre and its hardware and software components along with supply, installation & integration of a minimum of [5%] Smart Meters/ DCUs (along with its related hardware and software equipment). The SAT for remaining meter population shall be staged on monthly basis based on the total supply, installation and integration of Smart Meters (along with its related hardware and software equipment).

The AMISP 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 AMISP's recommended procedures. The SAT shall exhibit generally all functions of the equipment and duplicate factory test. All variances must be corrected prior to the start of the SAT. The list of final tests to be carried out in the field shall be listed in the site-testing document by the AMISP. Among others, the site testing document shall include the following minimum performance tests:

| Data Type | Performance Requirement |
|---|---|
| **1. Load Profile Data Read**[2] | |
| One-month block load profile for installed meters | From 98% of the meters in 12 hours after the midnight |
| **2. Billing Profile Data Read**[3] | |
| Billing profile data for installed meters | From 98% of the meters in 12 hours after the midnight |
| **3. On-Demand Remote reads of meters** | |
| Collection of 7 days of interval energy data and the current total accumulated energy from a selected individual meter | From 90% of the meters in 2 minutes |
| **4. Remote connect / disconnect** | |
| Action to response for individual meter | Less than 3 mins |
| **5. Updating of data on consumer portal/ app** | |
| Updating of individual consumer data on portal/ app after receiving the data in MDM | Action performed for active on portal consumers within 5 minutes after receiving the data in MDM |
| **6. Ping Response with acknowledgement/ response for selected meters** | |
| For installed meters | Action performed at 99.9% of meters within [1] minute; and |
| For an individual meter | Action performed within 3 seconds |

[2] This performance test shall be done during SAT, from second lot of meters onwards

[3] This performance test shall be done during SAT, from second lot of meters onwards

| Data Type | Performance Requirement |
|---|---|
| **7. Meter loss and restoration of supply** | |
| Receiving of alert for all affected AMI meters | Alert to be received within 3 minutes for 60% of meters |
| **8. Meter Tamper Alerts** | |
| Receiving of alert for an individual meter | Alert to be received within 3 minutes |
| **9. Power Quality Alerts** | |
| Receiving of alert for an individual meter | Alert to be received within 5 minutes |
| **10. Firmware upgrade with acknowledgement/ response for selected meters** | |
| For installed AMI meters | Action performed at 99% of meters within [1] hour; and |
| | Action performed at 99.9% of meters within [2] hours |
| 11. **Remotely altering settings in meter** | |
| For installed AMI meters | Action performed at 99% of meters within [30] minutes; and |
| | Action performed at 99.9% of meters within [1] hour |
| **12. Remotely read events logs** | |
| For reading the full event log for installed AMI meter | 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. |
| **13. VEE processing** | |
| For all installed meters | Action performed in [15] mins |
| **14. Computation of Billing Determinants** | |
| For all installed meters | Action performed in [2] hours |
| **15. Prepaid Recharge** | |
| Payment success to consumer acknowledgement | Within 5 mins |
| Payment success to meter update | Within one hour |
| **16. Utility User Interface** | |
| Manual data entry of new value appears on screen | Less than 6 secs |
| Acknowledgement of any action request | Within 3 secs |
| Display update rate | 2 secs |
| 17. **Disaster Recovery Capability (Refer to Clause 2.7.3.3.9 of Schedule A of this Contract for details)** | |
| Recovery Time Objective (RTO) | [12 hours] as agreed |
| Recovery Point Objective (RPO) | [4 hours] as agreed |

| Data Type | Performance Requirement |
|---|---|
| 18. **On-Demand Remote reads of meters** | |
| Collection of 7 days interval energy data and the current total accumulated energy from a group of 10% of installed base of meters (configurable) | Action performed within 2 hours |

Interim inspection reports shall be generated if the SAT is unsuccessful at any stage and all variances shall have to be corrected and recorded. On successful completion of each lot of SAT a clear SAT Report shall be issued.

## 9.5 System Availability Test

QA/QC Manager will be responsible for oversight of the conduct of 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 QA/QC Manager. AMISP will operate and maintain the system according to procedures described in the AMISP documentation. QA/QC Manager shall 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 AMISP during the availability test period. When on-site maintenance support is needed, qualified AMISP personnel shall arrive at the site within maximum four (4) hours of notification and shall keep records 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 AMISP 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 AMISP’s inventory.

### 9.5.1 Downtime

Downtime occurs whenever the criteria for successful operation defined in Clause 9.6.1 of Schedule A of this Contract 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.

### 9.5.2 Hold time

During the availability test, certain contingencies may occur that are beyond the control of any stake holder. 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". 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 AMISP-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 AMISP is engaged in remedial action and normal functions can be restored by AMISP-defined procedures whenever the failure occurs. Instead of accounting for the actual intermittent downtime, one hour of downtime shall be counted for each 24 hours of otherwise successful operation while the problem persists.

d) **Service Response Time:** A maximum four (4) hours of hold time will be allowed for the AMISP to respond to each call for maintenance support.

e) **Corrected Design Defect**: Hold time may be declared to ensure against similar future occurrences if a failure occurs due to a defect in system design for which the AMISP defines and implements corrective measures. In such a case, hold time shall be allowed in increments of 24 hours to allow verification of the corrective action.

9.5.3 Test Duration and Criteria for Acceptance

After the elapse of [120 hours] of cumulative test time, the availability shall be calculated. Should availability falls short of specified percentage as defined in Clause 9.6.1 of Schedule A of this Contract, the AMISP 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 5 days, Or (b) the AMISP may restart the test for 120 hours, .

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 un-commanded fail over shall have occurred within 48 hours of the test's conclusion.

#### 9.5.3.1 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 | 98% |
| 2. | DCU/ AP | 98% |
| 3. | MDM | 99.5% |
| 4. | HES | 99.5% |
| 5. | NOMC Hardware such as UPS, Router, etc. | 98% |
| 6. | Utility and Consumer User Interface | 99.5% |

The total operational time shall not include the hold time. The system shall be considered available as long as all the requirements defined under Clause 9.5 are available.

## 9.6 Operational Go Live

### 9.6.1 Conditions To Be Met For Operational Go Live

The Operational Go Live of the AMI system shall be considered as completion of the SAT for [5%] or [25,000] of Smart Meters whichever is less (along with its related hardware and software equipment) supplied installed and integrated. AMISP's obligations for Operational Go Live of the system shall be deemed to be met when the following milestones are achieved:

a) Completion of training obligations pre-Operational Go-Live;
b) Supply, installation & integration of [5%] or [25,000] of Smart Meters whichever is less (along with its related hardware and software equipment);
c) Successful completion of SAT for the quantity of Smart Meters as mentioned in serial no (b) above;
d) Successful completion of system availability test for 120 (one hundred twenty) hour. 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.
e) Independent third-party cyber security audit

The Availability Test mentioned in Clause 9.6.1 (d) is meant for the initial supply as mentioned in Clause 9.6.1 (b). For the subsequent lots of Smart Meters along with associated equipment, only up to SAT will be required for operationalising the lot.

### 9.6.2 Certification of Operational Go Live

Following the successful completion of System Availability Tests as per Clause 9.5 of Schedule A of this Contract, the AMISP has to submit the following documentation to the Utility Project Manager:

a. Utility certification of training obligations pre-Operational Go-Live

b. SAT and resolved variance reports of initial installation phase signed by QA/QC Manager

c. Availability and resolved incident reports of System Availability Test signed by QA/QC Manager

d. Initial third-party Cyber Security Audit Report

Based on these submittals the utility shall check for the completeness and accuracy of the submittals and issue Operational Go Live certificate to the AMISP in not more than [3] days from the date of submittal. Commercial operation shall be effective from the date mentioned in this certificate.

## 10. Project Management

Prior to AMI Project Implementation, the AMISP will prepare and submit a detailed project implementation plan, in consultation with the Utility, to ensure smooth takeover of existing Utility systems and any ongoing services under the scope of the AMI Project.

### 10.1 Project Implementation Plan would cover the following:

i. Understanding of Utility and its requirement with respect to Project implementation;
ii. Overall system architecture and system philosophy capable of scale-up;
iii. Details of proposed methodology;
iv. Schematic Diagram of Proposed System Configuration
v. An approach paper documenting the interfaces for integration with existing and future applications based on the information provided by utility
vi. Project team structure;
vii. Line of Credit / Source of funding and supporting documents;
viii. Governance framework;
ix. Resource planning and estimation;
x. Risk planning;
xi. Quality Assurance/ Quality Control of the Program (including Testing and Inspection);
xii. Data Privacy Approach
xiii. Cyber Security Approach;
xiv. Site Survey result;
xv. Documents, Data Requirement Sheet, Drawing submission and approval;
xvi. Installation & Field update schedule;
xvii. Repair and Maintenance Schedule including details on Spares Management;
xviii. Training schedule;

### 10.2 Key Personnel

The AMISP shall appoint at least the following personnel dedicated for the AMI Project

a) **Project Manager:** She / he shall have the authority to make commitments and decisions that are binding on the AMISP. Utility will designate a Nodal officer to coordinate all project activities. All communications between the Utility and the AMISP shall be coordinated through the project manager and nodal officer. The project manager should be an expert in AMI Implementation including metering and related aspects, installation and management of Smart Meters, communication network, last mile connectivity, HES and MDM. The project managers shall be responsible for all communications between other members of the project staffs including sub-contractors, if any.
b) **System Integration Expert:** An 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.
c) **Cyber Security Expert:** An 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

d) **Communication Protocol Expert:** An expert in communication protocols and in implementing applications using different communication technologies and ensuring communication inter-operability across applications/functionalities

The project manager shall be responsible for bringing in the Cyber Security expert and Communication Protocols expert at the appropriate stage in the project as and when required.

## 10.3 Progress Report

A progress report shall be prepared by the AMISP for each month against the activities listed in the project schedule. The report shall be made available to Utility on a monthly basis on a mutually agreed schedule, e.g., the 5th day of each month. The progress report shall include all the completed, ongoing and scheduled activities and transmittals issued and received for the month. The progress report will also highlight the risks to the project and plan for risk mitigation.

## 10.4 Transmittals

Every document, letter, progress report, change order, and any other written transmissions exchanged between the AMISP and the Utility shall be assigned a unique transmittal number. The AMISP shall maintain a correspondence index and assign transmittal numbers consecutively for all AMISP documents. The Utility will maintain a similar correspondence numbering scheme identifying documents and correspondence that the Utility initiates.

## 10.5 Review Meeting

Progress meetings shall be scheduled by the Utility and attended by the AMISP 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 review meeting will also be used to discuss upcoming milestones, support needed from the Utility, risk identified by the Program team, risk mitigation strategies and to make decisions for path forward.

The AMISP shall also attend technical meetings as and when required by the Utility to discuss technical aspects of the project and to review 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 AMISP shall submit documentation describing the systems to the Utility for review and approval.

The Utility will respond with written comments to the AMISP within Fifteen (15) calendar days after receipt of the documents. Documents requiring correction must be resubmitted by the AMISP to the Utility within fifteen (15) calendar days. The Utility will respond to resubmitted documents within seven (7) calendar days after receipt of the document. No Project Implementation Schedule relief is to be implied for documents requiring correction and resubmission to the Utility.

The Utility shall have the right to require the AMISP to make any necessary documentation changes at no additional cost to the Utility to achieve conformance with the Specification.

To help the Utility manage the review and approval of documents during any given period, the AMISP 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.

## 11. Document Requirements

List of documents to be provided by the AMSIP to the Utility over the entire Contract period has been provided below. The timelines for submission along with requirement of Utility approval (if required) have also been provided herewith:

| S. No. | Documentation to be submitted | Frequency | Purpose[4] |
|---|---|---|---|
| **A** | **Pre-Operational Go-Live Phase (from the date of execution of the Contract till the date of achievement of the Operational Go-Live of the AMI system)** | | |
| 1 | A checklist of all documents on which approvals from utility or other agencies may be required; | Once | I |
| 2 | Consumer engagement plan; | Once | I |
| 3 | Detailed Project Implementation Plan including verification of all integrations with external systems as mentioned in this Contract and delineated in the approach paper created for the purpose | Once | A |
| 4 | Exit Management Plan | Once | A |
| 5 | Document/ drawings to indicate the following:<br>i. Tentative location of devices/equipment for setting up communication network with power plan;<br>ii. Confirmation of adequacy of space and AC power supply requirements.<br>iii. Additional items required for interconnection with the existing/owner provided equipment/facilities;<br>iv. Requirement of modification to existing earthing arrangement of NOMC and locations where communication equipment / devices etc. are to be installed, if any. | Once | I |
| 6 | As-Built Drawings | Updated | I |
| 7 | Quality Assurance Plan | Once | A |
| 8 | Notice of Factory Acceptance Test | Periodic | I |
| 9 | FIIT Test Regime | Once | I |
| 10 | Type test reports and associated document as per Clause 9 of Schedule A of this Contract | Once | A |
| 11 | Consumer indexing as per the implemented AMI system | Updated | I |
| 12 | Categorised Interim Inspection Report | Periodic | A |
| 13 | Material Inspection & Clearance Certificate (MICC) | Periodic | A |
| 14 | Progress report briefing the status of installation of meters and key challenges faced if any | Monthly | I |
| 15 | Certification for Operational Go Live with following documentation:<br>i. SAT & resolved Variance Reports | Once | A |

[4] **I**: Informational, no approval required from Utility, **A**: Approval required from Utility based on signed documents submitted by AMISP,

| S. No. | Documentation to be submitted | Frequency | Purpose[4] |
|---|---|---|---|
| | ii. Availability & resolved incident Reports<br>iii. Completion of Training certificate<br>iv. Third party Cyber Security Audit<br>v. Document detailing security algorithm and security key generation method | | |
| **B** | **Post-Operational Go-Live Phase (after the Operational Go-Live of the AMI system till the end of Contract Period)** | | |
| 1 | Monthly progress report briefing the status of installation of meters and key challenges faced if any | Monthly | I |
| 2 | Reports as mentioned in this Contract which includes but not limited to the following:<br>i. Service Level Agreement (SLA) performance report;<br>ii. Monthly progress report including problems that arise with the installed AMI system (if any) including any cyber security related issues and corrective action taken by AMISP for the same. | Monthly | A |
| | iii. Reports mentioned in Clause 6 of the Schedule A of this Contract; | Monthly | I |
| | iv. Cyber Security Audit | Yearly | I |
| | v. Data Privacy Audit report; | Yearly | I |
| 3 | Change Requests / Change Notes | Periodic | A |
| 4 | Change Orders | Yearly | A |
| 5 | Operation and maintenance manual | Updated | I |
| 6 | Exit Management Plan | Updated | A |

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## 12. Project Implementation Schedule

The Project Implementation Schedule for AMI system establishment and timelines for Related Services milestones from date of execution of the Contract are given below:
*<The above timelines are prepared considering an installation of 1-2 million Smart Meters. The utility may appropriately change the timeline of the project in case of larger/ smaller deployments>*

| S.No. | Milestone | Timeline (in months) |
|---|---|---|
| 1 | Submission of detailed Project Implementation Plan giving the compliance sheet along with the make and model of various infrastructure, hardware & software that are proposed for delivery and operations incl.:<br>• Specification of System<br>• Architecture and Software Solution | Within [60] days from the date of execution of the Contract |
| 2 | Approval of detailed Project Implementation Plan by Utility | Within [15] days from the date of submission of Project Implementation Plan. |
| 3 | Delivery, site installation, integration and operationalization of 100% of Feeder Meters each with related hardware, software and equipment | Within [9] months from the date of execution of the Contract |
| 4 | • Delivery, site installation and commissioning of Network Operations cum Monitoring Centre with related hardware, software and equipment; and<br>• Delivery, site installation, integration and operationalization of [5%] of Smart Meters each with related hardware, software and equipment and successful operational go-live | Within [9] months from the date of execution of the Contract |
| 5 | Delivery, site installation, integration and operationalization of 50% of Smart Meters each with related hardware, software and equipment | Within [20] months from the date of execution of the Contract |
| 6 | Installation Milestone | Within [30] months from the date of execution of the Contract |
| 7 | Certification of Installation Milestone in accordance with the provisions of this Contract by Utility | Within [15] days from the date of Installation Milestone. |
| 8 | Operational period of the AMI system | From Operational Go-Live till end of the Contract Period |
| 9 | Transfer of AMI system to the utility | At the end of Term of the Contract in accordance with Exit Management Plan provided in Article 10.6 of this Contract |

**Installation Milestone**

The “Installation Milestone” is defined as the milestone when installation and operationalisation is completed for the number of smart meters envisaged for the project. The AMISP is expected to complete this Installation Milestone as per the table given above. The number of smart meters envisaged may change through negative variations provided for in the Contract as mentioned in Article 13. If the AMISP completes the “Installation Milestone” ahead of schedule, then the revised date shall be accepted as the date of achievement of “Installation Milestone”.

In accordance with Clause 1.15 (w) of Schedule A of this Contract, the Utility shall provide necessary clearance/ approval/ permits that are to be issued by it for initial 20% of contiguous area for Smart Meter deployment along with related documentation within 6 (six) months from date of execution of this Contract. Furthermore, the Utility shall provide necessary clearance/ approval/ permits to be issued by it for remaining contiguous area as well as non-contiguous area for Smart Meter deployment along with related documentation on quarterly basis. Utility shall endeavour to provide 20% of contiguous area cleared each quarter and complete area within 18 (eighteen) months from date of execution of the Contract. The Utility shall issue a Notice no later than 7 days of expiry of time period specified above confirming the actual number of meters for which clearance/ approval/ permits is available. If the Utility fails to issue the necessary clearance and approvals or if the Utility acknowledges that no further consumer/feeder locations are available for deployment within the allotted time, then the meter population for which clearance/ approval/ permits is available shall be assumed as the number required for meeting the “Installation Milestone”.

As and when the “Installation Milestone” is achieved by the AMISP, the Utility shall be obliged to certify the milestone through a written communication giving the date and the meter population installed and operationalised.

## 13. Annexures

**Annexure A Technical Specifications for Whole Current A.C. Single Phase Smart Energy Meter**

***Scope***

These specifications cover the design, manufacturing, testing, supply and delivery of AC whole current, single phase, 2 wires Smart Energy Meter with bidirectional communication facility & remote connect/disconnect switch. The meter shall communicate with Head End System (HES) on any one of the communication technologies mentioned in IS16444 Part 1, as per the requirement of the utility.

***Basic Features***

The Smart Meter would have the following minimum basic features-

- Measurement of electrical energy parameters
- Bidirectional Communication
- Integrated Load limiting /connect/disconnect switch
- Tamper event detection, recording and reporting
- Power event alarms as per IS 16444 Part 1
- Remote firmware upgrade
- Pre-paid features at MDM end (as per IS 15959 Part 2)
- TOD features
- Net Metering(kWh) features (optional as per requirement of utility)
- On demand reading

***General standards applicable for meters***

| S. No. | Standard No. | Title |
|---|---|---|
| 1 | IS 13779 with latest amendments | AC Static Watt-hour Meter class 1& 2 |
| 2 | IS 15884 with latest amendments | Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2)- Specification |
| 3 | IS 16444 Part 1 with latest amendments | A.C. Static Direct Connected Watt Hour Smart Meter 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 |

***Communication***

Meter shall have the ability to communicate with Head End System (HES) on any one of the communication technologies mentioned in IS16444 Part 1 (RF/PLCC /Cellular) in a secure manner. The selection of communication technology should be as per the site conditions and as

per design consideration of AMI Implementing agency to meet the performance as per agreed Service Level Agreements (SLAs). In case of Cellular based meter, the meter shall accommodate SIM card/ e-SIM of any service provider. The meter shall log the removal of the plug-in type communication module removal /nonresponsive event with snapshot.
***Remote connect/disconnect/load limiting:*** Remote Connect/disconnect/Load control facilities would be as per IS 16444 part 1.

***Other Specifications***

| Features | Minimum Requirement of Features |
|---|---|
| Applicable Standards | The meters shall comply with IS 16444 Part 1 for all requirements. |
| Reference Voltage | As per relevant IS (240 V) |
| Current Rating | 5-30 A<br>10-60 A |
| Category | UC1 |
| Starting Current | As per IS 16444 Part 1 |
| Accuracy | Class 1.0 as per IS 16444 Part 1 |
| Limits of error | As per IS 16444 Part 1 |
| Operating Temperature range | As per IS 13779 |
| Humidity | As per IS 13779 |
| Frequency | As per IS 16444 Part 1 |
| Influence Quantities | As per IS 16444 Part 1 |
| Power Consumption of meter | As per IS 16444 Part 1 |
| Current and Voltage Circuit | As per IS 16444 Part 1 |
| Running at No Load | As per IS 16444 Part 1 |
| Test output device | As per IS 16444 Part 1 |
| Meter Display | As per IS 16444 Part 1 |
| Name Plate & marking Meter Display | As per IS 16444 Part 1 |
| Parameters to be measured | As per IS 16444 Part 1 / 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 Part 1 |
| 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 part 1 |
| Alarm | As per IS 16444 Part 1/ 15959 Part 2 |
| Load Control | As per IS 16444 Part 1 |
| Connect/Disconnect switch | UC1 (As per IS 16444 part 1) |
| Status of load switch | As per IS 16444 Part 1 |
| Programmability | As per IS 16444 Part 1 |
| Communication | As per IS 16444. Part 1 |

| Features | Minimum Requirement of Features |
|---|---|
| Data Exchange Protocol | As per IS 16444 Part 1 |
| Remote Firmware upgrade | As per IS 15959 part 2 |
| Real Time Clock (RTC) | As per IS 16444 Part 1/ IS 15959 Part1 & Part 2 |
| Data Retention | As per IS 16444 Part 1 |
| Battery Backup | Meter shall be supplied with separate battery backup for RTC. |
| First Breath (power on) and Last gasp (power off) condition detection and communication to HES | As per IS 16444 Part 1 |
| Plug-in Communication Module | The Smart Meters shall be have a dedicated sealable slot for accommodating plug-in type bi -directional communication module which shall integrate the respective communication technology ( RF/PLCC/ Cellular) with the Smart Meters, leading to easy adaptability for network interfaces (WAN/NAN).The Plug-In module shall be field swappable/ replaceable.<br>The meter/communication module is proposed to have redundant dual communication mode with fallback arrangement to communicate with HES. |

***Data display facility (auto/manual)***

As per IS 16444. However minimum requirement should include the following:

Data Display shall be in two modes-

1. Auto Scroll
2. Scroll with Push Button

The display parameters shall be:

- Auto Scroll

- Display Check
- Date and Time
- Last Recharge Amount
- Last Recharge Time
- Current Balance Amount
- Current Balance days left
- Cumulative Active Energy kWh with legend.
- Current calendar month MD in kW with legend.
- Instantaneous voltage
- Instantaneous Phase current
- Instantaneous Load kW
- Instantaneous average Power Factor

These parameters should be displayed on the Meter Display continuously for a period of 10 seconds on Auto scroll.

- Scroll with Push-button

  All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed:
  - Internal diagnostics (display check)
  - Meter Serial No.
  - Last month cumulative kWh with legends
  - Last month MD in kW with legends
  - Current month Average Power Factor
  - Last month Average Power Factor

Further, the Meter should display high resolution energy values with resolution of 2 digits before decimal and 3 digits after decimal in push button mode

The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. (The order of display may be revised as per requirement of the utility). Meter display should go in to the sleep mode during Power-On condition in case the push button is not operated for more than 10 minutes.

***Anti-tamper features***

The meter shall continue working under tamper conditions as defined in IS 15959 Part 2 and would log the event and send alarm at Head End System after detection of the defined tamper features as per IS 15959 Part 2.

***Type Tests & Test Certificates***

Smart Meter shall be type tested for all the tests as per relevant parts of IS 16444 (latest versions), and certified by Indian Standard wise list of BIS recognized labs as available at https://bis.gov.in/index.php/laboratorys/list-of-bis-recognized-lab/. The number of sampling for testing of meters and criteria for conformity would be as per IS 16444 (as amended up to date). Necessary copies of test certificates shall be submitted as per agreement with the utility.

***Routine & Acceptance Tests***

The Factory Acceptance and Routine tests shall be carried out as per IS 16444 Part 1.

***General & Constructional requirements***

Meter shall be BIS marked as per IS 16444 Part 1. General & construction requirement shall be as per IS 16444/IS 13779

***Meter base & cover*** - Meter base & cover shall be as per IS 16444 Part1 / IS 13779. The meter Base & cover shall be 'Break to open' design. The material for meter base and cover shall be made of high-grade polycarbonate.

The meter Base & cover shall be ultrasonically welded / Chemically welded or other suitable bonding technology and it will not be possible to remove the cover from the base without evidence of damage

***Terminal block & cover*** - As per IS 16444 Part 1/IS 13779

***Design***
Voltage circuit, sealing arrangement, terminal block, terminal cover and nameplate etc. shall be in accordance with IS-16444 Part 1(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.

***Name plate and marking***
The name plate on the meter should be clearly visible, effectively secured against removal and indelibly/distinctly marked in accordance with relevant IS. In addition, "Name of the Utility", purchase order no. & year/month of manufacturing shall be provided on the name plate. The rating plate information shall be as per relevant IS.
***Connection diagram:*** As per IS 16444 Part 1

***Fixing arrangements***
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.

***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.

***Meter box:***
The Meter Box if required by utility/purchaser, would be provided as per requirement of the utility/ purchaser and the material of the Meter Box should be such that it does not hamper communications.

***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. The packing shall indicate marking details like Manufacturer's name, S.No. of meters, quantity etc.

***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 AMISP shall be responsible for any damage during transit due to inadequate or improper packing.

***Testing and Manufacturing Facilities at Manufacturer's Place***

The manufacturer shall have facilities of conducting Acceptance Testing as per IS 16444 Part 1.

***Inspection***

- The meters shall be sealed as per the mutual agreement of the supplier and the purchaser
- The utility/ purchaser may inspect the meter randomly as per sampling plan for acceptance test as per IS 16444 Part 1. The meters shall be tested for acceptance test as per IS 16444 Part 1

## Annexure B Technical Specifications for Whole Current A.C. Three Phase Smart Energy Meter

***Scope***

The specification covers the design, manufacturing, testing, supply and delivery of AC whole current 3 phase 4 wires Smart Energy Meter with bidirectional communication facility suitable for Advanced Metering Infrastructure (AMI) with connect/disconnect switch. The meter shall communicate with Head End System (HES) on any one of the communication technologies mentioned in IS16444 Part 1, as per the requirement of the utility / authorized system integrator.

***Basic Features***

The Smart Meter would have the following minimum basic features-

- Measurement of electrical energy parameters
- Bidirectional Communication
- Integrated Load limiting switch /relay
- Tamper event detection, recording and reporting
- Power event alarms as per IS 16444 Part 1
- Remote firmware upgrade
- Pre-Paid features at MDM end (as per 15959 part 2)
- TOD feature
- Net Metering(kWh) features (optional as per requirement of utility)
- On demand reading

***General standards applicable for meters***

| S. No. | Standard No. | Title |
|---|---|---|
| 1 | IS 13779 with latest amendments | AC Static Watt-hour Meter class 1& 2 |
| 2 | IS 15884 with latest amendments | Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2)- Specification |
| 3 | IS 16444 Part 1 with latest amendments | A.C. Static Direct Connected Watt Hour Smart Meter 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 |

***Communication***

Meter shall have the ability to communicate with Head End System (HES) on any one of the communication technologies mentioned in IS16444 Part 1 (RF/PLC/ Cellular) in a secure manner. The selection of communication technology should be as per the site conditions and as per design requirement of AMI Implementing agency to meet the performance as per agreed Service Level Agreements (SLAs). In case of Cellular based meter, the meter shall accommodate SIM card/ e-SIM of any service provider. The meter shall log the removal of the plug-in type communication module removal /nonresponsive event with snapshot.

***Remote connect/disconnect/load limiting:*** Remote Connect/disconnect/Load control facilities would be as per IS 16444 part 1.

***Other Specifications***

| Features | Minimum requirement of features |
|---|---|
| Applicable Standards | The meters shall comply with IS 16444 Part 1 for all requirements. |
| Reference Voltage | As per relevant IS |
| Current Rating | 10-60 A<br>20-100 A |
| Category | UC1 |
| Starting Current | As per IS 16444 Part 1 |
| Accuracy | Class 1.0 as per IS 16444 Part 1 |
| Limits of error | As per IS 16444 Part 1 |
| Operating Temperature range | As per IS 13779 |
| Humidity | As per IS 13779 |
| Frequency | As per IS 16444 Part 1 |
| Influence Quantities | As per IS 16444 Part 1 |
| Power Consumption of meter | As per IS 16444 Part 1 |
| Current and Voltage Circuit | As per IS 16444 Part 1 |
| Running at No Load | As per IS 16444 Part 1 |
| Test output device | As per IS 16444 Part 1 |

| Features | Minimum requirement of features |
|---|---|
| Meter Display | As per IS 16444 Part 1 |
| Name Plate & marking Meter Display | As per IS 16444 Part 1 |
| Parameters to be measured | As per IS 16444 Part 1 / 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 Part 1 |
| 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 Part 1 |
| Alarm | As per IS 16444 Part 1 /<br>As per IS 15959 Part-2 |
| Load Control | As per IS 16444 Part 1 |
| Connect/Disconnect switch | UC1 as per IS 16444 Part 1 |
| Status of Load switch | As per IS 16444 Part 1 |
| Programmability | As per IS 16444 Part 1 |
| Communication | As per IS 16444 Part 1 |
| Communication Protocol | As per IS 16444 Part 1 |
| Remote Firmware upgrade | As per IS 15959 Part-2 |
| Real Time Clock (RTC) | As per IS 16444 Part 1 /<br>IS 15959 Part 1 & Part 2 |
| Data Retention | As per IS 16444 Part 1 |
| Battery Backup | Meter shall be supplied with adequate separate battery backup for RTC. |
| First Breath (Power on) and Last gasp (Power off) condition detection and communication to HES | As per IS 16444 Part 1 |
| Plug-in Communication Module | The Smart Meters shall be have a dedicated sealable slot for accommodating plug-in type bi -directional communication module which shall integrate the respective communication technology ( RF/PLC/ Cellular) with the Smart Meters, leading to easy adaptability for network interfaces (WAN/NAN).The Plug-In module shall be field swappable/ replaceable.<br>The meter/communication module is proposed to have redundant dual communication mode with fallback arrangement to communicate with HES. |

***Data display facility (auto/manual)***

As per IS 16444. However minimum requirement should include the following:

Data Display shall be in two modes-

1. Auto Scroll
2. Scroll with Push Button

The display parameters shall be:

- Auto Scroll
    - Display Check
    - Date and Time
    - Last Recharge Amount
    - Last Recharge Time
    - Current Balance Amount
    - Current Balance days left
    - Cumulative Active Energy kWh with legend.
    - Cumulative Apparent Energy kVAh with legend.
    - Current month MD in kW with legend.
    - Current month average Power Factor
    - Instantaneous voltage VRN
    - Instantaneous voltage VYN
    - Instantaneous voltage VBN
    - Instantaneous current IR
    - Instantaneous current IY
    - Instantaneous current IB
    - Instantaneous current IN
    - Instantaneous Load kW and kVA
    - Instantaneous average Power Factor

  These parameters should be displayed on the LCD/LED continuously for a period of 10 seconds on Auto scroll.

- Scroll with Push-button

All Parameters mentioned under Auto-Scroll mode should be displayed. Additionally, the following Parameters shall also be displayed:

- Internal diagnostics (display check)
- Meter Serial No
- Cumulative Energy in kVArh Lag/ Lead with legend
- Cumulative Active Energy kWh ToD wise with legends.
- Cumulative Apparent Energy kVAh ToD wise with legends.
- Current month MD in kVAh with legends
- Last month cumulative kWh with legends
- Last month cumulative kVAh with legends
- Last month MD in kW with legends
- Last month Average Power Factor

Further, the Meter should display High Resolution energy values with resolution of 3 digits before

decimal and 2 digits after decimal in push button mode.

The meter's display should return to default display mode (continues auto scroll) if push button is not operated for more than 10 seconds. (The order of display may be as per the requirement of utility). Meter display should go in to sleep mode during Power-On condition in case the push button is not operated for more than 10 minutes.

***Anti-tamper features***

The meter shall continue working under tamper conditions as defined in IS 15959 Part 2 and would log the event and send alarm at Head End System after detection of the defined tamper features as per IS 15959 Part 2.

***Type Tests & Test Certificates***

Smart Meter shall be type tested for tests as per relevant parts of IS 16444 (latest versions), and certified by Indian Standard wise list of BIS recognized labs as available at https://bis.gov.in/index.php/laboratorys/list-of-bis-recognized-lab/. The number of sampling for testing of meters and criteria for conformity would be as per IS 16444(as amended up to date). Necessary copies of test certificates shall be submitted as per agreement with the utility.

***Routine & Acceptance Tests***

The Factory Acceptance and Routine tests shall be carried out as per IS 16444 Part 1.

***General & Constructional requirements***

Meter shall be BIS marked as per IS 16444 Part 1. General & construction requirement shall be as per IS 16444/IS 13779

***Meter base & cover*** - Meter base & cover shall be as per IS 16444 Part1 / IS 13779. The meter Base & cover shall be 'Break to open' design. The material for meter base and cover shall be made of high-grade polycarbonate.
The meter Base & cover shall be ultrasonically welded / Chemically welded or other suitable bonding technology and it will not be possible to remove the cover from the base without evidence of damage

***Terminal block & cover*** - As per IS 16444 Part 1/IS 13779

***Design***

Voltage circuit, sealing arrangement, terminal block, terminal cover and nameplate etc. shall be in accordance with IS-16444 Part 1 (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

***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, "Name of the Utility", purchase order no. & year/month of manufacturing shall be provided on the meter name plate. The rating plate information shall be as per relevant IS.

***Connection diagram:*** As per IS 16444 Part 1

***Fixing arrangements:***
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.

***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.

***Meter box:***
The Meter Box if required, would be provided as per requirement of the utility/ purchaser and the material of the Meter Box should be such that it does not hamper communications.

***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.
- The packing shall indicate marking details like Manufacturer's name, meters #s, quantity, etc.

***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 AMISP shall be responsible for any damage during transit due to inadequate or improper packing.

***Testing and Manufacturing Facilities at Manufacturer's Place***

The manufacturer shall have facilities of conducting Acceptance Testing as per IS 16444 Part 1.

***Inspection***

- The meters shall be sealed as per the mutual agreement of the supplier and the purchaser
- The Utility/ purchaser may inspect the meter randomly as per sampling plan for acceptance test as per IS 16444 Part 1. The meters shall be tested for acceptance test as per IS 16444 Part 1

## Annexure C Three phase CT operated alternating current Smart Meter of Accuracy Class 0.5S ( DT Meter, LT-CT Meter, etc.)

### 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.

| Sl. No. | Standard No. | Title |
|---|---|---|
| 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 | IS:9000 with latest amendments | Basic Environmental Testing Procedures for Electronic & Electrical Items. |
| 5 | IS 12063 with latest amendments | Degrees of protection provided by enclosures of electrical equipment. |
| 6 | IS 14451, Part-2: 1999 with latest amendments | Telemetering for consumption and demand. Direct digital transfer of meter values. |
| 7 | IS 4905: 1999 with latest amendments | Methods for Random sampling. |
| 8 | IS 12346 with latest amendments | Specifications for Testing Equipment for AC Energy meter. |
| 9 | IS 15959 Part 3 (as applicable) with latest amendments | Data exchange for electricity meter reading, tariff and load control: Companion specification |

### C.2 Communication

Meter shall have ability to communicate with HES on any one of the technologies mentioned in IS 16444 (RF/Cellular/PLC) in a secure manner. The selection of

communication technology should be as per the site conditions and as per design requirement of the AMISP to meet the Service Level Agreements (SLAs). In case of cellular based meter, the meter shall accommodate SIM Card / e-SIM of any service provider. The meter shall log the removal of the plug-in type communication module removal /nonresponsive 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 | Ib 5A |
| Starting Current | As per IS 16444: Part2 |
| Accuracy | Class 0.5S as per IS 16444: Part 2 |
| Limits of error | As per IS 16444: Part 2 |
| Operating Temperature range | As per IS 16444: Part 2 |
| Humidity | As per IS 16444: Part 2 |
| Frequency | As per IS 16444: Part 2 |
| Influence Quantities | As per IS 16444: Part 2 |
| Power Consumption of meter excluding communication module | As per I S 16444: Part 2 |
| Current and Voltage circuit | As per IS 16444: Part 2 |
| Running at No Load | As per IS 16444: Part 2 |
| Test output device | As per IS 16444: Part 2 |
| Meter Display | As per IS 16444: Part 2 |
| Time of Use (In case of net-meter both export & import parameters to be measured) | As per IS 15959: Part 3 (as applicable) |
| Parameters to be measured | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) |
| Power Quality Information | As per IS 15959: Part 3 (as applicable) |
| Maximum Demand | As per IS 15959: Part 3 (as applicable) |
| Load Survey/Interval Data | As per IS 15959: Part 3 (as applicable) |
| LED/LCD Indicators | As per IS 16444: Part 2 |
| Tamper/Event recording | As per IS 15959: Part 3 (as applicable) |
| Alarm | As per IS 16444 / IS 15959: Part 3 (as applicable) |

| Particulars | Specifications |
|---|---|
| Measuring Elements | As per IS 16444: Part 2 |
| Anti-Tamper features | The meter shall continue working under tamper conditions as defined in IS 15959 Part 3 and would log the event and send alarm at HES after logging of the defined tamper features as per IS 15959 Part 3. |
| Programmability | As per IS 16444: Part 2 |
| Communication | As per IS 16444: Part 2 |
| Communication Protocol | As per IS 15959: Part 3 (as applicable) |
| Real time clock (RTC) | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) |
| Data Retention | As per IS 16444: Part 2 |
| Battery Backup | Meter shall be supplied with separate battery backup for RTC. |
| Data display facility (manual/Auto) | As per IS 16444: Part 2 (as applicable)<br>However minimum requirement should include the following:<br>Data Display shall have following features:<br>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 3 digits after decimal.<br>• The Push button for manual scrolling in addition to auto scrolling with a persistence time of 10 seconds for each parameter shall be provided.<br>Display of data as per **IS 16444 (Part 2)** |
| Remote Firmware Upgrade | As per IS 15959: Part 3 (as applicable) |

## Annexure D Three phase CT/PT operated alternating current Smart Meter of Accuracy Class 0.5S/ 0.2S (as required) –Feeder Meter, Boundary Meter, HT Consumers, etc.

### D.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.

| Sl. No. | Standard No. | Title |
|---|---|---|
| 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 | IS:9000 with latest amendments | Basic Environmental Testing Procedures for Electronic & Electrical Items. |
| 5 | IS 12063 with latest amendments | Degrees of protection provided by enclosures of electrical equipment. |
| 6 | IS 14451, Part-2: 1999 with latest amendments | Telemetering for consumption and demand. Direct digital transfer of meter values. |
| 7 | IS 4905: 1999 with latest amendments | Methods for Random sampling. |
| 8 | IS 12346 with latest amendments | Specifications for Testing Equipment for AC Energy meter. |
| 9 | IS 15959 Part 3 (as applicable) with latest amendments | Data exchange for electricity meter reading, tariff and load control: Companion specification |

### D.2 Communication

Meter shall have ability to communicate with HES on any one of the technologies mentioned in IS 16444 (RF/Cellular/PLC) in a secure manner. The selection of communication technology should be as per the site conditions and as per design requirement of the AMISP to meet the Service Level Agreements (SLAs). In case of cellular based meter, the meter shall accommodate SIM Card / e-SIM of any service provider. The meter shall log the removal of the plug-in type communication module removal /nonresponsive event with snapshot.

### D.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 | Ib 5A/ 1A (as applicable) |
| Starting Current | As per IS 16444: Part2 |
| Accuracy | Class 0.5S or 0.2S as per IS 16444: Part 2 |
| Limits of error | As per IS 16444: Part 2 |
| Operating Temperature range | As per IS 16444: Part 2 |
| Humidity | As per IS 16444: Part 2 |
| Frequency | As per IS 16444: Part 2 |
| Influence Quantities | As per IS 16444: Part 2 |
| Power Consumption of meter excluding communication module | As per I S 16444: Part 2 |
| Current and Voltage circuit | As per IS 16444: Part 2 |
| Running at No Load | As per IS 16444: Part 2 |
| Test output device | As per IS 16444: Part 2 |
| Meter Display | As per IS 16444: Part 2 |
| Time of Use (In case of net-meter both export & import parameters to be measured) | As per IS 15959: Part 3 (as applicable) |
| Parameters to be measured | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) |
| Power Quality Information | As per IS 15959: Part 3 (as applicable) |
| Maximum Demand | As per IS 15959: Part 3 (as applicable) |
| Load Survey/Interval Data | As per IS 15959: Part 3 (as applicable) |
| LED/LCD Indicators | As per IS 16444: Part 2 |
| Tamper/Event recording | As per IS 15959: Part 3 (as applicable) |
| Alarm | As per IS 16444 / IS 15959: Part 3 (as applicable) |
| Measuring Elements | As per IS 16444: Part 2 |
| Anti-Tamper features | The meter shall continue working under tamper conditions as defined in IS 15959 Part 3 and would log the event and send alarm at HES after logging of the defined tamper features as per IS 15959 Part 3. |
| Programmability | As per IS 16444: Part 2 |
| Communication | As per IS 16444: Part 2 |
| Communication Protocol | As per IS 15959: Part 3 (as applicable) |

| Particulars | Specifications |
|---|---|
| Real time clock (RTC) | As per IS 16444: Part 2 / IS 15959: Part 3 (as applicable) |
| Data Retention | As per IS 16444: Part 2 |
| Battery Backup | Meter shall be supplied with separate battery backup for RTC. |
| Data display facility (manual/Auto) | As per IS 16444: Part 2 (as applicable)<br>However minimum requirement should include the following:<br>Data Display shall have following features:<br>• High Resolution (Shall display energy values with resolution of 2 digits before decimal and 5 digits after decimal.<br>• The Push button for manual scrolling in addition to auto scrolling with a persistence time of 10 seconds for each parameter shall be provided.<br>Display of data as per **IS 16444 (Part 2)** |
| Remote Firmware Upgrade | As per IS 15959: Part 3 (as applicable) |

## Annexure E System Sizing Requirement

### E.1 Sizing Parameter

The system shall be designed as per the technical parameters defined in this specification and as specified in this Annexure.

The AMI system (MDM, Historian, NMS etc.) shall be suitably sized based on expansion requirements mentioned in Article 13 of this contract.

The auxiliary memory and utilization of any of the Servers shall not exceed 30% and 25% respectively of their delivered capacity at any time even under peak loading conditions involving a combination of the following –

- 400 alarms per minute for 5 minutes.
- 10 concurrent display requests from 5 users. Including graphical trends
- Restoration of 100%-meter data after system failure.
- VEE and billing determinant calculations involving 10,000 consumer meters
- 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, and user as defined.

## Annexure F General requirement for common pluggable communication module for Smart Meters

Considering that the new Smart Meters may use different types of communication technologies (RF/PLCC/Cellular, etc.), thus in order to enable different communication modules to be used in the same meter, it is necessary to use a universal interface and a particular size irrespective of the choice of communication technology that defines the dimensions of the communication slot as well as physical placement and location of connectors. The following example recommendations will go a long way in assuring interoperability whilst still complying with the provisions of IS 16444 and IS 15959 standards:

**Part I**

1. **Recommended Module Placement location**

   In order to improve the Radio Performances of any of the wireless technologies encompassing but not limited to Cellular, RF and / or RF mesh, it is recommended to place the communication module anywhere on the accessible part of the meter. This will also enable an easy approach to improve antennae performances.
2. Meter shall have the means of tamper detection to record the event(s) of the removal of the communication module set from the meter, irrespective of whether the meter is in power on (has supply) or powered off (no supply) condition.
3. The Module shall be hot swappable and shall fit snugly inside the meter box, so that the same IP class of the meter is maintained.
4. A transparent cover may be used for the purpose,

   a. To have a sealing arrangement with the meter body as well as
   b. For easy viewing of LED indicators and antenna assembly without having to open the cover.

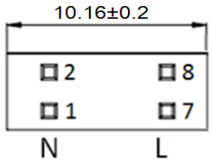
**Part II**

**AC power interface:**

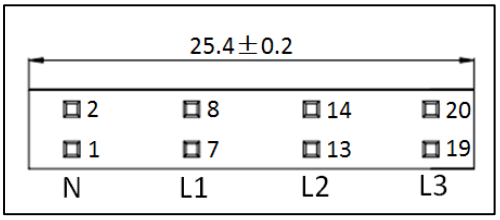
In the event of PLC communication being chosen as the only or one of the choices, the following arrangement of connector and pinouts need to be provisioned on the communication module.

**Female connector**

1. Front View:

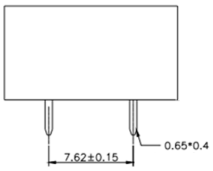



Single phase meter

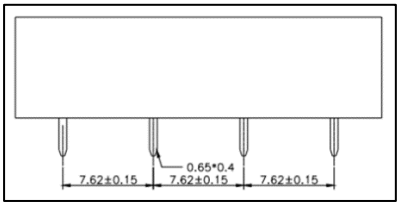



Poly phase meter

2、Top View:

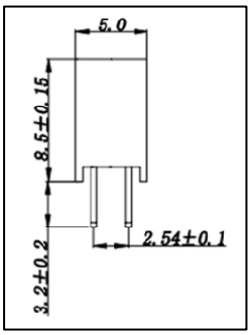



Single phase meter




Poly phase meter

3、Side View:



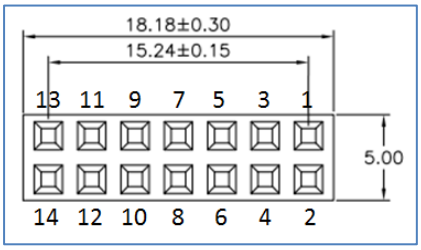

Pin to Pin distance should be: 7.62mm (Standard Pin connector)

**Communication interface:**

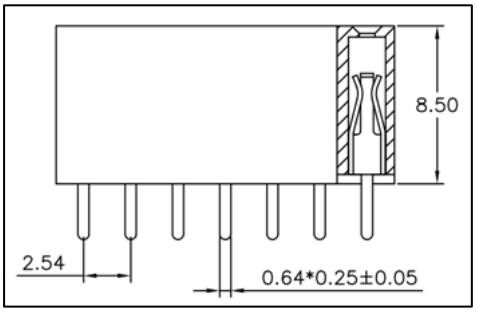
The meter shall have a slot of an appropriate size to allow for the pluggable communication module (such as but not limited to NAN /WAN, dual mode RF, Dual Technology, cellular etc.) to be fit in to the meter. The meter/communication module is proposed to have redundant dual communication mode with fallback arrangement to communicate with HES. The meter shall provide a 14-pins Female socket connector (2*7pin, 2.54mm). The socket shall be selected and positioned to ensure that the male pins on the communication module can connect reliably and easily connect with the female contactors on the meter.

**Female connector**

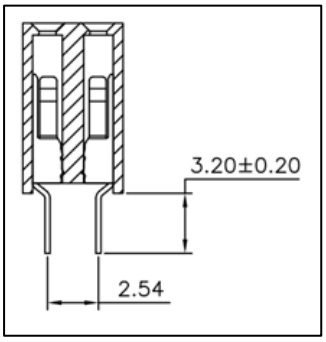
1. Front View：




2. Top View:




3. Side View:



**PIN Outs may be provided as per below details**

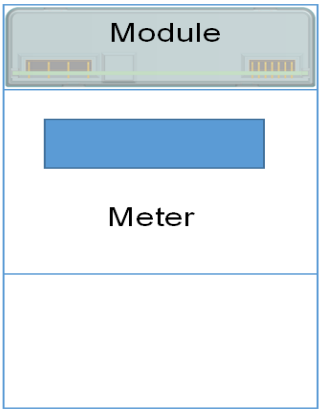
| Pin No | Name | Input/output | Description |
|---|---|---|---|
| 1 | Reserved | / | / |
| 2 | Reserved | / | / |
| 3 | Power EN | Output | Control the module's power supply |
| 4 | Reserved | / | / |
| 5 | Reserved | / | / |
| 6 | Meter TXD | Output | To Module UART port RXD, Min.38400 |
| 7 | Meter RXD | Input | From Module UART port TXD, Min.38400 |
| 8 | Reserved | / | / |
| 9 | RTS | Input | Input digital signal from module |
| 10 | RST | Output | Reset signal for module |
| 11 | CTS | Output | Output digital signal to module |
| 12 | +Vdc | Power | As per IS16444 |
| 13 | GND | Common | Ground Reference Potential |
| 14 | GND | Common | Ground Reference Potential |

**Part III**

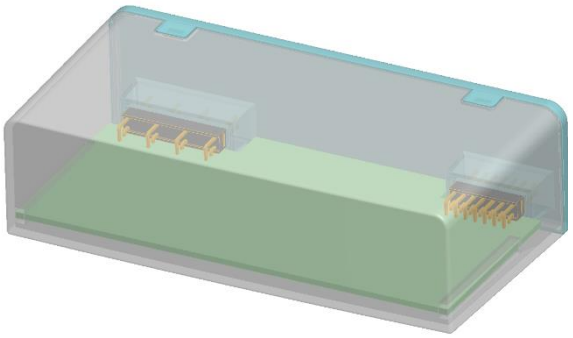
The following reference size may be adhered to irrespective of a single or multiple communication options provisioned on the same module. This standard form factor and dimensions will enable physical and functional interoperability with different makes of meters.

**A. Module 3-D views (For Representational Purpose Only)**

1. Module in meter (Top View)




2. 3D View

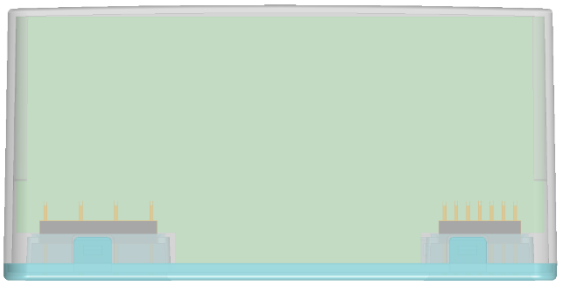


3. Front View

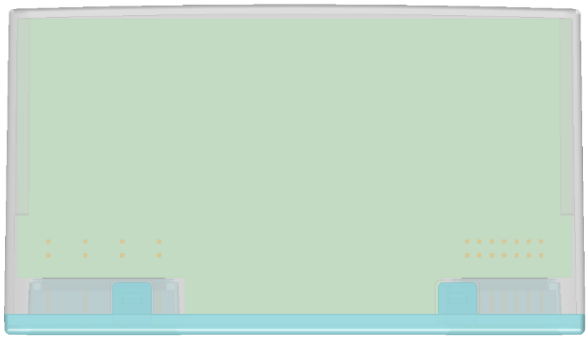
4. Back View

5. Side View

6. Top View

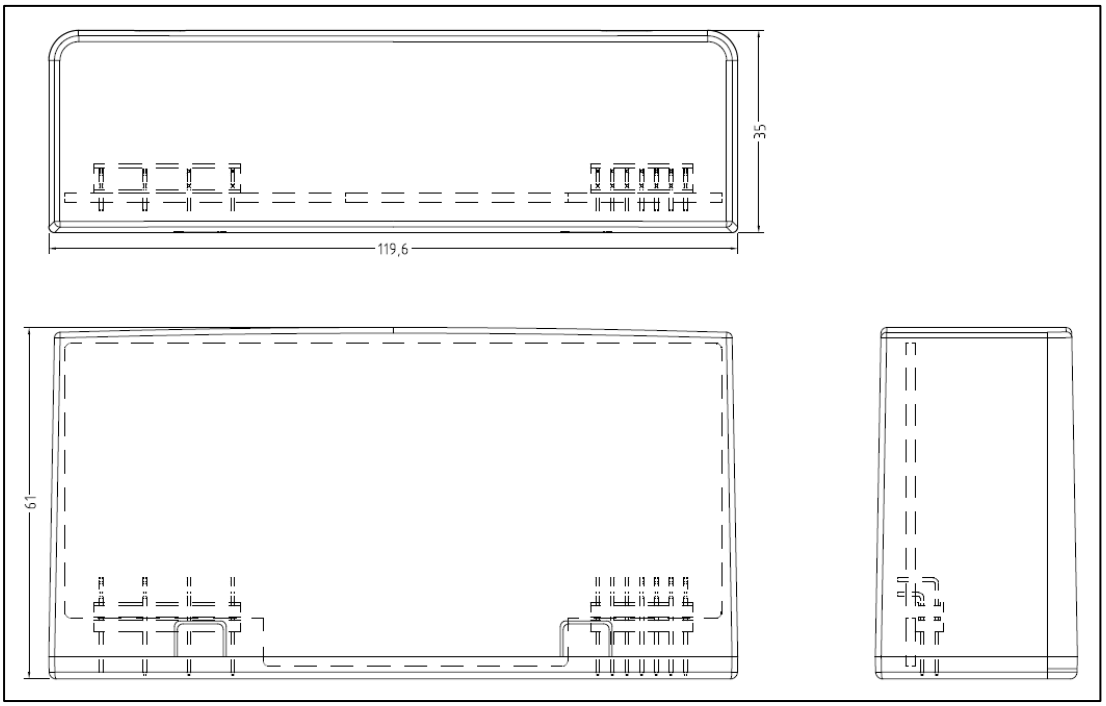


7. Bottom View

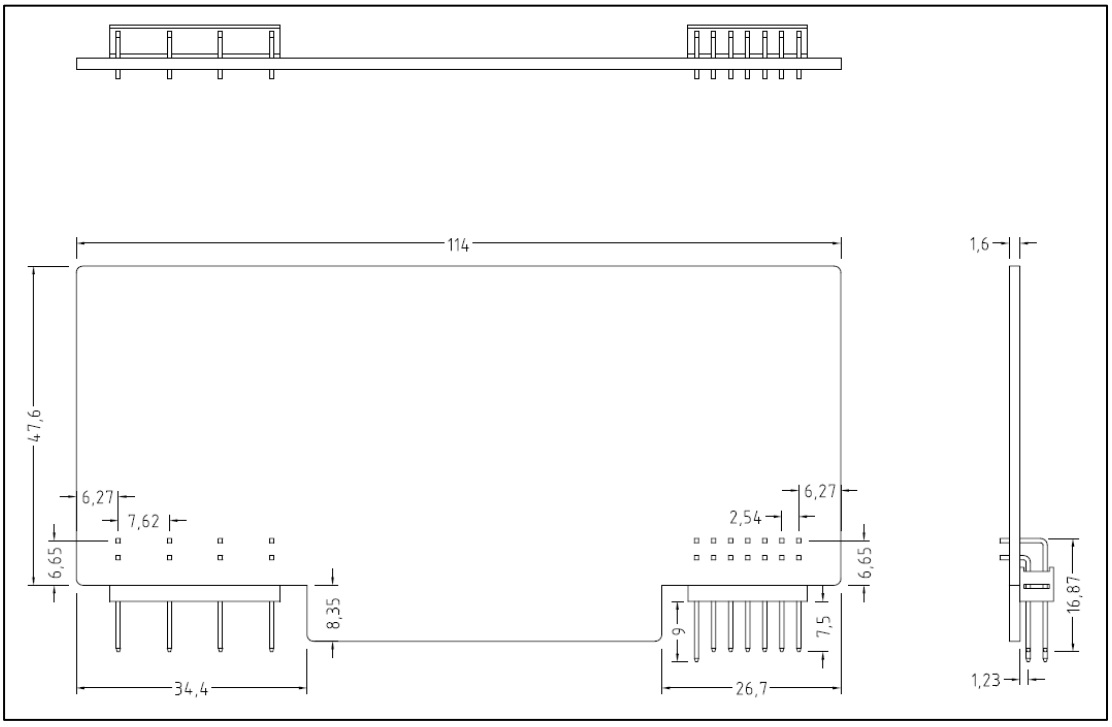


## B. Module Dimensions

**Overall view of the module:**




**Overall view of the module's PCBA:**




**Notes: Module Reference Sizes: unit mm.**

## Annexure G Details of ESB Architecture

*<Utility to provide the details>*

| S.No. | Parameters | Description |
|---|---|---|
| 1 | Architecture Design | |
| 2 | Core Functionalities | |
| 3 | Implementations | |

## Annexure H Future Demand Response Program Use Cases for Reference

The objective of the Demand Response is to optimal utilization of energy resources by uniform distribution of load across the day, to save additional investment in capacity addition within the utility, improved access of power to rural areas, reduction in technical losses, enhanced consumer satisfaction by load curtailment in place of load shedding.

| S.No | Functional requirement | Description of Functional requirement |
|---|---|---|
| 1. | Load Curtailment event in place of Load Shedding | System will determine based on day ahead schedule for available generation capacity and load forecasting the load curtailment events. Advance notice will be sent to a group of consumers affected by this load curtailment. DR system will send the load curtailment command to the MDM. The MDM will forward this command to the appropriate AMI Head-End. |
| 2. | DR Program Commencement | Once the consumer is set up with all the devices necessary, the consumer details will be sent to DR system. Premium charges for assured power supply with SLA and/or Rebates and incentives can be given to consumers who participate in DR programs. |
| 3. | Real time Pricing | Utility shall be able to send real-time pricing signals to end consumers/ AMI system |
| 4. | Curtailment due to Contract Violation | Utility limits consumer's load due to reasons like exceeding contract load |
| | | Alarms (visual and audio) shall be provided in case of load violation (in home device, Email, SMS etc.). The billing system shall be notified of the load violation, and the |

| S.No | Functional requirement | Description of Functional requirement |
|---|---|---|
| | | corresponding charges shall be applied to consumer (based on tariff rules). |
| 5. | Demand side Management | In every 15-minute interval Meter data should be captured, Confirmation of action taken for demand response should be mentioned as well as monitoring of historical Consumer Load Profile should be done. |
| 6. | Load Monitoring at Demand side | Daily Meter Reading, Status and associated details capturing for records of consumer consumption data, TOU details, real time trends and Load profile Details. Along with this whenever there is a load violation event recorded in the meter, the information is sent to the control center |
| 7. | Initiate Direct Load Control Event | Utility calls a Direct Load Control Event using the Peak Load Management (PLM) Application and executes through head-end by sending a load control signal to Smart Appliances thru HAN/Smart Meter or other means |
| 8. | Energy accounting system | **Register and Interval based accounting:**<br>**Register based**<br>Register based accounting supports requirements for prepaid energy accounting based on register reads.<br>It includes billing cycle data services that deliver billing determinants via an interface to CIS/Billing on the billing cycle date and on request when special reads are required. A Billing Determinant Calculator provides the flexibility to compute the billing determinant values based on utility defined formulas. Formulas are built around logical and arithmetic operators, and can contain other billing determinants, constants, and consumer functions.<br>**Bi-directional**<br>MDM should support bi-directional metering by processing the delivered and received channels for a given meter in two separate channels.<br>**Net Metering** (using Virtual channel)<br>MDM should support net metering by processing the delivered and received channels from the meter/recorder and calculating a net amount. The calculated net will be stored onto a virtual channel. MDM should provide full tracking, management, and storage of usage data related to each data channel. This allows summation of usage data separately for each data channel.<br>**Usage Calculated from Register Reads**<br>MDM can create usage data from register reads received from AMI systems or gathered manually through HHUs. MDM will calculate the difference between the current bill period register read and the previous bill period register read, applying the ratio required converting to the correct kWh usage. Rollover conditions are also considered when computing usage. The calculated usage is stored in the |

| S.No | Functional requirement | Description of Functional requirement |
|---|---|---|
| | | billing table and accessible to all applications that require the data.<br>**Interval Billing**:<br>The Interval Billing should include all of the functionality offered in the Register Billing in addition to support Advanced Billing Determinants (ABD) calculated from interval reads.<br>As interval data is retrieved by the AMI systems, the Advanced Billing Determinant (ABD) engine should process the interval reads into daily and billing cycle usage-based billing determinants (as compared to register-based billing).<br>For example, if 15 min interval data is retrieved by the system, MDM calculates the proper billing determinant which is based on RTP/ Time-of-Use (TOU) tariff, then ABD engine will make this computation based on tariff configuration data in the database. Then it stores this daily data set (RTP/TOU values with usage details for each), along with the interval data in the Metered Usage Data Repository (MUDR). On each billing cycle, the ABD engine will summarize the RTP/TOU and demand data for each period over the requested billing span and deliver these billing determinants to the billing system. By performing the billing determinant summations daily, MDM support end-user presentation of "month-to-date" information as well as spread computational loads over time (including weekends). |

## Annexure I Conditions/protocols for auto-disconnections

*<These conditions/ protocols should be reviewed and updated by utilities as per their requirement>*

*a) <Utility to mention for which consumer categories would the protocol for auto-disconnections shall apply and for which consumer categories the same shall not be applicable.>*

b) The auto-disconnection shall not be allowed during gazetted holiday / national holidays and during night-time

## Annexure J AMI system availability

AMI system issues and availability are flagged at three different severity levels.

a) Severity 1 is the most critical being a complete system level failure or breach of IT policies and requiring urgent and immediate attention.

b) Coverage under severity 2 are outages that do not cause any immediate disruption but subsequently may result into severity 1 outage.

c) Severity 3 are those issues / problems / outages which are neither of an emergency nor priority level as grouped under severity level 1 or 2.

The AMISP shall implement an appropriate online SLA Application (as elaborated in Clause 7.7 of Schedule A of this Contract) for problem/defect reporting and tracking system. This would enable logging and tracking of outages / defects/non-conformances of all severity levels and get the approval of the same from the Utility towards desired resolution. The incidents (15 in number) are categorized as mentioned in below table.

| Category | Incident Description[5] |
|---|---|
| Severity 1 – Urgent | a) Complete loss of AMI system functions[6]<br>b) Partial outage of AMI functions<br>i. Utility user interface<br>ii. Consumer portal<br>c) Stoppage of data backup at DC/DR (refer Clause '7.3.1 e' of Schedule A)<br>d) Cyber Security issues leading to unauthorized access to systems/applications |
| Severity 2 – Serious | a) Outage at Network Operation cum Monitoring Centre<br>i. Complete outage of communication connectivity<br>ii. Failure of UPS system<br>iii. Failure of Battery / other auxiliary system)<br>b) Interruption of data exchange with utility enterprise systems<br>c) Partial outage of AMI functions<br>i. Outage of VEE<br>ii. Billing Determinants<br>iii. Reports<br>d) Breach of data privacy<br>e) Adherence to RPO / RTO[7] as per Clause 2.7.3.3.9 of Schedule A and as mentioned in Clause 7.3.1 of Schedule A |

[5] Please note that the table provides the different incidents categorized under different severity levels. If any incident at a higher severity level or order is active, then it shall be understood that a new incident at a lower severity level or order linked to the one at the higher-level incident, shall not be separately registered. For instance, when there is an incident "Complete Outage of AMI system functions" under Severity-1, then "Partial outage of AMI functions" or "Interruption of data exchange with utility enterprise systems" shall not be registered.

[6] A complete outage of AMI functions may happen due to a system level crash or outage of DC/DR infra or outage of MPLS bandwidth at DC/DR

[7] RTO and RPO are expected to be checked once a month for purpose of SLA

| Category | Incident Description[5] |
|---|---|
| Severity 3 – Minor | a) Non-availability of reports as per Clause 6.2 of Schedule A during the Operation Phase<br>b) Resolution of complaint ticket raised and passed on by CCS [These complaints shall be registered within the SLA Application and hence shall have to undergo mutual agreement checks between Utility/AMISP before being registered for resolution]<br>c) Non-availability of required inventory of spares specified in Clause 7.3.3 of Schedule A<br>d) Failure of workstation, printers, LAN etc. at the NOMC<br>e) Non-availability of designated AMISP's Manpower at the NOMC |

### I.1 Response & Resolution Time

The target times within which the AMISP should respond to support requests for each category of severity is described in the following table.

a) The Initial Response Time is defined as the period from the initial logging of the support request (through established systems and/or communications channels) and the acknowledgment of the AMISP subject to the maximum time defined in the following table. In case, AMISP doesn't respond within initial response time, the support shall be deemed acknowledged by the AMISP.

b) The Action Resolution Time is the period from the acknowledgement of support request to the AMISP delivering a solution subject to the Maximum time defined in following table.

c) The Action Resolution Time includes investigation time and consideration of alternative courses of action to remedy the situation.

| Severity | Initial Response Time | Maximum Action Resolution Time | Action |
|---|---|---|---|
| 1 | [15 minutes] | [2 hours] | An urgent or emergency situation requiring continuous attention from necessary support staff until system operation is restored. |
| 2 | [30 minutes] | [24 Hours] | Attempt to find a solution acceptable to the utility (dependent on reproducibility), as quickly as practical. |
| 3 | [2 hours] | [10 days] | Evaluation and action plan. Resolution time is dependent on reproducibility, ability to gather data, and the Utility's prioritization. |

### I.2 Service Response Requirements

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 to. Severity 1 issues shall be reported by telephone for rapid response; the key objective is to restore the system to an operational state as quickly as possible.

### I.3 System Availability Calculations

System level issues / availability calculation methodology shall be as below:

a) For Severity-1 and 2 level incidents, the non-availability hours for availability calculation shall be counted from the end of the allowed Action Resolution time for their first instance in a given month. If any incident, repeats in the same month, the non-availability hours for availability calculation shall be counted from the end of allowed Initial Response Time.

b) For Severity-3 events, the non-availability hours for availability calculation shall be counted from the end of the allowed Action Resolution time

A standardized online ticket register shall be maintained, that shall be made available to utility online, containing the following:

Details of each issue reported:

a) Actions taken by AMISP to correct the issue

b) Applicable Severity level

c) Time of reporting to the AMISP support engineer/support

d) Actual vs Allowed response & resolution time as defined in this annexure

e) Review of utility's Engineer-in-charge as well as the AMISP'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 system availability calculation. However, simultaneous multiple outages due to unrelated cause would be counted separately.

Availability computation shall be done on monthly basis in selected area(s) of operation. The formula to be used for availability computation shall be as under:

$$\text{Availability per month} = \frac{\text{THM} - (\text{S1 X } 1 + \text{S2 X } 0.8 + \text{S3 X } 0.5)}{\text{THM}}$$

- Where THM is total hours in the month when power supply to AMI system is available
- S1/ S2/ S3 is the total non-available hours in Severity Level-1 /2/3

S1/ S2/ S3 are computed for each event. For instance, S3 for each Severity-3 event would be number of hours passed beyond the maximum resolution time for which the event is not resolved. Some examples for the same are provided below

| Category | Example of computing non-available hours |
|---|---|
| Severity 1 – Urgent | For incidents happening for the first time in the month, Number of hours beyond the allowed maximum resolution time for which:<br>a) Complete loss of AMI system functions<br>b) Partial outage of AMI functions<br>i. Utility user interface<br>ii. Consumer portal<br>c) Cyber security issues remain unresolved<br>d) Data backup at DC/DR remains stopped<br><br>For incidents happening for the second or more times in the month, Number of hours beyond the allowed initial response time for which:<br>a) Complete loss of AMI system functions<br>b) Partial outage of AMI functions<br>i. Utility user interface<br>ii. Consumer portal<br>c) Cyber security issues remain unresolved<br>d) Data backup at DC/DR remains stopped |
| Severity 2 – Serious | For incidents happening for the first time in the month, Number of hours beyond the allowed maximum resolution time for which:<br>a) Outage at Network Operation cum Monitoring Centre<br>i. Complete outage of communication connectivity<br>ii. Failure of UPS system<br>iii. Failure of Battery / other auxiliary system)<br>b) Partial outage of AMI functions<br>i. Outage of VEE<br>ii. Billing Determinants<br>iii. Reports etc.<br>c) Any single event on data privacy breach is not resolved<br>d) Interruption of data exchange with utility enterprise systems remains unresolved<br>e) Adherence to RPO / RTO is not ensured<br><br>For incidents happening for the second or more times in the month, Number of working hours beyond the allowed initial response time for which<br>a) Outage at Network Operation cum Monitoring Centre<br>i. Complete outage of communication connectivity<br>ii. Failure of UPS system<br>iii. Failure of Battery / other auxiliary system)<br>b) Partial outage of AMI functions |

| Category | Example of computing non-available hours |
|---|---|
| | i. Outage of VEE<br>ii. Billing Determinants<br>iii. Reports etc.<br>c) Any single event on data privacy breach is not resolved<br>d) Interruption of data exchange with utility enterprise systems remains unresolved<br>e) Adherence to RPO / RTO is not ensured |
| Severity 3 – Minor | Number of days beyond 10 days for which (Number of days shall be converted to number of hours by multiplying it with 24)<br>a) Non-availability of reports as per Clause 6.2 of Schedule A during the Operation Phase<br>b) Resolution of complaint ticket raised and passed on by CCS [These complaints shall be registered within the SLA Application and hence shall have to undergo mutual agreement checks between Utility/AMISP before being registered for resolution]<br>c) Non-availability of required inventory of spares specified in Clause 7.3.3 of Schedule A<br>d) Failure of workstation, printers, LAN etc. at the NOMC<br>e) Non-availability of designated AMISP's Manpower at the NOMC |

**Annexure K**

**Schedule of billing data collection for different consumer category**

The schedule for billing for various consumers on which the current AMI system (procured under this contract) is implemented is provided below:

**K.1 Industrial Consumers**

***The schedule of billing will be provided to the successful bidder at the time of LOA/LOI.***

**K.2 Commercial Consumers**

***The schedule of billing will be provided to the successful bidder at the time of LOA/LOI.***

**K.3 Residential Consumers**

***The schedule of billing will be provided to the successful bidder at the time of LOA/LOI.***

**K.4 Agricultural Consumers**

***Not Applicable***

**K.5 Street Lights**

***The schedule of billing will be provided to the successful bidder at the time of LOA/LOI.***

**K.6 General Purpose Services**

***The schedule of billing will be provided to the successful bidder at the time of LOA/LOI.***

**K.7 Any other Services Specified by the APSPDCL**

***The schedule of billing will be provided to the successful bidder at the time of LOA/LOI.***

## Annexure L Integration Interface of Existing Enterprise/Legacy Applications

Standard brief regarding detail of existing systems relevant to the AMI Project:

i. ***1 No. AMI Solution for* 3000 Nos. (approx.) Meters with Cloud Based Service.**
ii. **1 No. billing System based on JAVA, ORACLE and AIX/LINUX.**
iii. **1 No. Collection System based on JAVA, ORACLE and AIX/LINUX.**
iv. **1 No. Customer Service Center and 1 No. Customer Care Center based on JAVA, ORACLE and AIX/LINUX.**
v. **1 No. Outage Management System (OMS) with JAVA/MySQL.**
vi. **1 No. Energy Audit System with Servers based on ORACLE/MySQL with AIX/SUSI LINUX.**
vii. **1 No. SAP System with ERP supplied by SAP India.**
viii. **1 No. SCADA-DMS System with OSI Software (at Nellore)**
ix. **1 No. GIS System (ArcGIS) for integrating/sharing GIS details of the Smart Meters.**

***Note:*** ***All bidders are advised to study the existing systems as per ITB 2.4 and provide information exchange and integration as specified in the RFP/Requirements of the Project.***

# CONTRACT FOR

**Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis**

**Between**

**[STATE POWER UTILITY]**

**AND**

**[SPV incorporated by Selected Bidder]**[1]

**AND**

**[SELECTED BIDDER]**

[1] *Notes:*

*(i) Applicable only in the event the Utility proposes to incorporate a Special Purpose Vehicle (SPV) by the Selected Bidder for project implementation.*

*(ii) The provisions in square brackets and/or blank spaces shall be suitably filled post finalisation of the Contract.*

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# I. A. FORM OF CONTRACT

**(*Applicable in the event SPV incorporated by Selected Bidder is permitted and proposed)***

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

**BETWEEN:**

**[Insert name of the Utility]** (hereinafter referred to as "**Utility**" which expression shall unless repugnant to the context or meaning thereof include its successors, assigns and permitted substitutes), a company incorporated under the extant provisions of Indian Laws and having its registered office at [Address];

**AND**

……. <insert the name of the SPV>,a company incorporated in terms of the Companies Act, 2013 having its registered office at……. [Registered address of the Company] (hereinafter referred to as the "**AMISP**" which expression shall unless repugnant to the context or meaning thereof include its successors, assigns and permitted substitutes).

**AND**

**<** *insert the following if the Selected Bidder identified pursuant to the RFP is Sole Bidder>*

……. , < *insert the name of Selected Bidder*> having its registered office at……. [Registered address of the Company] (hereinafter referred to as the "**Selected Bidder**" which expression shall unless repugnant to the context or meaning thereof include its successors, assigns and permitted substitutes).

< *insert the following in case the Selected Bidder identified pursuant to the RFP is a Consortium* >

……. < *insert the name of the Lead Member of the Consortium who is the Selected Bidder>,* having its registered office at……. [Registered address of the Company], the Lead Member acting for and on behalf of the Consortium comprising ……..*<insert name of the all the members of the Consortium including the Lead Member>* (hereinafter referred to as the "**Selected Bidder**" which expression shall unless repugnant to the context or meaning thereof include its/ their successors, assigns and permitted substitutes).

**WHEREAS** the Utility had invited Bids for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on Design Build Finance Own Operate Transfer (DBFOOT) basis (the "Project") through RFP/Tender No. [Tender Details]

**WHEAREAS** after evaluation of the Bids received from the Bidders, the Utility accepted the Bid of the Selected Bidder, and issued its Letter of Award No. [_____] dated [_____] ("**LOA**") to the Selected Bidder, requiring the Selected Bidder, inter alia, to execute this Contract within the time period prescribed in the RFP, through a special purpose vehicle.

**WHEAREAS** the Selected Bidder has since promoted and incorporated such a special purpose vehicle as the AMISP under the Companies Act, 2013 in accordance with the terms of the RFP, and has requested the Utility to accept the AMISP as the entity which shall undertake and perform the obligations and exercise the rights of the Selected Bidder under the LOA, including the obligation to enter into this Contract for Design Build Finance Own Operate Transfer (DBFOOT) AMI system in the Project area.

**WHEAREAS** the AMISP, by its letter dated [_____], while representing that it has been promoted by the Selected Bidder for the purposes hereof, joined in the request of the Selected Bidder to the Utility to accept the AMISP as the entity which shall undertake and perform the obligations and exercise the rights of the Selected Bidder including the obligation to enter into this Contract pursuant to the Letter of Award (LOA).

**NOW, THEREFORE**, in consideration of the foregoing and the respective covenants and agreements set forth in this Contract, the receipt and sufficiency of which is hereby acknowledged, and intending to be legally bound hereby, the Parties agree as follows:

1. The following documents attached hereto shall be deemed to form an integral part of this Contract:

   (a) The General Conditions of Contract (including Attachment 1 "Fraud and Corruption";
   (b) The Special Conditions of Contract;
   (c) Appendices:

   Appendix A: Project Requirements (AMI System Requirements and Service Level Agreement)

   Appendix B: **AMISP Service Charge**

   (d) Technical and Financial Bid as submitted by the Selected Bidder

   In the event of any inconsistency between the documents, the following order of precedence shall prevail: the Special Conditions of Contract; the General Conditions of Contract, including amendments thereto [*…. Insert reference to amendments….*]; Appendix A and Appendix B; and Technical and Financial Bid as submitted by the Selected Bidder. Any reference to this Contract shall include, where the context permits, a reference to its Appendices also.

**IN WITNESS WHEREOF**, the AMISP, the Selected Bidder and the Utility, executed these presents and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

1. Common Seal of Utility has been affixed in my/ our presence pursuant to Board Resolution dated ….....

For Utility
[Signature of Authorized Representative]

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

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

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

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

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

   [Name of the AMISP],
[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: …….

# I. B. FORM OF CONTRACT

***(Applicable in the event SPV incorporated by Selected Bidder is either not or, if permitted, is not proposed)***

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

**BETWEEN:**

**[Insert name of the Utility]** (hereinafter referred to as "**Utility**" which expression shall unless repugnant to the context or meaning thereof include its successors, assigns and permitted substitutes), a company incorporated under the extant provisions of Indian Laws and having its registered office at [Address];

**AND**

**<** *insert the following if the Selected Bidder identified pursuant to the RFP is Sole Bidder>*

……. , < *insert the name of Selected Bidder*> having its registered office at……. [Registered address of the Company] (hereinafter referred to as the "**Selected Bidder**" which expression shall unless repugnant to the context or meaning thereof include its successors, assigns and permitted substitutes).

< *insert the following in case the Selected Bidder identified pursuant to the RFP is a Consortium* >

……. < *insert the name of the Lead Member of the Consortium who is the Selected Bidder>,* having its registered office at……. [Registered address of the Company], the Lead Member acting for and on behalf of the Consortium comprising ……..<*insert name of the all the members of the Consortium including the Lead Member*> (hereinafter referred to as the "**Selected Bidder**" or the "**AMISP"** which expression shall unless repugnant to the context or meaning thereof include its/ their successors, assigns and permitted substitutes).

**WHEREAS** the Utility had invited Bids for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis (the "Project") through RFP/Tender No. [Tender Details]

**WHEAREAS** after evaluation of the Bids received from the Bidders, the Utility accepted the Bid of the Selected Bidder, and issued its Letter of Award No. [_____] dated [_____] ("**LOA**") to the Selected Bidder, requiring the Selected Bidder, inter alia, to execute this Contract within the time period prescribed in the RFP.

**WHEAREAS** the Selected Bidder ,in accordance with the terms of the RFP, shall undertake and perform the obligations and exercise the rights under the LOA, including the obligation to enter

into this Contract for Design Build Finance Own Operate Transfer (DBFOOT) AMI system in the Project area.

**NOW, THEREFORE**, in consideration of the foregoing and the respective covenants and agreements set forth in this Contract, the receipt and sufficiency of which is hereby acknowledged, and intending to be legally bound hereby, the Parties agree as follows:

1. The following documents attached hereto shall be deemed to form an integral part of this Contract:

   (a) The General Conditions of Contract (including Attachment 1 "Fraud and Corruption";
   (b) The Special Conditions of Contract;
   (c) Appendices:

   Appendix A: Project Requirements (AMI System Requirements and Service Level Agreement)

   Appendix B: **AMISP Service Charge**

   (d) Technical and Financial Bid as submitted by the Selected Bidder

   In the event of any inconsistency between the documents, the following order of precedence shall prevail: the Special Conditions of Contract; the General Conditions of Contract, including amendments thereto [*…. Insert reference to amendments….*]; Appendix A and Appendix B; and Technical and Financial Bid as submitted by the Selected Bidder. Any reference to this Contract shall include, where the context permits, a reference to its Appendices also.

**IN WITNESS WHEREOF**, the AMISP/ Selected Bidder and the Utility, executed these presents and affixed common seals of their respective companies on the Day, Month and Year first mentioned above.

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

For Utility

[Signature of Authorized Representative]

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

3. Common Seal of ……. [Name of the Lead Consortium Member/ Sole Bidder], has been affixed in my/ our presence pursuant to Board Resolution dated .....
   For [Selected Bidder/ AMISP]

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

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

**WITNESS:**

3. ……. (Signature) Name
……
Designation.....……..

4. ……. (Signature) Name
……
Designation.....……

**Attested:**

……..
[Signature]
(Notary Public)

Place: ……. Date: …….

# II. GENERAL CONDITIONS OF CONTRACT

**Article/ Clause**

1. **Definitions and Interpretations**

**(a) Definitions**

1.1 In this Contract, unless the context otherwise requires, the following words, expressions and abbreviations shall have the following meanings:

(a) **"Advanced Metering Infrastructure" or "AMI"** means an integrated system of Smart Meters, communication networks and meter data management systems that enables two-way communication between the utilities and consumer premises equipment. The functional blocks of AMI typically include HES — Head End System, WAN — Wide Area Network, NAN — Neighbourhood Area Network, DCU — Data Concentrator Unit / Gateway and HAN — Home Area Network;

(b) **"Advanced Metering Infrastructure Service Provider" or "AMISP"**, means the responsible implementation agency named in **SCC** appointed by Utility for designing, building, financing, owning, operating and transferring the AMI Project in its area of operation upon execution of the Contract subsequent to the Letter of Award referred to in **SCC** ;

(c) **"Affected Party"** means any of the AMISP or the Utility whose performance has been affected by an event of Force Majeure or Force Majeure Event;

(d) **"AMISP Service Charge"** means the payment to be made by the Utility to the AMISP in Indian Rupee (INR) per meter per month for each category of meter as indicated in **Appendix B**; .

(e) **"Applicable Laws"** shall mean the laws and any other instruments having the force of law in India as they may be issued and in force from time to time;

(f) **"Bid"** means the bid submitted by the Bidder(s) in response to the RFP and shall include the Technical Bid and the Financial Bid;

(g) **"Bidder(s)"** means individual entity or consortium of entities bidding in response to the RFP;

(h) **"Change Order"** shall have the meaning as ascribed thereto in Article 13 of this Contract;

(i) **"Consortium Member"** Any member of the bidding consortium other than the Lead Consortium Member;

(j) **"AMISP Contract" or "Contract"** shall mean this Contract entered into between, the SPV incorporated by the Selected Bidder (if applicable and so indicated in **SCC)**, Selected Bidder(represented by the Lead Member acting for and on behalf of the consortium if the Selected Bidder is a consortium) and the Utility for undertaking the AMI Project and is the legally binding written agreement signed by the Parties and which includes all the attached documents listed in its paragraph 1 of the Form of Contract (the General Conditions (GCC), the Special Conditions (SCC), and the Appendices, Attachments, Annexures etc.).

(k) **"Contract Period" or "Term of the Contract"** shall have the meaning as ascribed thereto in Article 2.1.2 of this Contract;

(l) **"Contract Price"** shall have the meaning as ascribed thereto in Article 5.1 of this Contract;

(m) **"Day"** means a calendar day unless indicated otherwise;

(n) **"Exit Management Period"** shall mean the transition period encompassing the time from the date of termination of the Contract or end of the Contract Period until the date upon which all transition activities/ services are completed by the AMISP;

(o) **"Force Majeure" or "Force Majeure Event"** shall have the meaning as ascribed thereto in Article 8 of this Contract;

(p) **"GCC"** means these General Conditions of Contract.

(q) **"Goods"** means any good(s) supplied or to be supplied as a part of the Solution by the AMISP;

(r) **"Independent Valuer"** shall mean a qualified valuer duly registered under Companies (Registered Valuers and Valuation) Rules, 2017 for Plant and Machinery and jointly appointed by the Parties in the event of termination prior to Installation Milestone;

(s) **"Month"** means a calendar month unless indicated otherwise;

(t) **"Operational Go Live"** shall have the meaning ascribed thereto in Clause 9.6 of Schedule A of this Contract;

(u) **"Operational Period"** means the period from the Operational Go-Live till the end of the Contract Period;

(v) **"Project or AMI Project"** means the Utility's AMI Project defined in recital clause in the Contract Form;

(w) **"Project Implementation Schedule"** shall have the meaning ascribed thereto in Clause 12 of Schedule A of this Contract;

(x) **"Request for Proposal" or "RFP"** means the Tender of which the number, name and details have been mentioned in **SCC**, including all its Volumes/ Sections/ Forms/ Annexures/ Appendices etc., for Appointment of AMISP (including all clarification/ addendum/ amendment/ corrigendum/ etc. issued from time to time);

(y) **"Rupees" or "Rs." Or "INR" or "₹"** means Indian Rupees;

(z) **"SCC"** means the Special Conditions of Contract by which the GCC may be amended or supplemented.

(aa) **"Service(s)" or "Related Service(s)"** means any service(s) performed or to be performed as a part of the Solution by the AMISP;

(bb) **SLA Default Notice means** notice to be issued by the Utility in the event AMISP fails meet any of the criteria specified in the SLA for cumulatively 3 (three) months in past 6 (six) months so as to entitling levy of maximum penalty for such criteria;

(cc) **"Smart Meter"** shall mean and is an ac static watt-hour meter with time of use registers, internal connect and disconnect switches with two-way communication capability. It is designed to measure flow of forward (import) or both forward (import) and reverse (export), store and communicate the same along with other parameters defined in this standard. It shall be remotely accessed for collecting data/events, programming for select parameters *(as defined in IS 16444 including any amendments or modifications to the same from time to time);*

(dd) **"Solution"** shall mean the AMI system implemented in its entirety including but not limited to the designing, financing, supply of hardware, software, transportation, installation, integration, testing, commissioning, operation, maintenance, training and other services by the AMISP;

(ee) **"Termination Payment"** shall have the meaning as ascribed thereto in Article 10 of this Contract;

(ff) **"Utility"** shall have the same meaning as ascribed to it in the recital clause of the Form of Contract.

(gg) **"Meter-months":** At any point of time, meter-months of the AMI system is calculated as the sum of number of months from operationalization of the meter or Operational Go-Live, whichever is later, for all meters installed and commissioned by the AMISP, taking into account all Change Orders issued by the Utility

(hh) **"Total Meter-months"** : Total Meter-months of the AMI system is calculated as the product of total number of smart meters installed, integrated and operationalized in the Project (by taking into account all Change Orders issued by the Utility) and 90 (ninety) months commencing from Operational Go-Live

(ii) **"Installation Milestone"** shall have the meaning as ascribed thereto in Clause 13 of Schedule A of this Contract;

1.2 In the interpretation of this Contract, unless the context otherwise requires:

1.2.1. Utility, the Selected Bidder, and the AMISP/ Contractor shall individually be referred to as "Party" and collectively as "Parties."

1.2.2. Unless otherwise specified a reference to an Article number is a reference to all of its sub-article;

**(b) Interpretation**

1.2.3. 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;

1.2.4. A word in the singular includes the plural and a word in the plural includes the singular;

1.2.5. A word importing a gender includes any other gender;

1.2.6. A reference to a person includes a partnership and a body corporate;

1.2.7. A reference to legislation includes legislation repealing, replacing or amending that legislation;

1.2.8. 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;

1.2.9. In the event of an inconsistency between the terms of the RFP, Bid submitted by the Selected Bidder and the subsequent Contract, the terms of the Contract hereof shall prevail;

1.2.10. Whenever a material or article is specified or described by the name of a particular brand, manufacturer or trademark, 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 Utility to determine that the products are equivalent to those named.

1.2.11. No amendment or other variation of this Contract shall be valid unless it is in writing, is dated, expressly refers to this Contract, and is signed by a duly authorised representative of both Utility and the AMISP thereto.

1.2.12. An illustration of the methodology for determining the 'Total Meter-Months' as well as 'Operation and Maintenance Period of the AMI system' is provided in **SCC**.

2. **The Contract**

**(a) Effectiveness and Term**

**2.1.** EFFECTIVENESS AND TERM

2.1.1. This Contract shall come into force and effect on the date of execution of the Contract by the Parties;

2.1.2. Unless terminated earlier by either Party or extended by the Utility in accordance with the terms of this Contract, this Contract shall continue in full force and effect until the earlier of (a) 10 (ten) years from the date of execution of the Contract or (b) As soon as the "Meter-Months" exceeds "Total Meter-months" ("Term of the Contract").

2.1.3. The Utility, at its own discretion, may extend the operation and maintenance period of the AMI system at terms mutually agreed upon with the AMISP.

3. **Obligations of the Selected Bidder**

**3.1** Selected Bidder shall ensure that it subscribes to 100% (one hundred percent) of the equity share capital of the SPV and continue to hold such shares for a period up to two years after Installation Milestone. In the event Selected Bidder was a consortium then the shareholding

pattern indicated in the Consortium Agreement, shall be complied with;

**3.2** Selected Bidder shall continue to hold not less than 51% (fifty-one percent) for the entire term of the AMISP Contract;

**3.3** Selected Bidder shall ensure no change in shareholding up to 2 (two) years after Installation Milestone as per the AMISP Contract;

**3.4** In the event, Selected Bidder is a Consortium, the Lead Consortium Member shall hold at least 51% (fifty-one per cent) of the equity of the AMISP at all times until the two years from Installation Milestone as per this Contract and 26% (twenty-six) for the remaining term of this Contract.

**3.5** In the event the Selected Bidder is a Consortium, the Lead Member shall be liable to ensure that the Solution is provided to the Utility in accordance with the terms and conditions of this Contract in terms of the Project Implementation Schedule notwithstanding the failure and/ or non-performance by any other member of the consortium.

4. **Rights, Title and Interest to AMI System and Equipment**

**4.1** The ownership, rights and title to the AMI system and other equipment installed by AMISP for operation of the AMI system pursuant to this Contract shall vest with AMISP during the entire Term of Contract.

**4.2** Unless extended by mutual consent of the Utility and AMISP, after the Contract Period the ownership, rights and title of the installed AMI system and other equipment (if any) installed by AMISP for operation of the AMI system pursuant to this Contract shall be transferred to the Utility without any cost.

5. **Contract Price and Payment**

**(a) Contract Price**

**5.1 CONTRACT PRICE**

5.1.1 The Contract Price is as indicated in **SCC**

5.1.2 In the event any approval required for imports and/ or use of imported equipment is denied in accordance with all applicable laws including those in relation to testing issued by Ministry of Power (Order No No.9/16/2016-Trans-Part(2) dated 18 November 2020; as amended and/ or modified from time to time), the same shall neither entitle revision of Contract Price nor shall result in revision of the Project Implementation Plan as specified in Article 2.2 of this Contract.

**5.2 PAYMENT MECHANISM**

**(b) Payment Mechanism**

5.2.1 The payment shall be made to the AMISP in Indian Rupees (INR) only.

5.2.2 The payment to the AMISP shall commence only one month after Operational Go-Live as defined in Schedule A of this Contract;

5.2.3 The payments due to the AMISP from the Utility shall be paid on monthly basis as per the payment structure specified in **SCC**. **Payment will be made within 90 days after acceptance of invoice prepared as per the Terms and Conditions of the contract.**

5.2.4 Except in case of Change Order in accordance with Article 13 of this Contract, the sum total of all payments made to the AMISP shall not exceed the Contract Price quoted in Article 5.1.1

5.2.5 The actual payment shall be net of any applicable liquidated damages and/or penalty due to noncompliance of SLAs by the AMISP.

5.2.6 AMISP will raise and deliver the invoice and the Deliverables mentioned above to the Utility for the monthly payments within first 5 (five) working days of every month. AMISP shall also raise a supplementary invoice for the agreed amount towards software change requests/new requirements completed in the previous month, in accordance with Article 13.2 of this Contract. Utility will review the AMISP invoice and the Deliverables including the SLA performance report raised by the AMISP, in accordance with Article 25, within 5 (five) working days from

the invoice and SLA performance report delivered by the AMISP. Utility may dispute the amount payable and shall pay the undisputed amount of the **Payment due will be made within 90 days after acceptance of invoice prepared as per the Terms and Conditions of the contract (as specified in Article 5.2.7)**. The disputed amount, (related to actual number of meters installed, integrated and operationalized, penalty imposed due to non-compliance of SLAs, and liquidated damages ), shall be dealt as per Article 12 of this Contract.

5.2.7 The Utility shall, within 14 (fourteen) working days of the Operational Go-Live, a Payment Mechanism by preparing invoice on or before 5th of every month and the Payment due will be made within 90 days after acceptance of invoice by competent authority as per the Terms and Conditions of the contract.

5.2.8 **DELETED**

5.2.9 In the event the AMISP fails to meet a particular performance criterion as mentioned under the Service Level Agreement (SLA) specified in Clause 7.7 of **Schedule A** of this Contract for cumulatively 3 (three) months in past 6 (six) months, resulting in the maximum penalty for the particular performance criterion, Utility may issue a SLA Default Notice to the AMISP directing it to take steps within 90 days to comply with the performance criterion specified in the SLA[1].

5.2.10 In the event of Smart Meters supplied and installed by the AMISP is damaged for reasons not attributable to the AMISP such as theft, vandalism, burning, etc. but otherwise than as a result of Force Majeure Event, the AMISP shall not be liable for such damage. In such cases, upon receipt of Notice from the Utility, the AMISP shall repair or replace the damaged Smart Meters. AMISP shall be required to replace the Smart Meter no later than 15 days of notification by the Utility. Upon replacing the Smart Meter, AMISP shall be entitled to raise a supplementary invoice for the amount mutually agreed between AMISP and the Utility. The Supplementary Bill shall be paid along with the amount due to be paid towards AMISP Service Charges, for the

[1] For example, in the event AMISP fails to meet the norm specified for "**Availability of AMI System per month**" for cumulatively 3 (three) months in past 6 (six) months leading to levy of maximum penalty thereof.

immediately succeeding month. For the avoidance of doubt: (i) a damaged meter(s) shall be excluded from the total numbers installed and operational smart meters while conducting the SLA audit of the AMI system in accordance with Article 25; and (ii) in the event, AMISP replaces the Meter within 15 days of request by the Utility or Utility directs to continue operations without replacing the damaged Meter, the AMISP Service Charge *qua* such meter(s) shall be paid as if such damaged meter complies with the SLA prescribed in this AMISP Contract.

5.2.11. The operations for direct payment to AMISP through consumer payments has been illustrated in **SCC**.

**5.3 TAXES AND DUTIES**

5.3.1 For Goods whether supplied from or outside India, the AMISP shall be entirely responsible for all taxes, duties, stamp duties, license fees, and other such levies imposed outside India.

5.3.2 The AMISP shall provide a copy of all paid tax challans/ receipts to Utility related to implementation of the AMI system for record.

5.3.3 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 AMISP's offer shall be dealt with in accordance with provisions of Change in Law.

5.3.4 Notwithstanding anything above or elsewhere in the Contract, in the event that the input tax credit of the GST charged by the AMISP is denied by the tax authorities to the Utility for reasons attributable to the AMISP, the Utility shall be entitled to recover such amount from the AMISP by way of adjustment from any of the subsequent invoices submitted by the AMISP to the Utility.

**(c) Taxes and Duties**

6. **Performance Security**

**6.1** The AMISP has furnished Performance Security in the form of an irrevocable bank guarantee valid up to a period of 6 (six) months beyond the end of the Contract Period or extended thereafter, for the amount indicated in **SCC** on the prescribed format. However, in case of delay in Installation Milestone, the validity of the initial Performance

Security shall be extended by the period of such delay. In the event delay is solely due to acts and/ or omission of the Utility cost of extending the validity of Performance Security shall be reimbursed to the AMISP by the Utility.

**6.2** Upon achievement of Installation Milestone, the value of the Performance Security shall be reduced by AMISP, to the extent indicated in **SCC** as determined in accordance with numbers of meters considered for Installation Milestone.

**6.3** Any payments shall be made to the AMISP only after receipt of the initial Performance Security by Utility.

**6.4** Upon Termination of the Contract due to Utility Event of default or expiry of the Contract Period, the separate Performance Security shall be discharged by Utility without any interest and returned to the AMISP not later than 14 (fourteen) working days following the date of Termination of the Contract.

Upon Termination of the Contract due to AMISP Event of default, the Performance Security shall be forfeited by Utility.

6.5 In case of any delay by the AMISP in performing the activities of the scope of work with respect to the Project Implementation Schedule, then upon Utility's request, the AMISP shall extend the validity of the separate Performance Security for the period for which the Contract is extended. In the event delay is solely due to acts and/ or omission of the Utility cost of extending the validity of separate Performance Security shall be reimbursed to the AMISP by the Utility.

7. **Liquidated Damages, Penalty and Incentive**

7.1 Except in case of Force Majeure or where the delay in delivery of the Solution is caused due to any delay or default of Utility if the Installation Milestone is delayed by more than 30 (thirty) months from the date of execution of

the Contract the AMISP shall be liable to pay liquidated damages as per the rates specified in this Article.

**7.2** Except in case of Force Majeure or where the delay in delivery of the Solution is caused due to any delay or default of Utility if the delivery, site installation, integration and operationalization of 100% of Feeder Meters each with related hardware, software and equipment is delayed by more than 9 (nine) months from the date of execution of the Contract the AMISP shall be liable to pay liquidated damages as per the rates specified in this Article.

7.3 Utility shall without prejudice to all its other remedies under the Contract, deduct from the amount due to be paid, as liquidated damages, 50% of AMISP Service Charge for each delayed meter for each completed month of delay for a maximum period of 12 (twelve) months. An illustrative example for arriving at the deductions is given in **SCC**.

7.4 The AMISP shall be liable to penalties in the event of non-compliance of Service Level Agreements as specified in **Schedule A** of this Contract;

7.5 If the AMISP achieves milestone of “Installation Milestone (as provided in Article 2.2 of this Contract) at least one month in advance than the timelines specified in the Contract, Utility shall provide an incentive as specified in **SCC**.

7.6 Upon achieving Installation Milestone, in accordance with Article 7.5, AMISP shall be entitled to raise a supplementary invoice for the amount indicated therein. The Supplementary invoice shall be paid along with the amount due to be paid for AMISP Service Charges for the immediately succeeding month.

8. **Force Majeure**

**(a) Force Majeure Event**

8.1 A Force Majeure means any event or circumstance or combination of events and circumstances including those stated below that wholly or partly prevents or unavoidably delays an Affected Party in the performance of its obligations under this AMISP Contract, but only if and to the extent that such events or circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided if the Affected Party had taken reasonable care or complied with prudent utility practices:

**a) Natural Force Majeure Events:**

act of God, including, but not limited to drought, fire and explosion (to the extent originating from a source external to the site), earthquake, epidemic, volcanic eruption, landslide, flood, cyclone, typhoon, tornado, or exceptionally adverse weather conditions which are in excess of the statistical measures for the last 100 (hundred) years,

**b) Non-Natural Force Majeure Events:**

**i) Direct Non–Natural Force Majeure Events**

a) Nationalization or compulsory acquisition by any Governmental instrumentality of any material assets or rights of the AMISP; or

b) the unlawful, unreasonable or discriminatory revocation of, or refusal to renew, any Consents, Clearances and Permits required by the AMISP to perform their obligations under the Contract or any unlawful, unreasonable or discriminatory refusal to grant any other Consents, Clearances and permits required for the development/ operation of the Project, provided that a Competent Court of Law declares the revocation or refusal to be unlawful, unreasonable and discriminatory and strikes the same down; or

c) any other unlawful, unreasonable or discriminatory action on the part of any Governmental instrumentality which is directed against the Project, provided that a competent Court of law declares the action to be unlawful, unreasonable and discriminatory and strikes the same down.

d) any partial or complete shut-down of the internet services in the Project area

**ii) Indirect Non - Natural Force Majeure Events:**

a) an act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, riot, insurrection, terrorist or military action, civil commotion or politically motivated sabotage;

b) radioactive contamination or ionizing radiation originating from a source in India or resulting from any other Indirect Non-Natural Force Majeure Event mentioned above, excluding circumstances where the source or cause of contamination or radiation is brought or has been brought into or near the Site by the Affected Party or those employed or engaged by the Affected Party; or

c) industry wide strikes and labour disturbances, having a nationwide impact in India.

## 8.2 FORCE MAJEURE EXCLUSIONS

**(b) Force Majeure Exclusions**

8.2.1 Force Majeure shall not include (i) any event or circumstance which is within the reasonable control of the Parties and (ii) the following conditions, except to the extent that they are consequences of an event of Force Majeure:

i. Unavailability, late delivery, or changes in cost of the machinery, equipment, materials, spare parts etc. for the Project;

ii. Delay in the performance of any Contractors or their agents;

iii. Non-performance resulting from normal wear and tear typically experienced in transmission materials and equipment;
iv. Strikes or labour disturbance at the facilities of the Affected Party;
v. Insufficiency of finances or funds or the AMISP Contract becoming onerous to perform; and
vi. Non-performance caused by, or connected with, the Affected Party's:
    a. negligent or intentional acts, errors or omissions;
    b. failure to comply with an Indian Law; or
    c. breach of, or default under this AMISP Contract or any Project documents.

**8.3 NOTIFICATION OF FORCE MAJEURE EVENT**

**(c) Notification of Force Majeure Event**

8.3.1 The Affected Party shall give notice to the other Party of any event of Force Majeure as soon as reasonably practicable, but not later than 7 (seven) days after the date on which such Party knew or should reasonably have known of the commencement of the event of Force Majeure. If an event of Force Majeure results in a breakdown of communications rendering it unreasonable to give notice within the applicable time limit specified herein, then the Party claiming Force Majeure shall give such notice as soon as reasonably practicable after reinstatement of communications, but not later than 1(one) day after such reinstatement. Provided that such notice shall be a pre-condition to the Affected Party's entitlement to claim relief under this AMISP Contract. Such notice shall include full particulars of the event of Force Majeure, its effects on the Party claiming relief and the remedial measures proposed. The Affected Party shall give the other Party regular reports on the progress of those remedial measures and such other information as the other Party may reasonably request about the Force Majeure.

8.3.2 The Affected Party shall give notice to the other Party of (i) the cessation of the relevant event of Force Majeure; and (ii) the cessation of the effects of such event of Force Majeure on the performance of its rights or obligations under this AMISP Contract, as soon as practicable after becoming aware of each of these cessations.

### 8.4 DUTY TO PERFORM AND DUTY TO MITIGATE

**(d) Duty to Perform and Duty to Mitigate**

8.4.1 To the extent not prevented by a Force Majeure Event, the Affected Party shall continue to perform its obligations as provided in this AMISP Contract. The Affected Party shall use its reasonable efforts to mitigate the effect of any event of Force Majeure as soon as practicable.

### 8.5 AVAILABLE RELIEF FOR A FORCE MAJEURE EVENT

**(e) Available Relief for a Force Majeure Event**

8.5.1 Subject to this Article 8

a) no Party shall be in breach of its obligations pursuant to this AMISP Contract except to the extent that the performance of its obligations was prevented, hindered or delayed due to a Force Majeure Event;
b) every Party shall be entitled to claim relief for a Force Majeure Event affecting its performance in relation to its obligations under this AMISP Contract;
c) in the event on the 10th anniversary of the date of execution of this AMISP Contract, the AMISP has not operated the AMI system for 'Total Meter-Months' due to a Force Majeure Event(s) the Utility shall extend the term of this AMISP Contract by such duration as may enable the operation of AMI system for the 'Total Meter-Months'.

9. **Intellectual Property**

9.1 All Intellectual Property Rights in all material (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 AMISP solely during the performance of Related Services and for the purposes of inter-alia use or sub-license of such services under this Contract, shall be the property of the AMISP. The AMISP undertakes to disclose all such material, which have been newly created and developed by the AMISP solely during the performance of Related Services and for the purposes of inter-alia use or sub-license of such services under this Contract, to the Utility. The AMISP hereby grants to Utility a perpetual, non-exclusive, non-transferable, irrevocable, royalty-free license to use all material disclosed to the

Utility under the Contract. Nothing contained herein shall be construed as transferring ownership of any Intellectual Property Right from the AMISP to the Utility.

9.2 The AMISP 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 AMISP shall keep the 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 AMISP or its personnel during the course of performance of the Related Services. In case of any infringement by the AMISP, the AMISP shall have sole control of the defence and all related settlement negotiations

9.3 Subject to Article 9, the AMISP shall retain exclusive ownership of all methods, concepts, algorithms, trade secrets, software documentation, other intellectual property or other information belonging to the AMISP that existed before the date of execution of the Contract.

10. **Termination**

**10.1 AMISP EVENT OF DEFAULT**

**(a) AMISP Event of Default**

10.1.1 AMISP Event of Default means any of the following events arising out of any acts or omission of AMISP, its representative, sub-contracts, employees and which have not occurred solely as a result of any breach of this Contract by the Utility or due to Force Majeure, and where AMISP has failed to remedy these events within a period of 90 (ninety) days of issuance of a notice by Utility requiring AMISP to remedy such event.

a) AMISP has failed to procure and arrange requisite finances for the implementation of the Project;
b) AMISP abandons the implementation of the Project or repudiates this Contract or otherwise takes any action, or evidences or conveys an intention not to be bound by the Contract;
c) AMISP, in the judgment of Utility has engaged in corrupt, fraudulent, collusive, or coercive practices, in competing for or in executing the Contract; or
d) AMISP is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for AMISP or for the whole or material part of its assets that has a material bearing on its ability to implement the Project;
e) AMISP 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 AMISP's ability to implement the Project;
f) A resolution for winding up of AMISP is passed, or any petition for winding up of AMISP 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 AMISP is ordered to be wound up by a court of competent jurisdiction;
g) In the event AMISP fails to cure the default as indicated in the SLA Default Notice within the time period specified therein;
h) Failure of AMISP to furnish Performance Security in accordance with the provisions of this Contract;
i) Failure or inordinate delay by AMISP to provide Solution as per Contract;

j) Any representation or warranty made by the AMISP during the term of the Contract is found to be false and/or misleading;
k) Failure on account of AMISP to abide by Applicable Laws and regulations;
l) The shareholding of the AMISP ceases to be in accordance with the provisions of this Contract;
m) No person having System Integration (SI) experience in terms of the RFP remains a shareholder of the AMISP;
n) In the event equipment installed or proposed to be installed by the AMISP is found to have any embedded malware/ trojans/ cyber threat;
o) AMISP fails to comply with the local content requirement as specified in the Bid Submission;
p) AMISP fails to comply with any of its material obligations under this Contract.
q) In the event the Solution supplied do not meet the minimum specifications as per the Contract, and the same is not replaced/ modified by the AMISP to meet the requirements within 14 (fourteen) working days of being informed by Utility, or as mutually decided between Utility and AMISP.

## 10.2 UTILITY EVENT OF DEFAULT

**(b) Utility Event of Default**

10.2.1 Utility Event of Default means any of the following events, unless such event has occurred as a consequence of the AMISP Event of Default or a Force Majeure event and where Utility has failed to remedy these events within a period of 90 (ninety) days of issuance of a notice by AMISP requiring Utility to remedy such event:

a) **DELETED**;
b) 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 Contract;
c) 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 AMISP would adversely affect Utility's ability to perform its obligations under this Contract;

d) 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;

e) The breach by Utility of its obligations under this Contract which has an adverse effect on the performance of AMISP's obligations under this Contract.

**10.3 TERMINATION FOR AMISP EVENT FOR DEFAULT**

10.3.1 Without prejudice to any other right or remedy which Utility may have in respect thereof under this Contract, upon the occurrence of AMISP Event of Default, Utility shall be entitled to terminate this Contract in the manner provided in Article 10.3.2.

**(c) Termination for AMISP Event For Default**

10.3.2 Utility shall issue a Preliminary Notice to AMISP providing 90 (Ninety) Days, or such extended period as the Utility may allow, to cure the underlying Event of Default. If AMISP fails to cure the underlying Event of Default within such period allowed, Utility shall be entitled to terminate this Contract by issuing a termination notice to AMISP.

**10.4 TERMINATION FOR UTILITY EVENT FOR DEFAULT**

10.4.1 Without prejudice to any other right or remedy which AMISP may have in respect thereof under this Contract, upon the occurrence of a Utility Event of Default, AMISP shall be entitled to terminate this Contract in the manner provided in Article 10.4.2.

**(d) Termination for Utility Event of Default**

10.4.2 AMISP shall issue a Preliminary Notice to Utility providing 90 (Ninety) Days, or such extended period as the AMISP may allow, to cure the underlying Event of Default. If Utility fails to cure the underlying Event of Default within such period allowed, AMISP shall be entitled to terminate this Contract by issuing a termination notice to Utility.

**10.5 CONSEQUENCES OF TERMINATION**

Upon Termination of the Contract, the AMISP shall:

**(e) Consequences of Termination**

10.5.1 Notwithstanding anything to the contrary contained in this Contract, any termination of this Contract 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 Contract, shall survive the termination of this Contract to the extent such survival is necessary for giving effect to such rights and obligations.

10.5.2 Following issue of the Termination Notice by Utility or AMISP, Utility take possession and control of AMISP's control room and call centre and the exclusivity granted to AMISP under Article 4 will come to an end.

10.5.3 Upon termination of this Contract by Utility or AMISP on account of AMISP's Event of Default (in accordance with Article 10.1), or termination of this Contract on account of Utility's event of default (in accordance with Article 10.2), , AMISP shall be entitled to a termination payment subject to proper transfer of the installed AMI System, as agreed mutually upon, basis the following criteria:

a) In case termination of this Contract on account of AMISP's event of default: Termination payment to AMISP after Installation Milestone has been declared shall be the percentage, specified in **SCC**, of the termination payment Value as determined in terms of this Contract.
b) In case termination of this Contract on account of Utility's event of default: Termination payment to AMISP after Installation Milestone has been declared shall be the percentage, specified in **SCC**, of the termination payment Value as determined in terms of this Contract.
c) In case termination of this Contract prior to Installation Milestone the Termination payment shall be equal to:
    i. the percentage, specified in **SCC,** of the value of the assets proposed to be handed over to the Utility as certified by an independent valuer in the event termination is on account of AMISP event of default–and
    ii. the percentage, specified in **SCC,** of the asset values shall be paid to the AMISP in the event

termination is on account of Utility event of default

For the avoidance of doubt, it is clarified that in the event lumpsum payment in terms of Article 5 has been made then such payment shall be reduced from the amount determined in accordance with this Article 10.5.3.(c)

d) In case termination of the Contract prior to-the Installation Milestone- The Goods that are complete and ready for shipment within 28 (twenty-eight) days after the AMISP's receipt of the Notice of termination shall be taken into account while determining value of the assets proposed to be handed over to the Utility.
e) In the event of termination prior to Installation Milestone, Utility may request the AMISP to complete any part of the Solution. The cost of such works shall be agreed between the Parties. In the event Parties deem it appropriate the cost may be determined by the Independent Valuer.

Upon termination of this Contract by Utility or AMISP on account of AMISP's Event of Default (in accordance with Article 10.1), or termination of this Contract on account of Utility's event of default (in accordance with Article 10.2), AMISP shall be entitled to raise a supplementary invoice for an amount which is equal to the termination payment. The Supplementary invoice shall be paid separately by the Utility within 30 (thirty) days from the date of such invoice.

10.5.4 The Termination payment value would be calculated basis the following mechanism:

a) The present value of the receivables for the AMI system installed shall be calculated by multiplying the outstanding meter-months of operating the AMI system with percentage of total meters installed, integrated and operationalized as on the date of termination, and AMI Service Charge, and discounting the same as on date of termination at the percentage specified in **SCC** ("**Present Value**").
b) All amounts due, but not paid by the Utility, including the aggregated amount due to be paid including amount due to be paid towards supplementary invoice, but not paid or recovered from the Utility, for the AMI system operations and maintenance as

defined in the RFP by the AMISP, shall be calculated and factored in to arrive at the net outstanding receivables of the AMISP ("**Outstanding Receivables**");

c) All amounts due, but not paid by the AMISP, including the aggregated applicable liquidated damages and/(or) penalties due to non-compliance of SLAs by the AMISP, but not paid or recovered from the AMISP, for the AMI system operations and maintenance as defined in the RFP by the AMISP, shall be calculated and factored in to arrive at the net outstanding payables by the AMISP ("**Outstanding Payables**");

d) Termination Payment Value shall be equal to the sum of Net Present Value and Outstanding Receivables as per Article 10.5.4.(a) and (b); reduced by Outstanding Payables as per Article 10.5.4.(c) and the sum of insurance proceeds received by the AMISP for the AMI system, (if any).

10.5.5 Upon Termination of the Contract or expiry of the contract period, the AMISP shall prepare and present a detailed Exit Management Plan within 5 (five) working days of termination notice receipt to the Utility("**Exit Management Plan**") in accordance with Article 10.6 to this Contract.

10.5.6 The Utility or its nominated agency will review the Exit Management plan. If approved, AMISP shall start working on the same immediately. If the plan is rejected, AMISP shall prepare alternate plan within 2 (two) working days. If the second plan is also rejected, Utility will provide a plan for AMISP and it should be adhered by in totality.

10.5.7 The Exit Management 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 Utility.

10.5.8 The AMISP and the Authorized personnel from Utility will sign a completion certificate at the end of successful completion (all points tracked to closure) of the Exit Management Plan.

### 10.6 Exit Management

10.6.1 Exit Management

In case the Contract with the Utility ends or is terminated before the expiry date of Contracts, the Parties shall agree at that time whether, and if so during what period, the provisions of this Exit Management Plan shall apply. The Parties shall ensure that their respective associated entities carry out their respective obligations set out in this Exit Management Plan. The exit management shall be done in such a manner that operations should continue without any restriction on access/usage of any kind of functionality. At the end of the Contract period, AMISP shall provide necessary handholding and transition support to the Utility or its agency for maintaining the system post the Contract with the AMISP. This includes (but not limited to):

**(f) Exit Management**

a) Conducting detailed walkthrough and demonstrations for the AMI Solution;

b) Handing over of AMI Solution, Utility's data and all other relevant documentation;

c) Addressing the queries/clarifications of the designated staff / new agency with respect to the working / performance levels of the infrastructure;

d) Conducting training sessions;

e) Knowledge Transfer;

f) Any other activity, over and above these, as may be deemed necessary to meet the service levels and requirements specified in the RFP.

10.6.2 Transfer of Assets / AMI Solutions

a) Utility shall be entitled to serve notice in writing on the AMISP at any time during the Exit Management Period requiring the AMISP and/or its sub-contractor to provide the Utility with a complete and up to date list of the Assets within 30 (thirty) days of such notice.

Utility shall also be entitled to serve notice in writing on the AMISP at any time prior to the end of the Exit Management Period requiring the AMISP to transfer to the Utility or its nominated agencies in accordance with Article 9.

b) In case of contract being terminated by Utility, Utility reserves the right to ask AMISP to continue running the project operations for a period of 3 months after termination orders are issued. In case of contract being terminated by AMISP, Utility reserves the right to ask the AMISP to continue running the project operations for a period of 6 (six) months after termination notice is served by AMISP. In such case, payments during the Exit Management Period shall be made in accordance with the Article 5.2 and 10.5 (as the case may be).
c) Upon service of a notice under this Plan, the following provisions shall apply:
    i. All title to the assets shall be transferred to Utility, on or before the last day of the Exit Management Period.
    ii. Payment to the outgoing AMISP shall be made to the tune of last set of completed Services / deliverables, subject to SLA requirements.

10.6.3 Cooperation and provision of information

During the Exit Management Period:

a) AMISP will facilitate / allow the Utility or its nominated agency access to information reasonably required to define the then current mode of operation associated with the provision of the services to enable the Utility to assess the existing services being delivered;
b) Promptly on reasonable request by the Utility, the AMISP shall provide access to and copies of all information held or controlled by them which they have prepared or maintained in accordance with this Contract relating to any material aspect of the services (whether provided by the AMISP or sub-contractors appointed by the AMISP) to the Utility or its nominated agency. Such information shall include details pertaining to the services rendered and other performance data. AMISP shall permit the Utility or its nominated agencies to have reasonable access to its

employees and facilities to understand the methods of delivery of the services employed by the AMISP and to assist appropriate knowledge transfer; and

c) In the event of Termination prior to Installation Milestone, AMISP and Utility shall jointly appoint an Independent Valuer to certify the value of assets proposed to be handed over to the Utility upon termination. The cost of Independent Valuer shall be paid by the AMISP.

10.6.4 Confidential information, security and data

AMISP shall promptly on the commencement of the Exit Management Period supply to the Utility or its nominated agency the following:

a. information relating to the current Services rendered and consumer and performance data relating to the performance of sub-contractors in relation to the Services;
b. documentation relating to the Project's Intellectual Property Rights;
c. documentation relating to sub-contractors;
d. all current and updated data as is reasonably required for purposes of Utility or its nominated agencies transitioning the services in a readily available format;
e. all other information (including but not limited to documents, records and agreements) relating to the services reasonably necessary to enable Utility or its nominated agencies, to carry out due diligence in order to transition the provision of the Services to Utility or its nominated agencies, (as the case may be).

10.6.5 Transfer of certain agreements

On request by the Utility or its nominated agency, the AMISP shall affect such assignments, licenses and sub-licenses as Utility may require in favour of the Utility or its nominated agency reasonably necessary for the carrying out of replacement services. These agreements may include equipment lease, maintenance or service provision agreement between selected AMISP and third-party lessors, service providers, and any other agreements related to the Services.

10.6.6 General obligations of the AMISP during exit management period

a. The AMISP shall provide all such information as may reasonably be necessary to effect as seamless a handover as practicable in the circumstances to the Utility or its nominated agency and which the AMISP has in its possession or control at any time during the Exit Management Period.
b. For the purposes of this Schedule, anything in the possession or control of the AMISP or associated entity, or sub-contractors is deemed to be in the possession or control of the AMISP.
c. The AMISP shall commit adequate resources to comply with its obligations under this Exit Management Schedule.

10.6.7 Exit management process

The AMISP shall prepare an Exit Management Plan for transfer of operations to the Utility or its nominated agency, in the event of termination or expiry of the contract with the Utility, without affecting services to stakeholders adversely. AMISP shall get this process approved by Utility. The Plan shall include, but not be limited to, the following-

a. A detailed program of the transfer process including details of the means to be used to ensure continuing provision of the Services throughout the transfer process or until the cessation of the Services and of the management structure to be used during the transfer;
b. Plans for the communication with such of the AMISP's subcontractors, staff, suppliers, customers and any related third party as are necessary to avoid any material detrimental impact on the Utility's project operations and AMI Services to other stakeholders as a result of undertaking the transfer;
c. Plans for provision of contingent support to Utility or its nominated Agency for a reasonable period after transfer.
d. The Exit Management Plan including all updates shall be presented by the AMISP to and approved by the Utility or its nominated agencies.
e. During the Exit Management Period, the AMISP shall use its best efforts to deliver the services.

f. Payments during the Exit Management Period shall be made in accordance with the Articles 5.2 and 10.5 (as the case may be)
g. The Exit Management plan shall be furnished in writing to the Utility or its nominated agencies within 90(ninety) days from date of execution this AMISP contract
h. The AMISP shall re-draft the Exit Management Plan annually thereafter to ensure that it is kept relevant and up to date. The updated plan shall be furnished in writing to the Utility or its nominated agencies within 15 days from the end of such period.

11. **Liability/ Indemnity**

11.1 The AMISP hereby agrees to indemnify Utility, for all conditions and situations mentioned in this Article, in a form and manner acceptable to Utility. The AMISP agrees to indemnify Utility and its officers, servants, agents ("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:

a) any negligence or wrongful act or omission by the AMISP or its agents or employees or any third Party associated with AMISP in connection with or incidental to this Contract; or
b) any infringement of patent, trademark/copyright or industrial design rights arising from the use of the supplied Solution or any part thereof.

11.2 The AMISP shall also indemnify 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.

11.3 Without limiting the generality of the provisions of the Article 11.1 and 11.2, the AMISP shall fully indemnify, hold harmless and defend Utility Indemnified Persons from and against any and all suits, proceedings, actions, claims, demands, liabilities and damages which 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 the Solution, information, design or process supplied or used by the AMISP in performing the AMISP'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 AMISP 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 Solution or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the AMISP shall promptly make every reasonable effort to secure for the Utility a license, at no cost to Utility, authorizing continued use of the infringing work. If the AMISP is unable to secure such license within a reasonable time, the AMISP shall, at its own expense, and without impairing the specifications and standards, either replace the affected work, or part, or process thereof.

**(a) Survival on Termination**

**(b) Defence of Claim**

**11.4 SURVIVAL ON TERMINATION**

11.4.1 The provisions of this Article 11 shall survive the Termination of the Contract

**11.5 DEFENCE OF CLAIMS**

11.5.1 If any proceedings are brought or any claim is made against the Utility arising out of the matters referred to in Article 11, the Utility shall promptly give the AMISP a notice thereof, and the AMISP may at its own expense and in the Utility's name conduct such proceedings or claim and any

negotiations for the settlement of any such proceedings or claims.

**(c) Limitation of Liability**

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

11.5.3 The Utility shall, at the AMISP's request, afford all available assistance to the AMISP in conducting such proceedings or claim, and shall be reimbursed by the AMISP for all reasonable expenses incurred in so doing.

**11.6 LIMITATION OF LIABILITY**

11.6.1 Except in cases of gross negligence or wilful misconduct:

a) 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 AMISP to pay liquidated damages to the Utility; and

b) The aggregate liability of the AMISP to the Utility, whether under the Contract, in tort, or otherwise, shall not exceed 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 AMISP to indemnify the Utility with respect to infringement of any Intellectual Property Rights.

12. **Governing Laws and Settlement of Disputes**

12.1 The Utility and the AMISP shall make every effort to resolve amicably any disagreement or dispute arising between them under or in connection with the Contract, by direct informal negotiation.

12.2 If the Utility and the AMISP fail to resolve such a dispute (the date of commencement of the dispute shall be taken from the date when this Article 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 28 (twenty-eight) days from the commencement of such consultation, either Party may

require that the dispute be referred for resolution to the formal mechanisms specified in this Article.12.

12.3 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 arbitrator each to be nominated by the AMISP and the Utility and the third to be appointed as the presiding arbitrator by both the arbitrators in accordance with the Arbitration and Conciliation Act,1996. If either of the parties fails to appoint its nominee arbitrator within 60 (sixty) days after receipt of a notice from the other party invoking the arbitration, the nominee arbitrator appointed by one of the party invoking the arbitration clause shall act as the sole arbitrator to conduct the arbitration under the Arbitration and Conciliation Act 1996, as amended from time to time.

12.4 The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 or any statutory modification thereof. The seat of arbitration shall be as specified in **SCC**.

12.5 The Contract shall be governed by and interpreted in accordance with laws of the India. The Courts, specified in **SCC** , shall have exclusive jurisdiction in all matters arising under this Contract.

12.6 Parties to Perform Obligations: Notwithstanding the existence of any Dispute and difference referred to the Arbitration Tribunal as provided in Article 12.3 and save as the Arbitration Tribunal may otherwise direct by a final or interim order, the Parties hereto shall continue to perform their respective obligations (which are not in dispute) under this Contract.

13. **Change Order**

**(a) Change Notes / Change Order to Alter Number of Meters to be Installed**

**13.1 Change Notes / Change Order to Alter Number of Meters to be Installed**

Necessity of Change Notes arise due to more meters getting added over and above the numbers agreed for the project, subject to the variance limit of specified in **SCC**,

as percentage of the number of meters decided. Negative variation is permissible only up to the "Installation Milestone". Positive variation is however possible at any time during the Contract Period

13.1.1 Change Notes shall be generated and maintained by the AMISP based on a backup written communication from the Utility Project Manager. The AMISP shall continue to receive its monthly AMISP Service Charges for additional meters installed and made operational through the means of Change Notes.

13.1.2 To establish the revised Total Meter-Months for the project due to additional meters installed, the Utility shall convert all such Change Notes to Change Orders any time before the Total Meter-Months are completed.

13.1.3 In the event of loss of a consumer the Utility may request the AMISP to relocate a Smart Meter at a different location, however AMISP shall continue to receive the AMISP Service Charge qua all the Smart Meters installed.

13.1.4 In the event a Change Note / Change Order causes an increase or decrease in the time required for, the AMISP's performance of any provisions under the Contract, an equitable adjustment shall be made in the Project Implementation Schedule as provided in Clause 12 of Schedule A of this AMISP Contract and the Contract shall accordingly be amended. Any claims by the AMISP or the Utility for adjustment under this Article must be asserted within 28 (twenty-eight) days from the date of the AMISP's receipt of the Change Note / Change Order. The Parties agree that any change in the delivery and Project Implementation Schedule shall result in a proportional change in the Term of the Contract.

(b) **Change Request/ Change Order for New/Enhancements to Software Applications**

**13.2 Change Request/Change Order for New/Enhancements to Software Applications**

Another form of change may arise when the Utility discovers the need to have enhancements in the delivered software applications and/or entirely new functional requirements in the applications ("New Requirements"), subject to Article 13.2.5 of this Contract.

13.2.1 At any point in time the Utility may raise a Change Request to include New Requirements in the AMI system application. This Change Request shall include the following:

- Identification and documentation of the need for the change
- Functional details of the change
- Information related to initiator, initiation date and
- Priority of the change

13.2.2 The AMISP will analyse and evaluate the Change Request to come up with the estimate of the effort involved in terms of man-days required (in respective skill areas) and time schedule as per agreed priority and document the same. Utility will use the estimated effort of the new requirements made by the AMISP and together with the quoted man-month rates arrive at a cost estimate. For all technical resources, the quoted man-month rate shall be used. Efforts of support staff shall not be taken into consideration for this purpose.

13.2.3 Based on the agreed cost estimate, the Utility shall raise a "Change Order". The AMISP shall undertake the development of the New Requirements only after securing express consent of the Utility. If the consent of Utility is not received, then the change will not be carried out. The change will be implemented in accordance to the agreed cost, effort, and schedule by the AMISP and the change will be verified by the Utility on completion of implementation.

13.2.4 If the Change Order for New Requirements agreed to herein causes an increase or decrease in cost of, or the time required for, firm's performance of any provisions under the Agreement, equitable adjustments shall be made in the Agreement Price or Delivery Schedule, or both, and the Agreement shall accordingly be amended. Any claims by firm for adjustment under this must be asserted within 30 (thirty) days from the date of AMISP receiving the change order.

13.2.5 The following categories of Change Requests shall not be treated as "New Requirements" and the AMISP is expected to deliver these Change Requests as per agreed schedule without any commercial implications.

- All bug fixes
- All upgrades of the licensed platforms
- Changes made to report templates
- New reports not exceeding [x] numbers
- Integration with national level systems like NFMS etc.
- Minor changes not requiring more than 10 man-days
- Aspects already covered under existing scope of work provided in this Contract

(c) **Process for executing a Change Request, Change Order**

**13.3 Process for executing a Change Request, Change Order**

The two types of Change Requests as described in articles 13.1 and 13.2 are dealt with at the appropriate level of authority within the Utility in separate ways. The processing of these Change Requests into Change Orders are as follows:

b. An institutional mechanism will be set up for taking decisions regarding requests for changes or New Requirements. The Utility will set up a Change Control Committee with members from its procurement department and the AMISP. If it is unable to reach an agreement, the decision of the Utility will be final.
c. In the case of additional meters installed through Change Notes maintained by the AMISP, the Utility shall convert all such Change Notes to Change Orders any time before the Total Meter-Months are completed.
d. In the case of New Requirements in Software Applications, Utility may at any time, by a written Change Request seek changes to be implemented within the general scope of the Agreement provided this does not constitute unrelated work and that it is technically practicable, taking into account both the state of advancement of the Solution and the technical compatibility of the change envisaged with the nature of the Solution as specified in the Contract.
e. The Change Request/New Requirement management procedure will follow the following steps: -
    i. Identification and documentation of the need for the Change Request/New Requirement - The information related to initiator, initiation date and details of Change Request/New Requirement and priority of the change/New Requirement will be documented by the Utility.

ii. Analysis and evaluation of the Change Request/New Requirement - Impact of the change/ new requirement in terms of the estimated effort, changed schedule, cost and the items impacted will be analysed and documented by the AMISP.
iii. Approval or disapproval of the Change Request/New Requirement – the Utility will approve or disapprove the Change Request/New Requirements. Once approved the Change Request is converted into a Change Order which is subject to the conditions laid down in Article 13.2.5.
iv. Implementation of the change/New Requirement – The Change Order/New Requirement will be implemented in accordance to the agreed cost, effort, and schedule by the AMISP.
v. Verification of the change/New Requirement - The Change Order/New Requirement will be verified by the Utility on implementation of the change request.

14. **Miscellaneous**

**(a) Waiver**

**14.1 WAIVER**

14.1.1 Subject to Article 14.1.2, 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.

14.1.2 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) 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
b) 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.

c) 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.

**(b) Extension of Time**

**14.2 EXTENSIONS OF TIME**

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

14.2.2 Except in case of Force Majeure, as provided in Article 8 or where the delay in delivery of the Goods or completion of Related Services is caused due to any delay or default of the Utility, any extension granted under Article 14.2.1 shall not absolve the AMISP from its liability to the pay of liquidated damages pursuant to Article 7. Time will be the essence of the Contract and no variation shall be permitted in the delivery time/delivery schedule mentioned in the order unless agreed by the Utility. The AMISP is expected to implement the systems for the project area as per the schedule indicated in the Contract.

**(c) Insurance**

14.3 **INSURANCE**

14.3.1 The Goods supplied under the Contract shall be fully insured by the AMISP against loss or damage incidental to manufacture or acquisition, transportation, storage, delivery, and operations, in the manner specified in the Contract.

14.3.2 The AMISP shall furnish to the Utility copies of certificates and policies of the Insurances as soon as they are effected and renewed by or on behalf Of the AMISP from time to time in terms of Article 14.

**(a) Transportation**

**14.4 TRANSPORTATION**

14.4.1 The AMISP shall at its own risk and expense transport all the AMISP's equipment to the site by the mode of transport that the AMISP judges most suitable under all the circumstances.

14.4.2 Unless otherwise provided in the Contract, the AMISP shall be entitled to select any safe mode of transport operated by any person to carry the AMISP's equipment.

14.4.3 The AMISP shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the AMISP's equipment to the Project site. Utility shall use its best endeavours in a timely and expeditious manner to assist the AMISP in obtaining such approvals, if requested by the AMISP.

15. **Confidential Information**

15.1 Both AMISP and the Utility 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.

15.2 After the entering of the Contract, the Utility and the AMISP 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 AMISP may furnish to its subcontractors such documents, data, and other information it receives from the Utility to the extent required for the subcontractors to perform its work under the Contract, in which event the AMISP shall obtain from such subcontractors an undertaking of confidentiality similar to that imposed on the AMISP under this Article 15.

15.3 The Utility shall not use such documents, data, and other information received from the AMISP for any purposes unrelated to the Contract. Similarly, the AMISP shall not use such documents, data, and other information received from the Utility for any purpose other than the design,

procurement, or other work and services required for the performance of the Contract.

15.3.1 The obligation of a Party under Articles 15.1 and 15.2 above, however, shall not apply to information that:

a) Utility or AMISP need to share with the institutions participating in the financing of the Contract;
b) now or hereafter enters the public domain through no fault of that Party;
c) 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
d) Otherwise lawfully becomes available to that Party from a third Party that has no obligation of confidentiality.

15.3.2 The above provisions of this Article 15 shall not in any way modify any undertaking of confidentiality given by either of the Parties hereto prior to the date of execution of the Contract in respect of the Supply or any part thereof.

15.3.3 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 Articles by its employees, agents and sub-contractors.

15.3.4 The provisions of this Article 15 survive completion or termination, for whatever reason, of the Contract.

16. **Subcontracting**

16.1 The AMISP shall be permitted to appoint subcontractor(s) so as to meet its obligations under the Contract with the Utility, with intimation to the Utility, provided they ensure that any person engaged by AMISP are not blacklisted by any Government organization or regulatory agencies or Government Undertaking (as defined under the RFP).

16.2 AMISP shall engage only such sub-contractor(s) who satisfy the eligibility requirement in terms of applicable laws including the guidelines issued vide Order No. F/No.6/18/2019-PPD by Ministry of Finance, Department of Expenditure, Public Procurement Division dated 23 July 2020 and as amended from time to time.

17. **Warranty**

17.1 The AMISP warrants that all the Goods that would be used as part of Solution would be 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.

**17.2** The AMISP further warrants that the Goods shall be free from defects arising from any act or omission of the AMISP or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

**17.3** The warranty of the AMI system shall remain valid till expiry of the Contract Period.

**17.4** The AMISP shall be responsible for comprehensive maintenance of all the equipment and systems supplied & installed under this Contract during the Operational Period. There may be some variation during detailed engineering. AMISP 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 is deployed.

**17.5** The maintenance of the system supplied & installed by the AMISP shall be comprehensive. The AMISP shall be responsible for providing all the spares as mentioned in Form 15 of Schedule B of this Contract. The spares shall be maintained by the AMISP at no extra cost to the Utility.

18. **Change in Laws and Regulations**

18.1 Unless otherwise specified in the Contract, if after the Bid Submission Deadline indicated in **SCC**, 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 project delivery, then such delivery shall be correspondingly amended, to the extent that the AMISP

has thereby been affected in the performance of any of its obligations under the Contract.

18.2 The Party affected by a change in law shall give notice giving details of the likely impact of the change in law. The Parties shall negotiate in good faith to place the affected party at the same economic position as if no change in law had occurred. Provided only such change in law events which have financial impact beyond a threshold specified in **SCC**, are to be considered for the purposes of grant of relief to the affected Party.

18.2 Notification of Change In Law: If the AMISP is affected by a Change in Law in accordance with Article 18.1 and wishes to claim relief for such Change in Law under this Article 18, it shall give notice to the Utility of such Change in Law as soon as reasonably practicable after becoming aware of the same. Any notice served pursuant to Articles 18 shall provide, amongst other things, precise details of the Change in Law and its effect on the AMISP.

19 **Severability**

19.1 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.

21. **Language**

20.1 The official language of the Contract is English. Contract as well as all correspondence and documents relating to the Contract exchanged by the AMISP and Utility, 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.

20.2 The AMISP shall bear all costs of translation to English and all risks of the accuracy of such translation. The AMISP

shall be bound to the English translation and what has been stated therein.

21. Assignment

21.1 The AMISP shall not assign, in whole or in part, their obligations under this Contract without prior permission of the Utility.

21.2 The permission for assignment of whole or part of this contract shall only be requested/permitted at least two years after Installation Milestone.

22. **Entire Agreement**

22.1 This Contract along with all its annexures, schedule and the provisions of the RFP reflect the entire understanding of the Parties.

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

23. **Disclaimer**

23.1 Utility reserves the right to share, with any consultant of its choosing, any resultant proposals in order to secure expert opinion.

**23.2** Utility reserves the right to accept any proposal deemed to be in the best interest of the Utility.

24. **Public Disclosure**

24.1 All materials provided to Utility by the AMISP may be disclosed in accordance with the provisions of applicable law including but not limited to the Right To Information Act, 2005 (RTI), etc.

24.2 The AMISP's team shall not make or permit to be made a public announcement or media release about any aspect of this Contract unless Utility first gives the AMISP its written consent.

25. SLA Audit

25.1 A designated team/ person from Utility may review the system generated SLA performance report of AMISP each month. The review/ audit report will form basis of

any action relating to imposing penalty on or breach of Contract of the AMISP.

25.2 In case, there is no review/ audit report submitted within 10 (ten) working days of every month, it shall be deemed that all SLAs were met in the previous month.

26. **Adherence to Safety Procedures, Rules, Regulations and Restriction**

26.1 AMISP 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 Utility shall be applicable in the performance of this Contract and AMISP's team shall abide by these laws.

26.2 Access to the Utility's locations shall be strictly restricted. No access to any person except the designated personnel belonging to the AMISP who are genuinely required for execution of work or for carrying out management/maintenance who have been explicitly authorized by Utility shall be allowed entry to the Utility's locations. Even if allowed, access shall be restricted to the pertaining equipment of Utility only. The AMISP shall maintain a log of all such activities.

26.3 The AMISP shall take all measures necessary or proper to protect the personnel, work and facilities and shall observe all reasonable safety rules and instructions. AMISP's team shall adhere to all security requirement/regulations of Utility during the execution of the work. Utility's employees and associates also shall comply with safety procedures/policy.

26.4 The AMISP 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.

26.5 Utility will be indemnified for all the situations mentioned in this Article in the similar way as defined in Article 11.

27. **Non- Solicitation of Staff**

27.1 The Articles of this contract, which by nature are intended to survive termination of this Contract, shall remain in effect after such termination

28. **Notices**

29.1 All notices to be given under this Contract shall be in writing and in the English language.

29.2 A Notice shall be effective when delivered or on the notice effective date, whichever is later.

**29.3** All notices must be delivered personally, by registered or certified mail or by facsimile transmission or email.

**29.4** All notices shall be effective:

a) If sent by facsimile transmission or email, when sent (on receipt of confirmation of the correct number or address);
b) If sent by registered post or certified mail, within 5 (five) days of dispatch;
c) If delivered personally, on receipt by intended recipient, provided that all notices given by facsimile transmission shall be confirmed by registered or certified mail.

29.5 Each party shall forthwith notify the other party of any change in its address to which notices under this Contract are to be delivered, mailed or facsimiled.

# III. Special Conditions of Contract

<table>
<tr><th>GCC Article/ Clause</th><th>Amendments of, and Supplements to, Clauses in the General Conditions of Contract</th></tr>
<tr><td>1.1 (j)</td><td>SPV is not applicable</td></tr>
<tr><td>1.2.12</td><td>
The methodology for determining the ‘Total Meter-Months’ as well as ‘Operation and Maintenance Period of the AMI system’ is provided below:<br>
Assuming a deployment of 1 million Smart Meters to be installed in Project area A, ‘Total Meter-Months’ is determined as below:<br>
‘Total Meter-Months’ = (Total number of smart Meters to be installed in the AMI Project X 90 months) = 1 million meters X 90 months = 90 million meter-months (A)<br>
The implementation of the AMI system is aligned to the schedule provided above. This implies the following:<br>
a) 50,000 Smart Meters (5% of total) are operationalized at the end of 9th Month from date of execution of the Contract;<br>
b) From there on, ~40,909 Smart Meters (4.09% of total) are operationalized every month till 500,000 Smart Meters (50% of total) are operationalized at the end of 20th Month from date of execution of the Contract;<br>
c) From there on, 50,000 Smart Meters (5 % of total) are operationalized every month till 1,000,000 smart meters (100% of total) are operationalized at the end of 30th Month from date of execution of the Contract.<br>
The accrual of meter-months will commence as soon as the first lot of 5% of total Smart Meters are installed and operationalized at the end of 9th Month from date of execution of the Contract. Hence, ‘Meter-Months’ of AMI system operated after operational go-live is determined as below:
<table>
<tr><th>Month</th><th>Total Smart Meters Installed</th><th>Meter-Months</th></tr>
<tr><td>9</td><td>50,000</td><td>0</td></tr>
<tr><td>10</td><td>90,909</td><td>50,000</td></tr>
<tr><td>11</td><td>131,818</td><td>90,909</td></tr>
<tr><td>12</td><td>172,727</td><td>131,818</td></tr>
<tr><td>13</td><td>213,636</td><td>172,727</td></tr>
<tr><td>14</td><td>254,545</td><td>213,636</td></tr>
<tr><td>15</td><td>295,455</td><td>254,545</td></tr>
<tr><td>16</td><td>336,364</td><td>295,455</td></tr>
<tr><td>17</td><td>377,273</td><td>336,364</td></tr>
<tr><td>18</td><td>418,182</td><td>377,273</td></tr>
<tr><td>19</td><td>459,091</td><td>418,182</td></tr>
<tr><td>20</td><td>500,000</td><td>459,091</td></tr>
<tr><td>21</td><td>550,000</td><td>500,000</td></tr>
<tr><td>22</td><td>600,000</td><td>550,000</td></tr>
</table>
</td></tr>
</table>

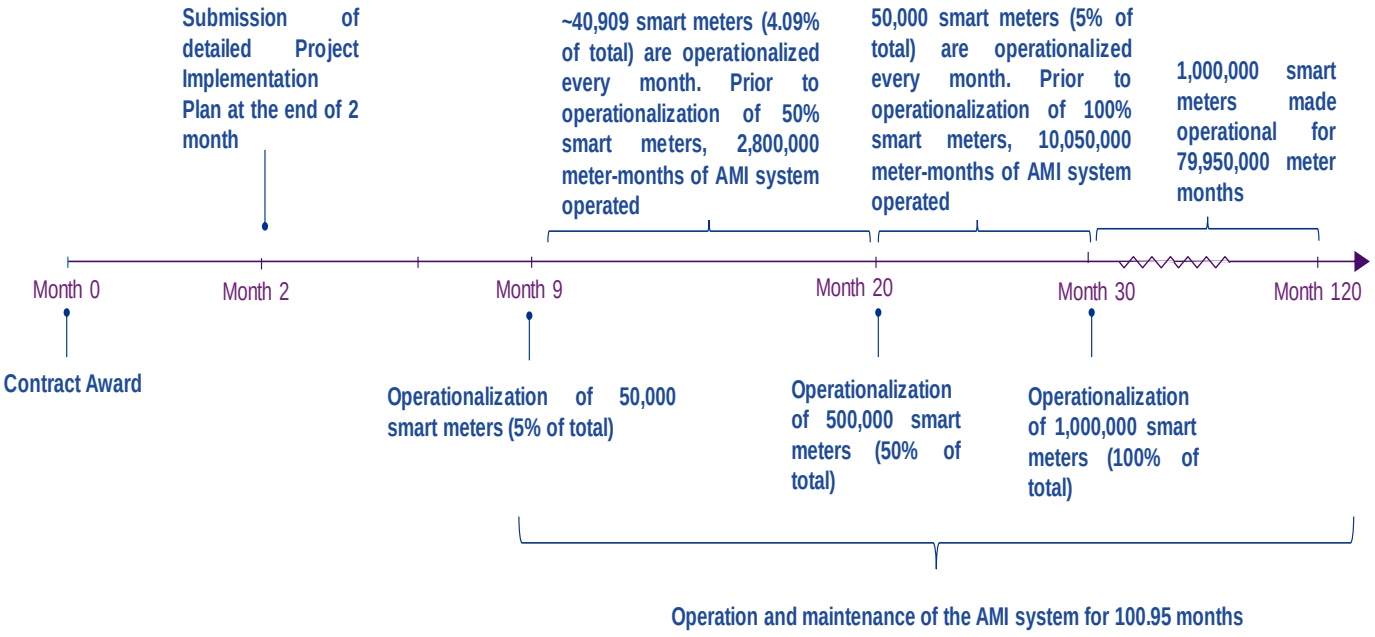
<table>
<tr><th>GCC Article/ Clause</th><th>Amendments of, and Supplements to, Clauses in the General Conditions of Contract</th></tr>
<tr><td></td><td>
<table>
<tr><td>23</td><td>650,000</td><td>600,000</td></tr>
<tr><td>24</td><td>700,000</td><td>650,000</td></tr>
<tr><td>25</td><td>750,000</td><td>700,000</td></tr>
<tr><td>26</td><td>800,000</td><td>750,000</td></tr>
<tr><td>27</td><td>850,000</td><td>800,000</td></tr>
<tr><td>28</td><td>900,000</td><td>850,000</td></tr>
<tr><td>29</td><td>950,000</td><td>900,000</td></tr>
<tr><td>30</td><td>1,000,000</td><td>950,000</td></tr>
<tr><td>Total</td><td>1,000,000</td><td>10,050,000</td></tr>
</table>
Basis the above table, the AMI System would have been already operational for 10,050,000 meter-months prior to Installation Milestone (B)<br>
Hence, AMI system will remain operational for the remaining Contract period, i.e.,<br>
= [‘Total Meter-Months’ (A) – ‘Meter-Months’ of prior to Installation Milestone (B)] (C)<br>
= (90,000,000 – 10,050,000) meter-months<br>
= 79,950,000 meter-months (C)<br>
Time period (in months) for operating AMI system after Installation Milestone is,<br>
= [Remaining ‘Meter-Months’ / (Total number of Smart Meters installed in the AMI Project)] (D)<br>
= 79,950,000 / 1,000,000<br>
= ~79.95 months<br>
Hence the Total ‘Operation and Maintenance period of the AMI system’ = (Months of operating Smart meters prior to Installation Milestone + ‘Months’ of operating AMI system after Installation Milestone) = 21 months + 79.95 months = 100.95 months<br><br>
The above methodology has been illustrated in the graphic at Annexure I (SCC)
</td></tr>
<tr><td>5.1.1</td><td>Contract Price is INR [X] <Utility to insert to figure based on the total project cost as provided in Form 16 of Schedule A of this Contract></td></tr>
<tr><td>5.2.3</td><td>
<table>
<tr><th>S.No.</th><th>Deliverable</th><th>Payment</th></tr>
<tr><td>1.</td><td>i. Monthly documentation/ records/ test certificates/ etc. during Post-Operational Go-Live Phase<br>a. Monthly progress report briefing the status of installation of meters including problems that arise</td><td>= AMISP Service Charge (as per Column E of Table- Bill of Materials and Services for Smart Meters in Form 16 of Schedule B of this Contract) X total number of meters in operation and maintenance phase at the end of each month Post-Operational Go-Live</td></tr>
</table>
</td></tr>
</table>

| GCC Article/ Clause | Amendments of, and Supplements to, Clauses in the General Conditions of Contract | | |
|---|---|---|---|
| | | with the installed AMI system (if any) as well any cyber security related issues and corrective action taken by AMISP for the same;<br>b. Change Notes<br>c. Reports as mentioned in this Contract which includes but not limited to the following:<br>i. Service Level Agreement (SLA) performance report;<br>ii. Energy Audit report;<br>iii. Other reports as per mentioned in Clause 6.2.2 of the Schedule A to this Contract; | Plus<br><br>Lumpsum payment rate per meter (as per Column F of Table- Bill of Materials and Services for Smart Meters in Form 16 of Schedule B of this Contract) X total number of new smart meters installed and integrated for which Lumpsum payment has not been made earlier, if any<br><br>Plus<br><br>Payment towards change request/new requirement completed, if any (as per Column K of Table- Bill of Materials and Services for Smart Meters in Form 16 of Schedule B of this Contract) |
| | 2. | Quarterly documentation/ records/ test certificates/ etc. during Post-Operational Go-Live Phase<br>a. As-Built Drawings;<br>b. Updated consumer indexing as per the implemented AMI system; | *<To be made on every third month of each quarter of the Contract Period as defined by the Utility>*<br><br>= AMISP Service Charge X total number of meters in operation and maintenance phase at the end of each month Post-Operational Go-Live<br><br>Plus<br><br>Lumpsum payment rate per meter X total number of new smart meters installed and integrated for which Lumpsum payment has not been made earlier, if any<br><br>Plus<br><br>Payment towards change request/new requirement completed, if any |
| | 3. | Annual documentation/ records/ test certificates/ etc. during Post-Operational Go-Live Phase<br>a. Cyber Security Audit; | *<To be made on every last month of each year of the Contract Period as defined by the Utility>* |

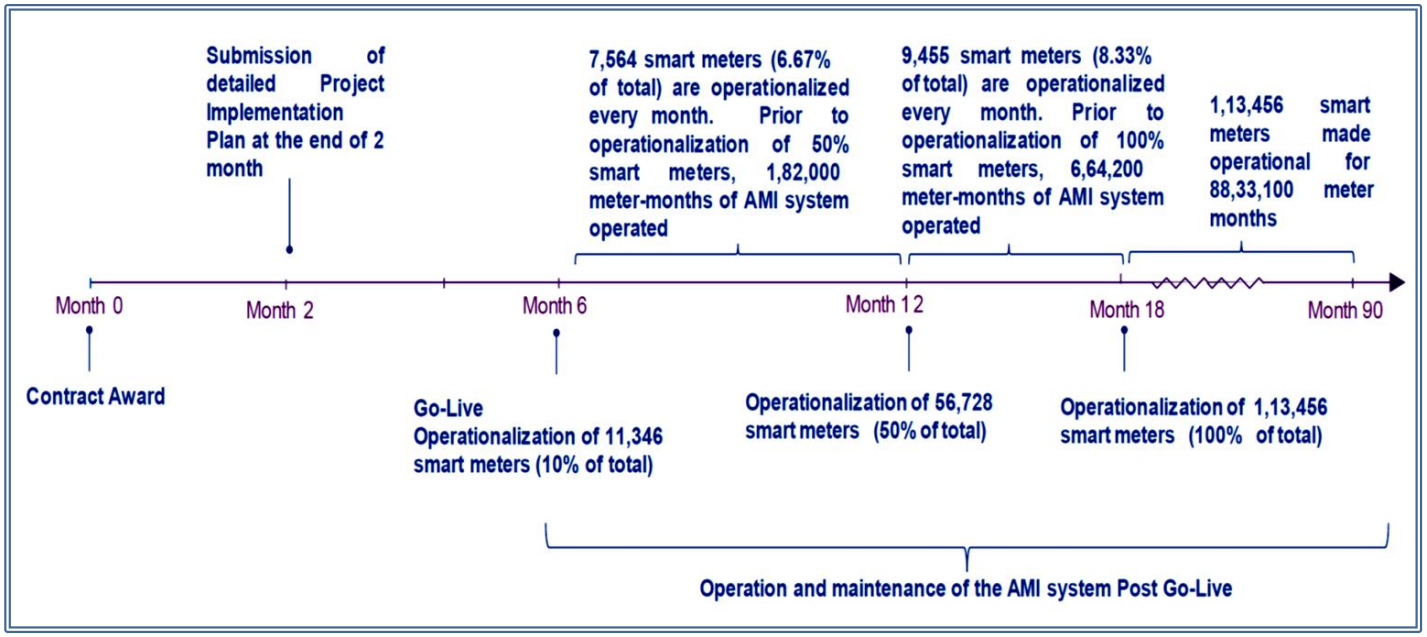
| GCC Article/ Clause | Amendments of, and Supplements to, Clauses in the General Conditions of Contract |
|---|---|
| | b. Data Privacy Audit report;<br>c. Updated Exit Management Plan | = AMISP Service Charge X total number of meters in operation and maintenance phase at the end of each month Post-Operational Go-Live<br><br>Plus<br><br>Lumpsum payment rate per meter X total number of new smart meters installed and integrated for which Lumpsum payment has not been made earlier, if any<br><br>Plus<br><br>Payment towards change request/new requirement completed, if any |
| **5.2.11** | The operations for direct payment to AMISP through consumer payments has been illustrated in **Annexure II (SCC)**. |
| **6.1** | [5] % of the Contract Price – Performance Security |
| **6.2** | [3]% of the Contract Price – Performance Security determined in accordance with Installation of Milestones |
| **7.3** | An illustrative example for arriving at the deductions is given in **Annexure III(SCC)** |
| **7.5** | A sum equivalent to [1]% of the Contract Price – Incentive on advance completion of work |
| **10.5.3 (a)** | [60] % |
| **10.5.3 (b)** | **[100]%** |
| **10.5.3 (c) i** | **[60]%** |
| **10.5.4 (a)** | **[12]%** |
| **12.4** | **AMARAVATHI** |
| **12.5** | **AMARAVATHI** |
| **13.1** | [-20%] to [+100%] |
| **18.1** | **22.10.2021 upto 03:00PM** |
| **18.2** | [1% of the Contract Price] |

# ANNEXURE I (SCC)

## GRAPHIC ILLUSTRATION MODEL




## GRAPHIC ILLUSTRATION FOR APSPDCL PROPOSED SMART METERS



# Annexure II (SCC)

## PAYMENT MECHANISM

***The Utility shall, within 14 (fourteen) working days of the Operational Go-Live, a Payment Mechanism by preparing invoice on or before 5th of every month and the Payment due will be made within 90 days after acceptance of invoice by competent authority as per the Terms and Conditions of the contract.***

# Annexure III (SCC)

*< For example, in case AMISP delays installation of say 100 similar type of meters by say 5.5 months out of a total meter installation of 1000 meters assuming AMISP service charges as Rs. 50 /meter/month for such meter. Liquidated Damages would be worked as 5*50*100*50%= Rs.12,500. Maximum Liquidated Damages that can be deducted in case of delay of say 13 months is limited to 12 months i.e., 12*50*100*50%= Rs. 30,000. Further, Liquidated Damages will be levied as per the delay of Goods i.e. if 80 meters are implemented after 5 months of delay and rest 20 meters are implemented after 12 months of delay, then LD would be 5*80*50*50%+12*20*50*50% = Rs. 16,000. In the event more than one type of meter are delayed, the LD would be calculated for each category of the meter on basis of their respective AMISP Service Charge >*

# Appendix A
# PROJECT REQUIREMENTS
# (AMI System Requirements and Service Level Agreement)

*[This Appendix shall include Section 6 of the RFP Document including all amendments/ clarification etc. thereto]*

# Appendix B
# AMISP Service Charge

# PART III

# CONTRACT RELATED FORMS

## Section 8. Contract Related Forms

| Form No. | Document |
|---|---|
| 19 | Performance Security as per the format prescribed in Form 19 |
| 20 | Letter of Award as per the format prescribed in Form 20 |

# Form 19: Format of Performance 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.]*

To: (Name of Purchaser)

WHEREAS……..(Name of Supplier) (hereinafter called "the Supplier") has undertaken, in pursuance of Contract No.....dated.....2005 to supply. ..... (Description of Materials/equipment and Services) (hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Supplier will furnish you with a Bank Guarantee by a recognized Bank for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Supplier a Guarantee:

THEREFORE WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of. ..... (Amount of the Guarantee in Words and Figures) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract and without cavil or argument, any sum or sums within the limit of..... (Amount of Guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the. ... day of. ..…... 20

Signature and Seal of Guarantors
..... Date. .....20
.....
Address:.....…...
.....

NOTE: This will be executed on a Rs.100/- non-judicial stamp paper by a scheduled Bank.

**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.
2. The Bank Guarantee by Bidder shall be given from the Scheduled Commercial Banks.

# Form 20: Format of Letter of Award

**Sub:** Bid for Appointment of Advanced Metering Infrastructure (AMI) Service Provider for Smart Prepaid metering by replacing the existing meters to all Government Services in SPSR Nellore, Chittoor, YSR Kadapa, Ananthapuram and Kurnool Districts in Andhra Pradesh state on DBFOOT basis

**REF**: 1. Request for Proposal for selection of AMISP dated [•] ("RFP")
2. Your proposal dated [•] ("Proposal")
3. Your clarification [•]

Dear Sir,

1. This is in reference to your Proposal in relation to the RFP.
2. Pursuant to the evaluations of the Bid, your bid has been found to be most suited.
3. You are requested to please take steps for incorporation of the SPV in terms of the RFP for execution of the AMISP Contract. The execution of the AMISP Contract shall happen only after you have furnished the performance security in terms of the RFP.
4. A draft of the AMISP Contract was provided to you along with the RFP. Please note that there shall be no change whatsoever in the terms and conditions as set out in the draft Contract.
5. Please note that in the event of failure to comply with any terms and conditions of this Letter of Award, the entire Bid Security may be forfeited.
6. Any further correspondence in connection with the Project should be addressed to the [insert details of the appropriate authority •]" with a copy to Chairman/ Managing Director, till further instructions are issued.
7. The terms and conditions as set out in this Letter of Award shall stand valid until execution of the AMISP Contract.
8. Please acknowledge the receipt and return the duplicate copy of this Letter of Award after signing and stamping it in all the pages to the undersigned as a token of acceptance.

Thanking You

Yours truly
[insert details of the Utility]

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