West Bengal State Electricity Distribution Company Limited
(A Government of West Bengal Enterprise)
(I T & Communication Cell)
Vidyut Bhavan,3rd Floor, C&D Block, Bidhan Nagar, Block-DJ, Sec-II, Kolkata-700091
Phone No.033-2358-9665, FAX No.033-2337-2427, 033-2358-9244
Website: www.wbsedcl.in, e-mail: itcell@wbsedcl.in
CIN: U40109WB2007SGC113473

WBSEDCL
e- TENDER NOTICE

(LOCAL COMPETITIVE BIDDING)

BID DOCUMENT

Supply & Installation of Smart Meter with Communication System and Cloud Based Head End System for AMI Solution in OPEX Model

Tender Fee: Rs 28,320/-

31/3/2021

Tender Notice No: WBSEDCL/ IT&C/ 33.10(iv)/ 3468 **Dated: 19.02.2021**

DISCLAIMER

This e-Tender Document (also referred as "e-Request for Proposal" or "e-RFP") is not an agreement and is not an offer or invitation by WBSEDCL to any Bidder other than one that qualifies based on evaluation of submitted BIDs. The purpose of this tender document is to provide information to the potential Bidders to assist them in responding to this Tender Document. Though this Tender Document is prepared with sufficient care to provide all required information to the potential Bidders, they may need more information than that has been provided. In such cases, the potential Bidders are solely responsible to seek the information required from WBSEDCL, at their own cost. WBSEDCL reserves the right to provide such additional information at its sole discretion. In order to respond to the Tender Document, if required, and with the prior permission of WBSEDCL, the potential Bidder may conduct his own study and analysis, as may be necessary.

WBSEDCL makes no representation or warranty and shall incur no liability under any law, statute, rules or regulations on any claim the potential Bidder may make in case of failure to understand the requirement and respond to the Tender Document. WBSEDCL may, in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information the information in this Tender Document.

CONTENTS

INSTRUCTION TO BIDDER (IB)

IB.1. Introduction: WBSEDCL is one of the leading Indian Discom in the State of West Bengal. For commitment towards a continuous improvement an ICT/OT Strategy & Implementation Roadmap for Smart Grid maturity under Smart Grid implementation strategy, Advanced Metering Infrastructure (AMI) is one of the most important initiative where conventional electronic meters are expected to be replaced with smart meters in a phased manner. Treading the journey of making power distribution smarter every day, WBSEDCL desires to leverage the benefits of Advanced Metering Infrastructure for taking power quality and reliability to the acme of excellence.

IB.2. Objective: WBSEDCL intends to appoint an "Implementation Agency (IA)" that can design, deploy and maintain the Smart Metering system in OPEX MODEL. The IA shall be responsible to finance and implements the entire project. The IA shall be responsible for Supply, delivery, installation, commissioning and operations of 1-ph and 3-ph whole current smart energy meter for consumers, related infrastructure as communication module, cloud based HES, Links, Integration between MDMS and HES, its successful Operational Go-Live and maintain the system throughout the contract period. Utility shall pay the Monthly Reading Charge to IA as per actual operational meter-month on monthly basis in accordance with the terms and conditions of the Contract. IA shall transfer the entire system with all operations including all the hardware, software along with its valid licenses to the WBSEDCL at the end of the Contract Period to facilitate seamless operation of Utility businesses.

The scope of work of the IA shall cover end-to-end metering in the selected AMI Project area to enable complete energy accounting with zero manual intervention. The Project scope shall include:

IB.2.1. Deployment of Smart Meters with NIC card,

IB.2.2. WAN communication systems,

IB.2.3. Cloud based Head End System (HES)

IB.2.4. MPLS/VPN link between HES and MDMS and link between HES cloud with existing DC of WBSEDCL

IB.2.5. Integration with Existing MDMS

The AMI Project shall be transferred to the Utility at no cost and as per the Exit Management Plan at the end of the term of the Contract on as-is where-is basis. The roles and responsibilities of the IA and payment thereof shall be governed by the terms and conditions laid down in the Contract.

IB.3. Eligibility of Bidder:

IB.3.1. Definition of Bidder: The bidder can be an individual organization or Joint Venture (JV) a consortium of maximum three (3) organizations meeting the qualifying Criteria (QR).

IB.3.2. Lead Bidder: One of the consortium/ JV members responsible for performing key components of the contract shall be designated Lead Bidder/ SI/ Implementation agency.

Evidence of this authorization shall be provided by submitting a power of attorney signed by legally authorized signatories of all consortium members along with the bid**.**

IB.3.3. The Bidder (Lead Bidder in case of a consortium/JV) shall have the authority to conduct all businesses for and on behalf of any and all the parties during the bidding process and, in the event the Lead Bidder will be awarded the Contract, during contract execution.

IB.3.4. Every Consortium/JV Member shall provide consent to the Lead Consortium Member and make itself aware of all the proceedings of the bidding process and Project implementation through legally enforceable consortium agreement, power of attorneys, legal undertakings, etc. entered amongst all members of that Bidding Consortium including but not limited to those as prescribed in ANNEXURE-I, ANNEXURE-II and ANNEXURE-IV. In the absence of duly executed formats, the Bid shall not be considered for evaluation and will be rejected.

IB.3.5. The Lead Consortium/JV Member shall designate and authorize one person to represent the Bidding Consortium in its dealings with WBSEDCL through a Power of Attorney as per ANNEXURE-III to perform all tasks including, but not limited to, providing information, responding to inquiries, signing of Bid on behalf of the Consortiums/ JV, etc.

IB.3.6. The Bidder (Lead Bidder in case of a consortium/JV) shall be wholly responsible for execution of the contract.

IB.3.7. In case the Bidder being Indian Company acting as a lead partner is having collaboration with the Company incorporated outside India (Foreign Company), the Bidder shall in respect of such collaboration submit duly certified/authenticated copies of the following documents:

IB.3.7.1. Certificate of Incorporation / Registration Certificate issued by the competent authority under the law in force in the country of its incorporation;

IB.3.7.2. Memorandum and Articles of Association or document constituting the company and regulating its affairs;

IB.3.7.3. List of board of directors or regulating/controlling body;

IB.3.7.4. Address of its place of business in India, if any;

IB.3.7.5. Complete copy of agreement entered into by the Indian company with the foreign company together with gist of major terms, validity period, demarcation of scope of work, role and responsibilities of each party to the agreement, technical, financial and management aspects of the agreement;

IB.3.7.6. Letter of undertaking of Commitment of the foreign company to continue partnering with agreement and to discharge its role / functions under the agreement till the completion of AMI project including the total contract period, if assigned by Utility.

IB.3.7.7. Any other papers or documents required by utility at a later stage or in future.

IB.3.8. In case of non-performance (slippage in milestones, scope & quality of work, discipline, etc. as assessed by WBSEDCL) and/or bankruptcy of any of the partners, the lead bidder shall take necessary remedial action through addition/change of partner for the concerned role. The addition/change of partner for concerned role shall be with necessary prior approval of the utility and shall be at no additional cost to the project cost already quoted at the

time of bidding for the project. The addition/change of partner for concerned role shall be required to meet the Qualifying Criteria as per IB.4.

IB.3.9. Bidder or the Lead Bidder in case of a Consortium shall not have a conflict of interest with one or more parties in this bidding process. Participation by Bidder(s) with a conflict of interest situation will result in the disqualification of all Bids in which it is involved. Purchaser considers a conflict of interest to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations, and that such conflict of interest may contribute to or constitute a prohibited corrupt practice. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process if, including but not limited to:

IB.3.9.1. receive or have received any direct or indirect subsidy from any of them; or

IB.3.9.2. have the same legal representative for purposes of this Bid; or

IB.3.9.3. have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Purchaser regarding this bidding process; or

IB.3.9.4. Participation by a Bidder or Lead Member in more than one Bid will result in the disqualification of all Bids in which it is involved. However, this does not limit the inclusion of the same product (commercially available hardware, software or network product manufactured or produced by the firm), as well as purely incidental services such as installation, configuration, routine training and ongoing maintenance/support, in more than one bid; or

IB.3.10. Sole bidder or any partner including lead bidder (In case of consortium/JV) is not allowed to bid as partner of other bidder for the same bid.

IB.3.11. The lead bidder's direct experience in India or overseas will be considered.

IB.4. Qualifying Requirement (QR) of Bidder and Partners in case of consortium/JV:

IB.4.1. The Bidder must possess credentials prescribed as Qualification Criteria. If any bidder fails to fulfil the Qualification Requirement (QR), his bid will be treated as non-responsive and no further correspondence/clarification will be taken into consideration for the same. It is also intimated that merely meeting the following requirements does not indicate that the bidders shall be short listed for opening of financial bid. The short listing shall be made considering all the technical parameters and submission of sample and demonstration of smart metring solution.

IB.4.2. The bidder can be an individual organization or a consortium of maximum three (3) organizations meeting the QR.

IB.4.3. The Lead bidder/ Individual Bidder can be any of the three organizations as detailed in table below. In reference to below table, the Lead/ individual bidder should meet its respective QR along with the QR of others (as given below) either as individual, Consortium or sub-contractor. Further, they have to provide clarity on the roles and responsibilities of each consortium member or sub- contractor.

Sl. No.	Lead Bidder	Consortium Member / Sub-contractor meeting respective QR		
		DL	MM	SI
1	Distribution Licensee (DL)	√	√	optional
2	Meter Manufacturer (MM)	optional	√	optional
3	System Integrator (SI)	optional	√	√

IB.4.4. Qualifying Requirement (QR) of Bidder:

	Qualifying Requirement (QR) of Bidder		
Sl.	**Descripti**	**Qualification Criteria**	**Evaluation/ Document Required**
(A) General Pre-qualification Criteria of Bidder			
1	Bidders Identity	The bidder shall be a private/public Company registered under Companies Act 1956 / 2013 proprietary firm / partnership firm. [The bidder / Each Member of Consortium/ Sub- Contractor need to satisfy this condition]	Certificate of Incorporation and Registration.
2	Quality Certification	The Bidder should be an ISO 9001:2008 certified. OR Bidder should have CMMI Level 3 (minimum) certification. [In case of consortium both, the lead bidder and consortium partners need to satisfy this condition]	A valid ISO/CMMi certificate on or before the date of publication of the tender.
3	Experience	The Bidder must have successfully executed & implemented AMR/AMI projects (meeting any of the below criteria) in an Indian/ Global Power Distribution Utility/ Distribution Franchisee in the last 7 years (i.e. FY 2014-15 to till the previous date of publication of this tender). a) Successfully executed AMR/AMI project covering implementation of minimum 50,000 nos. of Meters with required hardware, software and other associated accessories in a single/ multiple contract and project/ projects should have been operational for at least 01 year in last 07 years.	List of clients and individual Client's PO / WO / LOI / LOA / Contract/Certification on client letterhead and Performance certificate and contact details of clients as proof provided for the last 7 years needs to be submitted.

4	Financial Strength	a) The bidder should have average annual turnover of Rs. 250 Crores during last three financial years ending on 31- Mar-2020 (i.e. for the F.Y. 2017-18, 2018-19 & 2019-20). [In case of consortium bids, Minimum 50% to be met by Lead Bidder and balance to be met by other consortium members]	Income Tax return, All enclosures forming the part of Income Tax return (as applicable) and Audited Balance Sheet and certificate from Chartered Accountant stating turnover from each relevant line of business
		b) The bidder should have a minimum working capital or its sanctioned limit of Rs.250 Crores during financial year ending on 31-Mar-2020. [In case of consortium bids, Minimum 50% to be met by Lead Bidder and balance to be met by other consortium members]	Audit report for company registered under Company's Act & Tax Audit report for others to be submitted as a proof of net worth. In case of sanctioned limit, Bank sanctioned letter of the limit / Company secretary signed certification is required.
		c) Net Worth for the each of the last three Financial Years should be positive. Consider Financial year ending on 31-Mar-2020 (i.e. for the F.Y. 2017-18, 2018-19 & 2019-20). [In case of consortium, all need to satisfy this condition]	FORM- II (B) with attachments. (duly audited and approved by Authorized Audit Firm / CA)
5	Workforce Capability	The Bidder should have at least 15 personnel on its rolls with a minimum AMR/AMI implementation experience. The details of experience, roles & responsibilities of the personnel should be as per SW.25.	Signed resume of employees need to be submitted as per enclosed format in ANNEXURE-IX.
6	OEM Implementation Partner Status	The bidder should be an authorized implementation partner of OEM products proposed in the bid and should possess all the necessary authorizations of the OEM in order to supply, customize, implement and support their OEM solutions.	Authorization letter from OEM for next 7 years back to back support of as per the format attached for Manufacturer's authorization form (MAF)
7	Authentication	Bidder must submit a certificate on company letterhead, stating that the bidder hasn't been blacklisted by any institution/ organization/ society/ company of the Central / State Government ministry/department, or its public sector organizations during the last five years, with company stamp and signed by authorized signatory. [In case of consortium all need to satisfy this condition]	Self Certificate on company letterhead with company stamp and signed by authorized signatory as per ANNEXURE- XI and ANNEXURE-XII.
8	Office Location	Bidder shall have a registered office and operations in India for at least one year prior to submission of the bid. [In case of consortium, each member of consortium also shall have registered office in India]	Certificate of Incorporation/Registration Documents should be submitted as proof of the same
(B) Qualification Requirement for SI (To be satisfied by the System Integrator only)			

1	Quality Assurance	1. The SI should be an ISO 41001:2018 certified. 2. SI should have CMMI Level 3 certification. 3. SI should have ISO 27001:2013 or latest certifications.	valid ISO and CMMI certificate on or before the date of publication of the tender.
2	Large Projects Implementation Experience	The SI should have implemented the Billing & CRM system for power distribution Utility in Global / India for Minimum 10 Lacs Consumers in last 10 years and system till the date of publication of this tender.	Purchase orders/ Work award/ work order from End Customer/ Certificate from the client on successful implementation and operation of the project. (Power Utility) with detailed scope of work.
3	Integration capability between HES/MDAS with utility systems	System Integrator must have successfully executed AMI projects (Consists of Smart Meters, DCU/Gateway/Router/ GPRS Access Point and HES) with cumulative installation base of Minimum 1.5 lakh end points in the last 5 years till the date of publication of this tender.	Purchase orders/ Work award/ work order from End Customer/ Certificate from the client on successful implementation and operation of the project (Power Utility) with detailed scope of work
(C) Qualification Requirement for DL (To be satisfied by the Power Distribution Licensee only)			
1	Authentication	Distribution licensee in India for last 5 consecutive years immediately preceding the Bid due date	Self-attested copy of the license document as per the act
2	Quality Certification	Bidder should have ISO 9001:2015 certificate	Copy of valid certificate
3	Work Experience	Distribution Licensee (on its own or through its majorly owned subsidiary) must have successfully executed & implemented AMI Projects for minimum 50,000 metering points for its own consumers and such projects should be in operation for at least one year as on Bid Date.	Evidence of such deployment along with PO/ WO/ LoA / Contract / Appropriate Certification
(D) **Qualification Requirement for MM/ Proposed MM (To be satisfied by the Meter Manufacture only)**			
1	Technical Experience	The MM should be in the business of manufacturing Static Energy Meters and should have state of the art facility in India. Should be in Metering Business for at least 10 years as on date of Bid Submission.	Factory License Certificate/ MoA mentioning nature of Business. Purchase orders / Framework agreements for this duration or other documents that prove to this aspect.
2	Smart meter Experience	The MM must have successfully Supplied / Implemented, 1,00,000 Smart Meters in AMI projects in Indian/ Global Power Distribution Utility in the last 10 years as Main Bidder, Consortium member/Sub-contractor (as on date of Bid Submission date)	Individual Client's PO/ WO/ LOA/Contract/ Certification on client letterhead.

3	Capacity	MM/ Proposed MM should have experience of manufacturing and supply of Static electricity meters/ Smart electricity meters. Minimum 5 Lacs Single Phase Meters or 1 Lac Single Phase Smart Meters per annum. Minimum 1 Lac Three phase Whole Current Meters or 50,000 Three Phase Smart Meter per annum.	Proof of Work order & performance certificate/ work order completion certificate to be submitted.
4	ISI certificati on	Smart Meters offered should meet the relevant standards applicable in India ' IS:16444 with latest amendment' and should have BIS Certification.	Copy of Certificate for the Smart Meter offered should be furnished.
5	Quality	MM should have valid ISO9001 & 14001 for the manufacturing facility as on the bid submission date.	ISO certificate
6	Testing facility	The bidder should have in-house NABL accredited Laboratory Inside his factory premises.	A valid registration certificate mentioning issue / renewal / expiry date
(E)	**Qualification Requirement for Proposed Head End System**		
1.	Experienc e	The proposed HES must have following deployment capabilities in Indian/ Global Utilities: • Successfully Commissioned cumulative 5 Lacs end points in AMI project. • Single Large AMI deployment experience of at least 30,000 Smart meters, with RF or GPRS. • At least 3 different meter brands operating on single network and Head End System. • Successful integration of HES with Cots MDMS product. All projects should be in operations as on bid submission date.	Purchase order/Completion/ Go-live certification from client. Client certification with name, contact number and email with all required information (WBSEDCL may contact the client for verification purpose only)
(F)	**Qualification Requirement for Proposed Cloud Service Provider**		
1	Certificati on	Proposed CSP should be Tier-3 MeitY empanelled Data Centre within INDIA.	Valid Letter of Award of Empanelment from MEITY.
2	DC DR Criteria	Proposed CSP must be operating at least two (2) Data Centre / Disaster Recovery Centre Facilities in India at time of submission of the bid. CSP should be able to provide both DC & DR services together without any limitations as per MeitY guidelines.	Self-certificate from the CSP mentioning the location details signed by authorised signatory of the CSP for this bid.
3	Experienc e	The cloud service provider must have at-least two (2) work orders from Central Government / State Government / PSU / Semi-Government of India	Self-certificate from the CSP

IB.4.5. Government owned enterprises may only participate if they are legally and financially autonomous.

IB.4.6. Intending Bidders desirous of participating in the tender are to log on to the website http://wbtenders.gov.in. The tender can be searched by typing '**wbsedcl**' in the search box of the website.

IB.4.7. Bidders willing to take part in the process of e-tendering are required to obtain Digital Signature Certificate (DSC) in the name of person who will sign the tender, from any authorized Certifying Authority (CA) under CCA, Govt of India (viz. nCode Solution, Safescrypt, e-Mudhra). DSC is given as a USB e-Token. After obtaining the Class 2 or Class 3 Digital Signature Certificate (DSC) from the approved Certifying Authority they are required to register the fact of possessing the Digital Signature Certificates through the registration system available in the website.

IB.4.8. Intending bidders are to download the tender documents from the website stated above, directly with the help of the e-Token provided. This is the only mode of collection of tender documents. Details of submission procedure are given in "Instructions to Bidders".

IB.5. Responsibility Of Bidders:

IB.5.1. It shall be the sole responsibility of Bidders to determine and to satisfy themselves by such means as they consider necessary or desirable for all matters pertaining to this contract including, in particular, all factors that may affect the cost, duration and execution of the work.

IB.5.2. It must be understood and agreed that such factors have properly been investigated and considered while submitting the bid. Any claim, whatsoever, including those for financial adjustments to the contract, once awarded under these documents will not be entertained by WBSEDCL. Neither any change in time schedule of the contract nor any financial adjustments, arising thereof, shall be permitted by WBSEDCL, which are based on the lack of such clear information of its effect.

IB.5.3. The bid shall include all the information as per bid document.

IB.5.4. The bidder shall bear all the costs associated with the preparation and submission of bid and WBSEDCL in no case shall be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

IB.5.5. In order to avoid any problem arising out of network error or server error, bidders are advised to submit the bid, well in advance of the last date and time of submission of the bid.

IB.6. Formation of cartel & penal Measures: Any evidence of unfair trade practices, including overcharging, price fixing, cartelization etc. as defined in various statutes, will automatically disqualify the parties. Repeated occurrence of such evidence of above tenderers may also be viewed seriously by the WBSEDCL authority and penal measures as deemed fit would be imposed on such tenderers.

IB.7. Key Dates: Schedule of Dates for e-Tendering:

Sl. No.	Activity	Date & Time
1	**Publishing Date**	31.03.2021 at 14:00 Hrs
2	**Document Download start date**	31.03.2021 at 14:00 Hrs
3	**Seek clarification start date**	16.04.2021 at 14:00 Hrs

3	**Seek clarification end date**	23.04.2021 at 14:00 Hrs
4	**Date of Pre-bid Discussion**	28.04.2021 at 14:00 Hrs
5	**Bid submission start date**	10.05.2021 at 14:00 Hrs
6	**Bid submission end date**	21.05.2021 at 16:00 Hrs
7	**Last date of physical submission of Tender Fee and EMD**	24.05.2021 at 14:00 Hrs
8	**Technical Bid opening date**	25.05.2021 at 14:00 Hrs
9	**Financial Bid opening date**	To be intimated later

IB.8. If any 'Strike' or 'Holiday, falls on any of the scheduled date, then the next working day (between mentioned working hours) shall be considered as scheduled date and schedule time.

IB.9. Pre-Bid Discussion:

IB.9.1. Pre bid discussion will be held at WBSEDCL as per schedule indicated in **"Key Dates Clause"** above to clarify the queries, if any, from the vendors in respect of tender. Selected vendors who shall purchase the Bid may participate (maximum two persons) in the said meeting for any such clarification.

IB.9.2. Relevant queries in soft copy EXCEL format as per ANNEXURE-X must be sent within the scheduled dates to the following mail id: ceit@wbsedcl.in and dipakk.pal@wbsedcl.in

IB.9.3. Non-attendance at the pre-bid discussion will not be a cause for disqualification of the bidders.

IB.10. Clarification of Bidding Documents: If there be any discrepancy or obscurity in the meaning of any clause of the bid document, such queries must be sent to the Chief Engineer, IT & Communication Cell, in written form three days prior to the date of Pre-bid discussion. Such query received from vendors prior to pre bid discussion shall only be discussed in the pre bid discussion. No other query except the written submitted ones will be clarified during pre-bid discussion. If any changes are decided in pre-bid meeting the same will be uploaded in the website http://wbtenders.gov.in and no other communication shall be made afterwards on the issues discussed in the pre bid meeting. The clarification given in pre-bid discussion shall be final and binding on the bidder.

IB.11. Amendment / Addenda of Bidding Documents: At any time, prior to the deadline of submission of Bid, WBSEDCL may, for any reason, modify the Bidding Documents by issuing Addenda / Amendments and the same will be uploaded in the website (http://wbtenders.gov.in) only in due time. WBSEDCL shall not have any obligation to inform the vendor through any other mode of communication.

IB.12. Language of the Bid: The bid so prepared by the bidder and all other correspondences and documents relating to the bid, exchanged by the bidder and WBSEDCL, shall be written in English Language only.

IB.13. Period of validity of Bid: The bid shall remain valid for acceptance up to 180 (One hundred and eighty days) from the date of opening of tender. WBSEDCL may request to extend Validity of the bid beyond 180 (One hundred and Eighty) days if required so, without any change in offer.

IB.14. Tender Fee:

IB.14.1. All bids must be accompanied with a non refundable tender fee. The bid shall be considered non responsive if the tender fee is not submitted along with the bid.

IB.14.2. Scanned copy of Demand Draft (DD) / Banker's Cheque (BC) towards Tender Fee of **Rs. 28,320/- (Rupees Twenty four thousand only)** including GST, issued by any branch of any Indian Scheduled Bank in favour of West Bengal State Electricity Distribution Company Limited payable at Kolkata, is to be uploaded while submitting the bid online. The details of the instrument are to be entered while the bid is being submitted online.

IB.15. Earnest money [Bid Guarantee]:

IB.15.1. All bids must be accompanied with a refundable earnest money, as "Bid Guarantee". The bid shall be considered non responsive if the earnest money is not submitted along with the bid.

IB.15.2. Scanned copy of Demand Draft (DD) / Banker's Cheque (BC) / Bank Guarantee (BG) towards EMD of **Rs. 1.00 Cr./- (Rupees One Crore only)** issued by any branch of any Indian Scheduled Bank in favour of West Bengal State Electricity Distribution Company Limited payable at Kolkata, is to be uploaded while submitting the bid online. The details of the instrument are to be entered while the bid is being submitted online.

IB.15.3. In case the Bid Guarantee is submitted in the form of irrevocable Bank Guarantee, it is to be submitted as per format in ANNEXURE-VI and shall remain valid initially for a period of six months from the last date of submission of the bid document and claim period will be further 3 months.

IB.15.4. The Bid Guarantee of the unsuccessful vendors/Bidders will be returned against their written claim within one month from the date of placement of order on the vendor/Bidders.

IB.15.5. The 'Bid Guarantee', of the successful vendor/Bidders, will be returned within 30 (thirty) days from the date of acceptance of Performance Guarantee to be submitted as per Performance Guarantee Clause of bid document.

IB.15.6. No interest shall be payable by WBSEDCL on the above Bid Guarantee.

IB.15.7. The Bid Guarantee shall be forfeited for any of the following reasons:

IB.15.7.1. If during the period of bid validity, the bidder withdraws or modifies the bid in part or as a whole.

IB.15.7.2. If the vendor/ Bidders fails/fail to accept the order unconditionally as per "Acceptance of Order" clause of bid document or fails/fail to furnish the contract performance guarantee as stipulated in PBG clause of bid document.

IB.15.7.3. If the vendor / bidder fails to extend the validity period of EMD as per "Earnest Money" Clause of bid document.

IB.15.7.4. If any cartel is formed by the tenderer in their quotation.

IB.16. General guidance for e-Tendering: Instructions/Guidelines for electronic submission of the tenders have been mentioned below for assisting the bidders to participate in e-Tendering.

IB.16.1. Registration of Bidders: Any bidder willing to take part in the process of e-Tendering will have to be enrolled & registered with the e-Procurement system, through logging on to https://wbtenders.gov.in.

IB.16.2. Digital Signature certificate (DSC): Each bidder is required to obtain a class-II or Class-III Digital Signature Certificate (DSC) for submission of tenders.

IB.16.3. The bidder can search and download NIT & Tender Documents electronically from the https://wbtenders.gov.in website using the Digital Signature Certificate. This is the only mode of collection of Tender Documents.

IB.17. Signing of Bids:

IB.17.1. The bid shall be downloaded from the website www.wbtenders.gov.in and shall be signed by a **person / persons duly authorized by the bidder.**

IB.17.2. To be qualified for evaluation and finalization of contract, Bidder/ Bidders shall submit a written power of attorney, authorizing the signatory of the Bid to act on behalf of the Bidder in the form and manner which is acceptable by WBSEDCL.

IB.17.3. All the pages of the bid and where, entries/amendments have been made, shall be signed by the person/persons signing the bid.

IB.17.4. The complete bid shall be without alterations, interlineations or erasers, except those to accord with instructions issued by WBSEDCL or as necessary to correct errors made by the bidders, in which case such corrections shall be initialled by the person/persons signing the bid. Bids not duly signed shall be treated as cancelled.

IB.18. Submission Of Bid: Bids shall be submitted as under:

IB.18.1. Tenders are to be submitted online through the website (www.wbtenders.gov.in). All the documents uploaded by the Tender Inviting Authority form an integral part of the contract. Tenderers are required to upload all the tender documents along with the other documents, as asked for, in the tender, through the above website within the stipulated date and time as given in the Tender.

Tenders are to be submitted in two folders - one is Technical Proposal and the other is Financial Proposal. Documents for Technical Proposal are to be submitted at pre-defined folders. Price bid under financial proposal is to be submitted at pre-defined folder named: BOQ.

The tenderer shall carefully go through the documents and prepare the required

documents and upload the scanned documents in Portable Document Format (PDF) to the portal in the designated locations of Technical Bid.

The bidder needs to download the Forms / Annexure/ BOQ, fill up the particulars in the designated Cell and upload the same in the designated location of Technical folder / Financial folder. The documents uploaded shall be virus scanned and digitally signed using the Digital Signature Certificate (DSC). Tenderers should take note of all the addendum/corrigendum related to the tender and upload the latest documents as part of the tender. Original copies of the uploaded documents may be submitted for physical verification if required by the Tender Inviting Authority at the time of technical evaluation.

IB.18.2. Part 1: Technical Proposal: The Technical Proposal shall contain scanned copies and/or declarations in the following standardized formats in two covers (folders).

IB.18.2.1. Statutory Cover:

A. <u>Contents of "Drafts" folder:</u>

- **a. Tender Fee:** Copy tender fee document.
- **b. EMD:** Copy of Bank Guarantee (BG).
- **c. Power of Attorney:** ANNEXURE-III
- **d. Consortium Agreement:** Annexure-I, II & IV (if required)

B. <u>Contents of "NIT" folder:</u>

- **a. Tender Document with all Annexure:** Signed Copy.
- **b. Addenda/Corrigendum:** Signed copy if published.

C. <u>Contents of "Annexure" folder:</u>

- **a.** All ANNEXURE I-XV are to be submitted in details (some may be blank, - ANNEXURE XIV) in Annexure folder in their respective format.
- **b. SLA and key performance parameters**
- **c. Price Schedule in Un-priced condition:** BoQ
- **d.** If Bidder being Indian Company is having collaboration with the Company incorporated outside India (Foreign Company), the Bidder shall in respect of such collaboration submit duly certified/authenticated copies of the documents mentioned in IB clauses.

D. <u>Contents of "Forms" folder:</u>

- **a. <u>Mandatory Condition:</u>** Form-I
- **b. <u>Sheet Containing Document Details:</u>** Form-II

Only downloaded copies of the relevant documents are to be uploaded, and digitally signed by the bidder.

IB.18.2.2. Non-Statutory Cover (My Document):

A. <u>Company Details:</u> Copy of the following document:

a. Company Profile description
b. Registration Certificate of the company
c. PAN Card.

d. GST registration certificate.
e. Valid PF (if applicable) Registration Certificate.
f. Valid Professional Tax certificate (if applicable).

B. Credentials:

a. Documents to be submitted as mentioned in Eligibility Criteria
b. Any documents found necessary.

Part 2: Submission of Sample: The bidder shall submit the sample smart meters along with manufacturer's test result and GTP, on any working day, from 11.00 A.M. to 04.00 P.M. on weeks days within the specified period of submission latest by 04.00 P.M. on the last day of submission of bid to the Office of the Chief Engineer (DTD), Abhikshan, Sec-V, Salt Lake, Kolkata-91. The bidder will be given a receipt, jointly signed by the bidder and DTD officials, mentioning the samples and papers submitted by the bidder as per check list.

1. One no. 1-ph consumer smart meter (whole current) with NIC card from the key manufacturer will be used in this project;
2. One no. 3-ph consumer smart meter (whole current) with NIC card from the key manufacturer will be used in this project;
3. Manufacturer's test result and GTP;
4. BIS certification
5. Three copies of the drawings

The bidder should have to present a practical demonstration of their proposed solution in a proto type HES (considering any one of HES solution). Required SIM card should be arranged by bidder itself. The sample meters will then be tested compared to manufacturer's test result and GTP, at DTD laboratory, WBSEDCL. The demonstration should showcase the following test cases:

a. Linking of Smart Meter and HES;
b. Interoperability of NIC card with al-least 2 leading service provider of India.
c. Capture of Instantaneous Parameters of meter;
d. Capture of billing data from meter (for consumer meter);
e. Capture of Load survey data from meter;
f. Remote Connect/Disconnect with relay switch of meters;
g. Last Gasp/First Breadth as Alert/Event;

The bidder will be declared as qualified to open commercial bid after successful result of their demonstration and meter test results along with other qualifying requirements.

IB.18.3. Financial Proposal:

A. Bill of Quantities (BoQ): The bidder shall quote the rate in the space marked for quoting rate in the Price Bid Sheet of the downloaded BOQ file.

IB.19. Submission of original copies of documents of Tender Fee and Earnest Money Deposit:

IB.19.1. Mode of Payment: Tender Fee must be submitted in the form of Bank Draft (DD) / Bankers Cheque (BC) of any scheduled Bank of India. EMD must be submitted in the form of Bank Draft (DD) / Bankers Cheque (BC) / Bank Guarantee (BG) of any scheduled Bank of India. Payment in any other form will not be accepted.

IB.19.2. Place of submission: The original copies of the DD/BC/BG, towards Tender Fee and Earnest Money Deposit shall be submitted in the following office:

Office of the Chief Engineer,
IT & C Cell,
West Bengal State Electricity Distribution Company Limited,
Vidyut Bhawan, 3rd Floor, D-Block,
Salt Lake, Sector-2,
Kolkata-700091.

IB.19.3. Time of submission: The original copies of DD/BC/BG towards Tender Fee and EMD shall be submitted in a sealed envelope in the office as stated above within the date and time as specified in the NIT. If the bidder fails to submit the original copies within the due date and time his tender will not be opened and his bid will stand rejected.

IB.20. Conditional and incomplete tenders are liable to summary rejection.

IB.21. No price preference will be allowed to any tenderer based on the size of the industry or its geographic location. Co-operative Society will not be considered with separate status.

IB.22. Late Submission of Bid: Bidder shall take all possible measures to submit the bid within the schedule date & time at specified location prescribed elsewhere in the bidding document. Late submission of bid for whatever reason shall not be accepted.

IB.23. Opening and evaluation of tender:

IB.23.1. Opening of technical proposal:

IB.23.1.1. Technical proposals will be opened by the Tender Inviting Authority or his authorized representative electronically from the website stated above, using their Digital Signature Certificate.

IB.23.1.2. All bids found to be responsive will be examined in respect of "Pre-qualification or Mandatory Condition" & other qualifying requirements as detailed in the bid document. Bids which do not satisfy the "Mandatory Condition" and qualifying requirements will not be considered for further technical scoring. Must Conditions are to be submitted as per format enclosed with the bid document as FORM-I.

IB.23.1.3. The bidder shall not take any commercial deviation from the stipulation of Bid document. If the bidder takes any commercial deviation, his Bid may be liable for rejection.

IB.23.1.4. Techno-commercial Deviations, if any, must be brought out in the specified Deviation Schedule (ANNEXURE-VIII). Techno-commercial deviations indicated elsewhere will not be considered in any circumstances. WBSEDCL during Techno Commercial Evaluation will examine these deviations. Negative deviations will not be accepted in any circumstances and shall be considered as non-responsive and shall be liable for rejection. When there is no deviation, this sheet is to be submitted with the offer duly signed with an endorsement indicating "No Deviation". Deviations not indicated here will not be taken into consideration.

IB.23.1.5. The summary list of bidders, whose bids will be found techno-commercially eligible, will be uploaded in the web portals. Date of opening of financial bid will be intimated

to the techno-commercially qualified tenderers.

IB.23.2. Opening of financial proposal (price bids):

IB.23.2.1. Financial proposals submitted by the tenderers in the prescribed format (BoQ Format) and declared techno-commercially eligible, will be opened electronically by the Tender Inviting Authority from the web portal stated above on the prescribed date.

IB.23.2.2. No deviation in any form in the price-bid sheet is acceptable.

IB.23.2.3. The encrypted copies will be decrypted and evaluated.

IB.23.2.4. After opening of the financial proposal, the preliminary summary result containing inter-alia, name of bidders and the rates quoted by them will be uploaded.

IB.23.2.5. The Tender Accepting Authority may ask any of the tenderers to submit analysis to justify the rate quoted by that tenderer.

IB.23.2.6. For any discrepancy in the amount of figures and words, the quoted amount in figure will prevail.

IB.23.3. Evaluation and Comparison of Bids (Price bids):

IB.23.3.1. On examination of documents submitted under different covers WBSEDCL will evaluate and compare the bids determined to be substantially responsive at each step.

IB.23.3.2. Evaluation of Bid will include and will take into account:

Total Quoted price.

And lowest quoted price will be considered as L1.

IB.23.4. Conditional Rebate / Discount, if any, offered by any Bidder shall be outside the purview of commercial terms & conditions & shall not be considered during Bid evaluation.

IB.23.5. Evaluation of bid shall be made on the total price of all the items, clubbed together. This however will not encroach the right of WBSEDCL to go into further processes for item wise evaluation, if required. Total price shall be calculated on the basis of quantity indicated in the NIT.

IB.24. Time Schedule: The basic consideration and the essence of the Contract shall be strict adherence to the time schedule as it will be specified in the contract for supply & services in LOA (Letter of Award) to be issued from WBSEDCL. Total contract period is 10 years from the data of LoA, including 1.5 years of implementation period. After contract awarded to bidder, bidder is expected to complete the implementation of full system on all the envisaged connections of his part within 18 months from the date of award of contract by the WBSEDCL defined by T1 at per time schedule IB.24.1. T1 is divided into 8 quarters (Q1 to Q6) consists of 3 months each. 1st & 2nd quarters Q1 & Q2 (Total 6 months) for project preparation, site inspection, system architecture finalization etc and roll out of AMI should be phase wise and starting from Q3 upto Q6 total 12 months. Count of meter roll out in each phase / quarter will be decided by = (Total no. of meters f awarded to bidder / 4). For example, if L1 bidder is awarded then the total no of smart meters under the scope L1 will be 2,46,733. So, the number of smart meters will fall under each phase/ quarter roll out (from Q3 to Q6) will be: (2,46,733/4) = 61,683. Service period of total AMI system defined by T2 will be 102 months from end of T1. Service will be reviewed monthly.

IB.24.1. Time Schedule:

Complete system is to be established by selected Implementation Agency (IA) within 18 months from the date of award of work and thereafter the same agency to provide support services for 102 months

Sl. No	Activity Name	Project Line T1 (total 1.5 years)						Project Line T2 (Total 102 months)
	Quarters ->	Q1	Q2	Q3	Q4	Q5	Q6	M19 to M120
1	Contract Finalization, Project Kick off, core team finalization, Document standards and templates finalization, SLA sign off etc., Specification of System Architecture and Software Solution finalization							
2	Site Survey, Resource Mobilization, Test plan, Training plan finalization							
3	Site Finalization, ccommencement of Installation inclusive of survey							
4	QA/QC plan, FAT testing							
5	Lot 1 roll out of AMI							
6	Lot 2 roll out of AMI							
7	Lot 3 roll out of AMI							
8	Lot 4 roll out of AMI							
9	**Overall system acceptance**							
10	**Service period**							

IB.25. Price:

IB.25.1. Price offer shall be submitted in the prescribed format only.

IB.25.2. No deviation in any form in the Price Bid Sheet is acceptable.

IB.26. Tax and Duties and other Levies: GST shall be admissible based on rule and rate in force and will be payable extra. Bidder should be registered under GST act.

IB.27. Statutory Obligation: Statutory obligations as per law of the land are to be complied.

IB.28. Variation during execution: No. of locations as incorporated in this tender are provisional, which may vary up to **-**10% to +25% (for the first 5 years of the project, from the date of issuance of LOA) of the ordered quantity during course of execution of the contract as per actual requirement and decision by WBSEDCL. WBSEDCL shall communicate such variation of quantity to the vendor in writing. The unit price to be quoted by the bidder and incorporated in the order would remain valid for such variation of quantity.

IB.29. Issuance of LOA: Methodology of award of Contract:-

IB.29.1. WBSEDCL will award the contract to the bidder whose bid has been determined to substantially responsive and has been determined the best quality and cost evaluated bid, provided further that the bidder is determined to be qualified to perform the contract satisfactorily. WBSEDCL shall be sole judge in this regard.

IB.29.2. L1 will be awarded for the project. In the event of non-performance by the L1 bidder within reasonable time frame, the L2 and/ or L3 bidder may be approached to perform the job at L1 rate.

IB.30. Acceptance of LOA: The vendor shall submit written unconditional acceptance of LOA within 15 (Fifteen) days from date of issuance of the same, also successful vendor has to submit a signed contract document (by authorized signatory of the vendor) as per ANNEXURE-XIII. Submission of conditional acceptance of LOA shall be treated as non-compliance of this clause.

IB.31. Right to reject Bids: WBSEDCL reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders the reason for WBSEDCL's action.

IB.32. Mandatory Condition: The bidder shall provide documentary evidence satisfactory & acceptable to WBSEDCL to establish that they have the requisite credential, capability and experience to handle the contract and meet requirements of all the Mandatory Conditions indicated in FORM-I.

IB.33. Settlement of Disputes: In case of any dispute arising out the contract, the same should be settled through meeting between the WBSEDCL and the contracting vendor at the appropriate level. The necessary judicial affairs and/or Court Case shall be exclusively within the jurisdiction of High Court at Kolkata only**.**

IB.33.1. Communication: The vendor, for communicating with WBSEDCL, for this job may use the following modes:

FAX- (033) 2358 9244.

Telephone – (033) 2358 9311, 2319 7278, 2319 7424.

IB.34. Representative of Vendor: The vendor is required to nominate one officer exclusively for this project from commencement to completion as a Nodal Officer to be stationed at Kolkata, with whom WBSEDCL will contact on all matters related to this order. The vendor has to specifically furnish to WBSEDCL, the name, designation, Telephone no. including mobile no., email address of such person.

IB.35. General Responsibilities and Obligations: This section describes the general responsibilities and obligations of the Contractor and the Employer.

IB.35.1. Responsibilities for the Implementation Plan: The bidder's technical proposal shall include a project implementation plan and schedule spread over **18** months from date of award that is consistent with the implementation plan detailed in this specification. The Implementation plan shall include the activities of the Bidders, showing all key milestones and clearly identifying the nature of all information**. The Bidder shall submit a preliminary Project implementation plan along with the Bid** which shall include at least the following activities:

a) Understanding of WBSEDCL 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) Privacy by Design document;

m) Site Survey;

n) Documents, Data Requirement Sheet , Drawing submission and approval;

o) Installation & Field update schedule;

p) Repair and Maintenance Schedule including details on Spares Management;

q) Training schedule;

SCOPE OF WORK (SW)

SW.1. Introduction: WBSEDCL intends to implement smart metering programme in phases and in Phase-1 of the programme which accounts for about 2,50,000 endpoints approx. includes consumers having connected load between 5 to 50 KVA of Industrial & Commercial category and all Govt. consumers below 50 KVA. During phase-1 implementation WBSEDCL intends to execute the programme in two different packages.

Package-1: Implementation of Centralize MDM solution hosted at cloud and integration with existing applications considering license of 2.5 lakh end point and future scalability upto 2.5 Cr. end points and a separate tender for the same is already floated and under process.

Package-2: Roll out of 2.5 lakh Smart meters with communication module and deployment of cloud based HES including integration with implemented MDMS and execution of the Project in OPEX model.

WBSEDCL wishes to implement the initial project for high valued L&MV consumer as specified in scope of work. Smart Meters (1-Phase Whole Current and 3-Phase Whole Current) will be installed under this projects and Installation will be spread over the licensee area of WBSEDCL. The communication module for Smart meter should be pluggable NIC card on 4G (fallback to 3G/2G) network based cellular Communication. The system shall also include HES System hosted in cloud and associated Support Services and an Advisory service for Revenue/Service Improvement action in for the project area.

The scope of this tender document is solely for implementation and execution of above mentioned Package-2 part only, where project will be executed in OPEX model.

SW.2. Smart Meter Count: All Smart Meters under this scope of this project, will be installed in consumer premises scattered throughout West Bengal. Distribution Zone & region wise, connection phase wise segregation of Consumers is indicated below:

Zone	Region	1-Ph Consumer	3-Ph Consumer
BERHAMPORE ZONE	MALDA REGION	1459	7146
	MURSHIDABAD REGION	2840	13796
	NADIA REGION	2230	14694
BURDWAN ZONE	BIRBHUM REGION	2528	8732
	BURDWAN REGION	4976	18169
	HOOGHLY REGION	3445	13455
KOLKATA ZONE	BIDHANNAGAR REGION	1778	9728
	HOWRAH REGION	1263	15554

Zone	Region	1-Ph Consumer	3-Ph Consumer
	NORTH 24 PGS REGION	4439	17954
	SOUTH 24 PGS REGION	2311	11766
MIDNAPORE ZONE	BANKURA REGION	5018	7082
	PASCHIM MIDNAPORE REGION	8048	12068
	PURBA MIDNAPORE REGION	3400	11586
	PURULIA REGION	1256	4934
SILIGURI ZONE	ALIPURDUAR REGION	666	2675
	COOCHBEHAR REGION	771	4634
	DAKSHIN DINAJPUR	827	3158
	DARJEELING REGION	2552	7046
	JALPAIGURI REGION	1291	4715
	RAIGUNJ REGION	1091	5652
Total Consumer	**2,46,733**	52,189	1,94,544

The aforementioned quantity is indicative. Final quantity will be ascertained during issuance of LoA with a variation of -10% to +25% for the first 5 years of the project, from the date of issuance of LOA.

SW.3. Scope: The scope of this tender document is implementing and execution of the Package-2 in OPEX model and in broad the bidder scope shall include the followings:

SW.3.1. Site survey, planning, design, engineering, manufacturing, transportation & insurance, supply, installation, testing, asset mapping, demonstration for acceptance, training, operation, maintenance, documentation of each component of the project.

SW.3.2. Supply, Installation, Commissioning of Smart Meters (1-ph & 3-ph Whole current) with Meter Box and along with compatible NIC (Network Interface Card).

SW.3.3. Plug and play type communication modules shall be deployed in the Smart Meters, these modules shall be field-deployable. The communication infrastructure should be primarily based on 4G (fallback to 3G/ 2G). Communication network shall provide reliable medium for two-way communication between various nodes i.e. Smart meter & HES. SIM cards shall be provided by the bidder from leading service provider in India along with aggregated Bandwidth at Cloud.

SW.3.4. One Head End System (HES) and Network Management System (NMS) deployment on cloud as per the specifications defined in this Contract. Proposed HES should be interoperable with minimum 2 different make of smart meters with NIC.

SW.3.5. Web portal application based on HES interface, dashboard and various reporting on SLA and KPIs for utility users.

SW.3.6. Android based Mobile App for Field device installation, replacement & site survey.

SW.3.7. Supply / Planning /Setup of Communication Infrastructure with Network Management (NMS) & Head End System (HES) for the project area.

SW.3.8. Integration with Out-bound interface of MDM through API-based model/ service bus to facilitate seamless data transfer between HES and MDM.

SW.3.9. (If required) Provisioning of minimum 8 MBPS (but bandwidth allocation should be sufficient to meet the performance parameters) MPLS/VPN links from two different service providers between MDMS system and HES. Link should be considered for both DC and DR of cloud.

SW.3.10. Provisioning of minimum 8 MBPS (but bandwidth allocation should be sufficient to meet the performance parameters) MPLS/VPN links from two different service providers between HES and WBSEDCL data Center. Link should be considered for both DC and DR of cloud.

SW.3.11. All other necessary software **(**Meter seal tracking – may be provisioned with HES) with valid licenses relevant to the Project to facilitate seamless operation of the system.

SW.3.12. Integration of different devices/equipment/software covered in scope of this project with each other as per functional requirements

SW.3.13. Configuration, customization, testing, documentation- technical and user manuals of all deployed components and all related software.

SW.3.14. Training and handholding as per training scope and system handover after end of contract.

SW.3.15. System Security and access with due consideration of data privacy, confidentiality;

SW.3.16. Carry out site Survey of site locations to assess the following:

SW.3.16.1. Consumer Indexing

SW.3.16.2. Smart Meter Installation/ replacement

SW.3.16.3. Network Planning for Setting up of communication network

SW.3.16.4. Assessment of backhaul connectivity (SIM card service Provider) for data transfer from Smart Meter to HES.

SW.3.17. Bidder will be the single point of contact for implementation, maintenance of meter, communication module, application, software, cloud and Link.

SW.4. It is preferable to use the smart meter from at least two (2) different Meter manufacturers with NIC in this project, to enable the respective meters to seamlessly integrate with proposed HES with ; thus enabling interoperability of the system.

SW.5. The bidder should submit detailed implementation methodology and technical solution for this project along with names and profiles of the resources being deployed. Implement & commission system architecture capable of upgrades and scaling as per WBSEDCL requirements with robust System security features with due consideration of data privacy, confidentiality cyber security guidelines etc. The implementation methodology should include the enhancement requirements of Smart Grid functionalities. The technical solution should include –

- Smart meter and NIC card details with documentation
- Technical architecture of deployed Software and applications
- Approach on DC and DR replication details
- Proposed approach on cyber/ data security

- Complete details of each software and cloud resource including license, processor, SAN storage etc.

SW.6. Complete system is to be established by selected Implementation Agency (IA) within 18 months from the date of award of work and thereafter the same agency to provide support services for another 102 months.

SW.7. Bidder should go through extensive site survey within project implementation time for identification of network design (equipment locations etc.) and detailing out comprehensive exercise of required material and system architecture plan.

SW.8. Provide a working system (go-live) that meets the functional and performance requirements of specified specifications of engineering and design, specific to location including review and conformance with local environment especially with respect to communication with development of installation, commissioning and safety guidelines and procedures for the complete system. The bidder shall provide comprehensive deliverable details for successful execution of the project such as Hardware, Software, Tools etc. as desired by the WBSEDCL in this document.

SW.9. Bidder to submit it's after sale service support plan and escalation matrix in order to meet contractual obligations and performance guidelines. Preferably, bidder should have service office in Kolkata, once PO is awarded.

SW.10. The key expert's profile as declared by the bidder shall remain deployed to this project during the entire implementation period upto complete system acceptance. In case of change of resource, the bidder shall intimate WBSEDCL in prior and can replace them with resource(s) having equal or higher skill profile subject to the approval of WBSEDCL.

SW.11. Bidder is liable to design and optimize the cloud resources for smooth operation of the entire system during whole project time line. Bidder is advised to design system resources as per application performance laid down in the bid document.

SW.12. The bidder is expected to propose latest versions of all software, hardware for the project and should be supported by OEMs for the at least whole contract period from operational acceptance test.

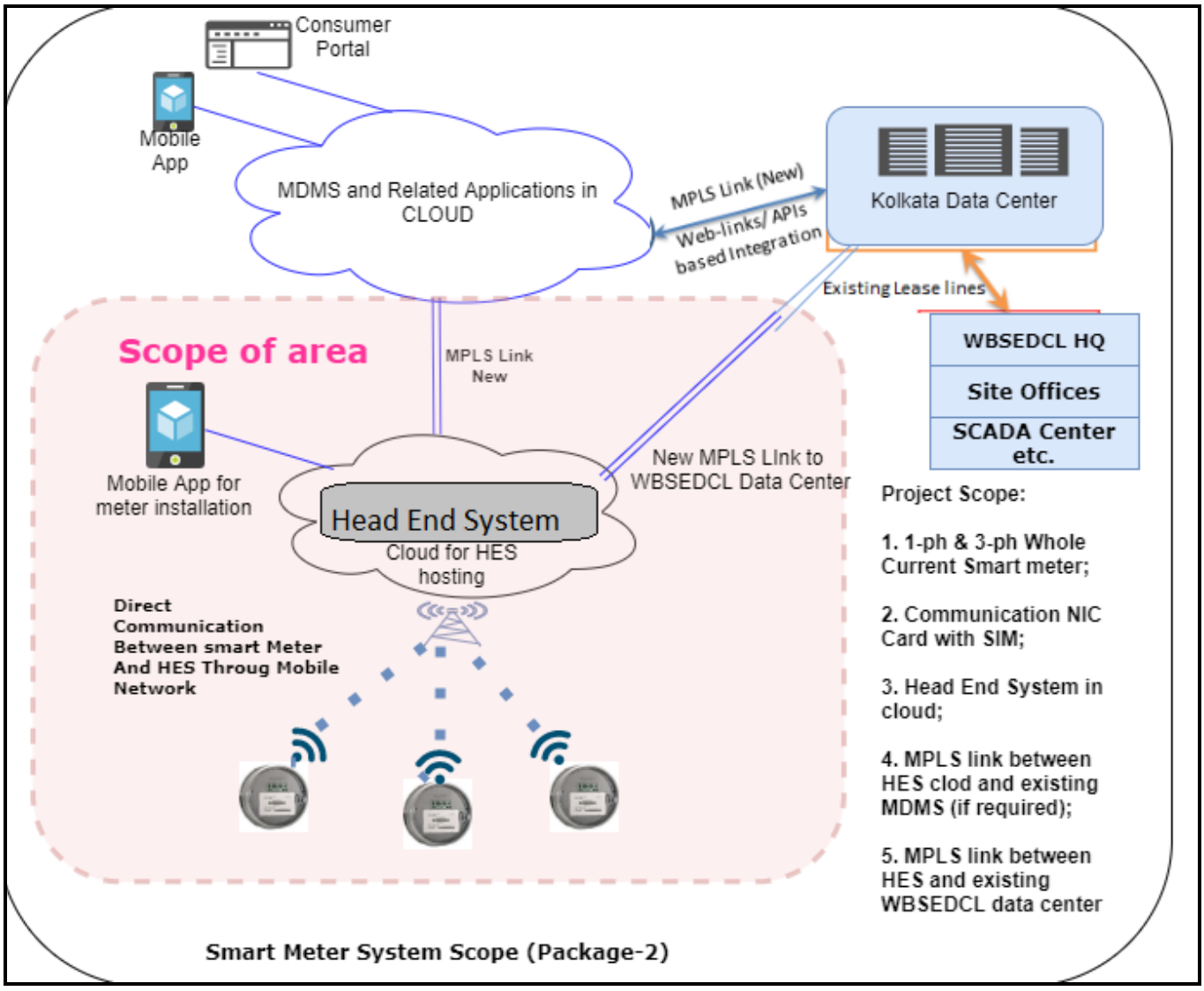
SW.13. Any software updates, upgrades, patches released till the completion of contract period shall be supplied, installed and commissioned under scope of this contract at free of cost.

SW.14. All SLAs and KPI under bidders' scope will be checked from system report of HES, MDMS and Integration BUS logs.

SW.15. The intended sub- system shall have following core components of AMI system:
a) Smart Meters;
b) Communication infrastructure;
c) Head End System (HES).
d) Network Management System (NMS).
e) Cloud Infrastructure (CSP)
f) Android Based mobile app for Field Device Installation

All the above-mentioned components are detailed specified in Technical Specification Section.

For understanding the scope of bidder can refer to the following architecture:



Now the below section will describe scope of each aspect of the overall system.

SW.16. Field Device Installation:

SW.16.1. General Rules of Installation:

SW.16.1.1. Contractor's Supervision**:** The Contractor shall provide all necessary superintendence during the installation of the Facilities, and the Site Engineer or its deputy shall be constantly on the Site to provide full-time superintendence of the installation. The Contractor shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

SW.16.1.2. Unless otherwise specified in the Contract, upon completion of the Facilities, the Contractor shall remove from the Site all Equipment brought by the Contractor onto the Site and any surplus materials remaining thereon.

SW.16.1.3. Compliance with Labour Regulations: During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all applicable existing labour enactments and rules made thereunder, regulations notifications and byelaws of the State or Central Government or local authority and any other labour law (including rules), regulations bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The employees of the Contractor and the Sub-contractor in no case shall be treated as the employees of the Employer at any point of time.

SW.16.1.4. It is mandatory for the Contractor to observe during the execution of the works, requirements of Safety Rules. All safety laws, rules and regulation enforced by statutory agencies and by Utility shall be applicable in the performance of this Contract and Contractor's Team shall abide by these laws, rules and regulations.

SW.16.1.5. In case any accident occurs during the construction/ erection or other associated activities undertaken by the Contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the Contractor to promptly inform the same to the Project Manager and also to all the authorities envisaged under the applicable laws.

SW.16.1.6. Emergency Work If, by reason of an emergency arising in connection with and during the execution of the Contract, any protective or remedial work is necessary as a matter of urgency to prevent damage to the Facilities, the Contractor shall immediately carry out such work. If the Contractor is unable or unwilling to do such work immediately, the Employer may do or cause such work to be done as the Employer may determine is necessary in order to prevent damage to the Facilities. In such event the Employer shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefor. If the work done or caused to be done by the Employer is work that the Contractor was liable to do at its own expense under the Contract, the reasonable costs incurred by the Employer in connection therewith shall be paid by the Contractor to the Employer. In case such work is not in the scope of the Contractor, the cost of such remedial work shall be borne by the Employer.

SW.16.2. All the 1-ph and 3-ph whole current smart energy meters should have plug in type NIC card and initially meters will be installed as post-paid mode (otherwise any instruction from WBSEDCL) and the same meter having programable pre-paid and Net metering facilities and the same can be configured OTA.

SW.16.3. 1-ph and 3-ph whole current Smart meters for consumers are to be fixed in meter boxes. The meter box shall be weather proof, tamper proof and suitable for outdoor

installation.

SW.16.4. Any meter installation will be supported by field device installation App and after meter installation/ re-installation, details of consumer connections, such as consumer identification no., Lat-long, meter ID, its hardware & software configuration, meter seal no, Old meter last reading, initial reading of new meter, name plate details, make, type i.e. 1 Phase or 3 Phase shall be updated in the HES system.

SW.16.5. Meter installation will be declared completed once it will be acknowledged by HES and integrated MDMS.

SW.16.6. In case of change of meter due to defect, vendor shall install/replace new meters and reconfigure the installed one and database system without any extra cost.

SW.16.7. Old meter with other dismantled material from site should be returned to WBSEDCL. The bidder shall also maintain record of all such dismantled material removed from the sites and returned to stores.

SW.16.8. Replacement of existing energy shall be carried out by Contractor according to the following procedure.

- **SW.16.8.1.** Removal of Old Meter & taking down the meter reading
- **SW.16.8.2.** Installation of new smart meters with 4G NIC card
- **SW.16.8.3.** Install SIM Card in the meter & activate / register new meters with Head End System & MDMS
- **SW.16.8.4.** Transfer Old & new meter data to the DISCOM
- **SW.16.8.5.** Provide or capture meter location through GPS
- **SW.16.8.6.** Digital photograph of meter reading before and after installation
- **SW.16.8.7.** Handover of attached modem, SIM (if any) to the concerned CCC of WBSEDCL.

SW.16.9. For new connections service cable till the meter installation point shall be provided by WBSEDCL.

SW.16.10. For fastening equipment and fittings to buildings only galvanized steel screws or screws made of non-corrosive material of strength shall be used.

SW.16.11. The meter shall be preferably located in a building, outside living area, suitable for physical inspection without entering into consumer's living area. However, Meter shall be installed as per prevailing utility practice.

SW.16.12. Civil works associated with the installation of the smart meters such as pointing, grouting, mortar touch-ups, carpentry, etc., are to be done by the contractor.

SW.16.13. The employer shall check on the quality of installation by checking the wiring methods, communication to control centre & time lag in data acquisition & to certify for acceptance to contractor.

SW.17. Meter Replacement:

SW.17.1. For any damaged or burnt of consumer smart meter is to be replaced within 72 hours

from the time of detection irrespective of cause(s) of defect. However, in case of meter getting burnt or damaged due to reasons such as system overvoltage, lightning surge, tampering caused by consumer etc., other than the manufacturing defect(s), the cost of such replacement will be reimbursement by WBSEDCL at actuals on production of the requisite document.

SW.17.2. The meter which does not communicate to HES/MDM for more than three days should be visited by the vendor and reason to be identified, reported and appropriate action need to be taken by the vendor.

SW.17.3. Whenever the meters require to be dismantled from existing premises, whole metering system with all its accessories will be dismantled immediately and the same may be installed in the new consumer premises provided by WBSEDCL, without any extra cost on a mutually fixed date but within 72 hours from intimation of such change from WBSEDCL. During this process if damage or loss occurs, no compensation will be provided for such losses. Beside if any cable, power cord, consumable required during the change of meters then the cost also need to borne by the vendor. The vendor also requires building and modifying the database and other information for these new meters without any additional cost.

SW.17.4. Any reason for no data communication due to WBSEDCL issue like electrical installation related issues shall be immediately brought to the notice to the utility in writing and email.

SW.17.5. Any reason of delay pertaining to installation of smart meters, communication or any network issue, cloud service issue etc. counted on vendor part and LD will be accounted from Vendor's bill as per LD clause.

SW.18. Operation and Maintenance:

SW.18.1. Scope and Period: The operation, maintenance, and support services start after the successful completion of the operational golive of the system. The scope of work under operation and maintenance services shall include:

SW.18.1.1. Comprehensive maintenance of all the software (including licensing and annual technical support cost)

SW.18.1.2. Comprehensive maintenance of all hardware at the Operation and Monitoring Centre, along with field devices (like Smart Meters, NIC etc.) provided by IA under the project.

SW.18.1.3. All equipment under leased service like cloud data centre, MPLS band width etc.

SW.18.1.4. WAN communication infra between field devices and the cloud data centre.

SW.18.1.5. Future integration and support services for meeting the future expansion requirement envisaged under this project and

SW.18.1.6. Day to day operations of the AMI system under supervision and authority of WBSEDCL. These shall include among others:

i. New meter installation
ii. Non communicated meter reading with CMRI.

iii. Changeover of consumer meters from post-paid to prepaid mode and vice versa or enabling of net metering.
iv. Firmware update of remote devices (Meters) as required
v. Ensuring completion of recharge cycle of prepaid consumer meters
vi. Connecting, disconnecting or reducing consumer's licensed load under approval from WBSEDCL.
vii. Initiating resolution of consumer trouble tickets raised by utility CCC
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 HES system as per agreed list, are made available to utility
xi. Ensuring MPLS/ VPN Link under scope of the project
xii. Ensuring smooth data traffic between the MDM and HES systems
xiii. Patch management of IA applications at cloud data centre
xiv. Provide backup data to support SLA and IA's invoicing
xv. Carry out performance checks of various functions as per agreed schedule or on demand.

The IA is to hand hold the WBSEDCL 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.

SW.18.2. IA's Responsibilities under Operation & Maintenance Services:

The IA 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) Two nos Operation Stuffs.
c) One support engineer for each category of hardware supplied and
d) One software specialists for each domain.

Other than that 5 numbers site engineer cum supervisor deployed in each 5 zone offices of WBSEDCL to monitor Site work.

The above-mentioned operation and support staff shall be made available for 12 hours a day, if required in two shifts, six days a week barring national holidays.

SW.18.3. Maintenance Practices: For all third-party equipment (Hardware & Software) IA shall have back to back support along with supply of spare with appropriate response time from OEM/OEM Authorized representatives. IA shall be responsible for coordination with the OEM for all matter related to equipment. The maintenance practice followed by IA 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.

SW.18.3.1. **Preventative Maintenance Activity:** The preventive maintenance activities shall be performed by the IA 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 WBSEDCL for addition and modification of utility user interface, App displays, and Database

e) Ensure Backup of the system at regular interval

f) Restoration of the systems upon its failure and to restore the functioning of the various application / systems at the cloud data centre.

SW.18.3.2. **Integration of Equipment:** All future services, protocol emulations and configuration support for integration of Smart Meters/ nodes, network devices, web services, integration with other offline applications etc. shall be the responsibility of IA and shall be part of the maintenance activities.

SW.18.3.3. **Spares inventory:** As part of project implementation plan, the IA shall detail the spares inventory that shall be maintained for the Project. These spares shall be used as and when required by the IA for the project and no separate charges shall be payable. The IA shall decide the items and components to be maintained as spare.

SW.18.4. **Physical Maintenance:** The IA shall undertake physical maintenance of all equipment/modules under the scope of this contract, in accordance with the schedule as indicated by IA 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.

SW.19. Monitoring: The proposed system is expected to provide continuous online monitoring and logging, analyse the results and submit report (capability to generate spread sheet and MIS report) to WBSEDCL.

SW.19.1. System Monitoring:

SW.19.1.1. MDM / HES system error history logs or selected day

SW.19.1.2. Each Integration node log monitoring for each action

SW.19.1.3. System outage/downtime

SW.19.1.4. Field & Network device failure – rate and trends

SW.19.1.5. Tamper information

SW.19.1.6. Availability of communication link

SW.19.1.7. Missing meter data – rate and trend

SW.19.1.8. Any other customized forms/reports as required by the utility

SW.19.1.9. Remote firmware upgrades information with versioning.

SW.19.2. Resource Monitoring: Resource Monitoring services comprise checking the system's major node resources, gather log data, analyse results, and report utility on the appropriate actions to be taken and undertake any agreed upon actions. The system shall be able to continuously collect the following information:

SW.19.2.1. CPU loading (Peak and Average)

SW.19.2.2. Memory utilization (Peak and Average)

SW.19.2.3. Disk utilization (Peak and Average)

SW.19.2.4. Network utilization (Peak and Average)

SW.19.2.5. Operating system resource utilization reports

SW.19.2.6. System error log

SW.20. System Design Requirements: The proposed solution should comply following basic design principles**:**

SW.20.1. Open and Industry Standards for Interoperability: The proposed solution must have highest degree of interoperability and the solution components shall be standard based and adopt an open approach rather than support a specific technology.

SW.20.2. Software Standards: All software provided by the SI/ IA under this tender document, 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 SI shall commit to meet the "open systems" objective promoted by industry standards groups.

SW.20.3. Design and coding Standards for Applications: 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.

SW.20.3.1. 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.

SW.20.3.2. A well-defined on-screen indication of the present focus shall be provided that moves among interactive interface elements as the input focus changes.

SW.20.3.3. Applications shall not override user selected contrast and colour selections and other individual display attributes.

SW.20.3.4. When animation is displayed, the information shall be displayable in at least one non-animated presentation mode at the option of the user.

SW.20.3.5. Software shall not use flashing or blinking text, objects, or other elements having a flash or blink frequency greater than 2 Hz and lower than 55 Hz.

SW.20.3.6. 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:

- **Expansion:** Software shall be dimensioned to accommodate the size of AMI application system keeping the scalability in count.
- **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.
- **User-Directed Termination:** Functions taking long execution times shall recognize and process user requests to abort the processing.
- **Portability & Interoperability:** The system shall be designed for hardware independence and operation in a network environment that facilitates interoperability and integration of third-party application.
- **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.

SW.20.3.7. **Remote Diagnostic:** Remote Diagnostic facility with necessary hardware and software as required shall be provided for communication between the AMI application system at the cloud data centre and the Network Operation cum Monitoring Centre and the WBSEDCL support office 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 WBSEDCL on such events of remote access and diagnosis.

SW.20.4. Service Oriented Architecture (SOA): solution components must follow SOA principles to provide specific services using well defined interfaces. The system solution design shall be based on cross-functional components or subsystems and shall be implemented in such a way that there is an opportunity for reuse. The integration architecture shall be based on the concept of a service, so all the applications of the HES solution are able to integrate without any complexity. Data access must be always through Services, no application will access HES data directly from the storage layer or data access layer. For every internal data access also (access between various modules) there will be services and no direct access will be there to ensure the system is scalable and secure.

SW.20.5. Solution Integration:

SW.20.5.1. Shall easily integrate to Standard MDMS using industry standard interfaces and shall comply with CIM/JSON/XML/ IEC 61968/ IS15959/ any other open standard.

SW.20.5.2. The integration is expected to be on on-line real time basis or batch mode where appropriate and shall operate in an automated fashion without manual intervention.

SW.20.5.3. The integration mechanism adopted must have minimal impact on the existing systems. The access to data will only be through applicable business rules i.e.

the applications will not access data directly without going through APIs managed by business rules/validation/workflow.

SW.20.5.4. In case, utility adopts any Integration Middleware/ Integration Service Bus then the data exchange to and from HES shall be through this ESB.

SW.20.5.5. HES should maintain log for every in out command/ request/ push transaction between MDMS and HES system.

SW.20.6. Key Data Management:

SW.20.6.1. The system must store and manage the security information related to Smart Meters. This include Device Security keys and asset information for processing further business flows.

SW.20.6.2. Update of HES with the necessary asset information of all AMI filed devices.

SW.20.6.3. The system must ensure that at all times the field data (customers, meters, etc.) shall be in sync across MDMS.

SW.20.6.4. The System should accurately maintain system time synchronization across all devices to ensure accuracy of data.

SW.20.7. Business Continuity and Disaster Recovery: In case if primary site / DC fails, the business shall continue from DR site. Connectivity between primary site and DR site shall be redundant. In case of Failures of Storage at DC, DR Backups shall be used to restore the Database from the last backup taken as defined in Backup policy. Bidders are expected to keep the above issues in mind and propose technically best alternative to ensure that the system is available for the users in all times by conceptualizing various scenarios and explaining how their solution addresses all the possible scenarios**.**

SW.20.8. Support for Cloud Enabled Deployment: All servers, applications, and IT components shall be hosted in a secure cloud with uninterrupted services on 24x365 days basis. The vendor must host the system in security standard ISO 27001 certified MeitY empanelled minimum Tier-3 Data Centre within INDIA. The datacenter and DR of Cloud Service Provider (CSP) must be within judicial jurisdiction of Indian Republic. Data should not be transferred across the border at any time. There should be a tripartite agreement of non-disposal of data between WBSEDCL and successful bidder.

SW.20.9. System Environments: The configuration – including application, database and communication servers shall support the following environments:

SW.20.9.1. Development environment

SW.20.9.2. Testing Environment

SW.20.9.3. Training Environment

SW.20.9.4. Production environment

SW.20.9.5. Disaster Recovery environment (Only for Production system with similar capacity).

SW.20.10. Security Zones Deployment: The IT Infrastructure will have multiple security layers to secure the infrastructure from threats. The proposed deployment has different security zones as briefed below and all zones shall have separate firewall in addition to the external (Perimeter security appliances). The firewall policies shall be configured

based on zone-based requirements.

SW.20.10.1. Zone for Production Servers (Database and Application servers) Zone: This zone shall not be accessible from Internet directly. All user traffic will to enter in this security zone after firewall only. The proposed solution will have provision of dedicated Internal Firewall to secure the critical production (Data base and Application) environment.

SW.20.10.2. Web server/Application: This security zone will host all servers that can be accessed from external users after authentication and traffic filtering. This zone shall host the Web servers, Access control and sign on servers, Antivirus Server etc.

SW.20.10.3. Testing and Development Zone: This zone will host all servers required for test and development for applications, which shall provide testing facility for integration of changes/modifications of the HES application and new field devices before putting it online with Real-time system. This zone will have limited access and it will not have any direct access to Production Servers Zone and the activity shall be monitored.

SW.21. Cyber Security: The complete system should have adequate cyber security measures not limited to the measures as described below.:

SW.21.1. Secure Access Controls: The system shall include mechanisms for defining and controlling user access to the operating system environment and applications. Measures such as password policy, password strength, password aging, and password history and reuse prevention must be implemented.

SW.21.2. 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.

SW.21.3. 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.

SW.21.4. Hardening: All unnecessary packages must be removed and/or disabled from the system. Additionally, all unused operating system services and unused networking ports must be disabled or blocked. Only secure maintenance access shall be permitted and all known insecure protocols shall be disabled.

SW.21.5. Malicious Software Prevention: Implementation of anti-virus software and other malicious software prevention tools shall be supported.

SW.21.6. Network Security: The network architecture of the HES must be secure with support for firewalls and encryption. The system shall also allow host-based firewalls to be configured, as an additional layer of security if the network firewall were to fail.

SW.21.7. End to End Security: Data in-flight must be signed and encrypted to guarantee

integrity and no tampering once the data is extracted from a meter until the same data gets delivered into the HES in the backend.

SW.21.8. Cyber Security System Monitoring: The IA shall also be responsible for monitoring of the cyber security system. The logs of the system shall be analysed for exceptions and the possible incident of intrusion/trespass shall be informed to the utility. The monitoring shall encompass the various cyber security devices installed at Control Centre such as firewalls, Intrusion prevention system (both network based and host based), routers etc. The Centralized Monitoring Console (CMC) shall monitor and continuously collect the above logs.

The Cyber security system shall also be subjected to **Annual Security Audit from CERT-In listed auditors at the cost of the Vendor** during contract period. SI/ IA shall implement the recommendations/remedial actions suggested by the Auditor after audit.

SW.22. Periodicity of data collection:

SL. No	Parameters	3-Ph Whole Current Meters	1-ph Whole Current Meters
1	Name Plate	Node Reboot	Node Reboot
2	Billing Data	Monthly	Monthly
3	Load Profile Data	Daily	Daily
4	Instantaneous	8 Hour Interval	8 Hour Interval
5	Midnight Data	Daily	Daily
6	Critical Event alarms	On Occurrence/ On Restoration	On Occurrence/ On Restoration
7	All event as info	Daily	Daily
8	Programmable Parameters	On-Demand	On-Demand
9	Connect/ Disconnect	On-Demand	On-Demand

SW.22.1. Billing Data: In case billing data is not available through AMI system due to different reasons, the implementer can download meter data from meters through CMRI and upload into the system within the specified billing period. However, 100% data for billing is to be ensured by the vendor in every month. A provision of downloading data through CMRI for maximum **5%** of the consumers is kept. Billing Schedule:

Sr No.	**Billing data**	**Mode of Communication**	**Allowable day for Data Transfer**
1	**Consumer Meter Data of the last day of the month at 24.00 Hrs**	**AMI**	**Within 2nd Day of Each Month**
2		**CMRI**	**Within 6th day of Each Month**

For temporary disconnection/ permanent disconnection if billing data could not communicate, vendor need to intimate respective supply office (CCC) in written and

email with copy to WBSEDCL HQ, then only it will be justified for SLA clause. For permanent disconnection, such meter installation shall be utilized elsewhere in the same Customer Care Centre (CCC) or nearby CCC.

SW.23. System Performance Measures: Apart from the functionalities of each component and business requirements following parameters are specified for system designing, cloud resource designing, system optimization:

SW.23.1. Performance Requirement for User Interface (HES) :

Sl No.	User Interface Requirements	Response Time
1	Any real time display/application display on work station console along with data values shall appear on screen.	Within 5 sec
2	Manual data entry of the new value appears on screen	Within 5 sec
3	Display Update rate	Within 5 sec
4	Response time for display of Alarm and event after receipt in system	Within 2 sec of system receipt
5	Requests for generation of reports (to be acknowledged with an indication of request is being processed)	Within 5 sec

SW.23.2. Performance Requirement for Smart metering System: Refer to SAT testing Criteria.

SW.23.3. Performance Requirement for HES Scalability: Above performance criteria should not be affected up to 2.47 lakh + 25%. meters integrated with HES.

SW.23.4. Cloud Requirement:

Sl No	Particulars	Count
1	RTO	Less than 4 Hours
2	RPO	Less than 30 minutes
3	The HES shall provide storage of all collected Meter Data, events and alarm.	capacity of storing 4 months live data and should not delete any meter data unless successfully processed to MDMS.
4	HES and other application log	last 6 months
5	NSM and security logs	For last 1 years

SW.23.5. Concurrent/ Simultaneous Users:

Sl No	Particulars	Count
1	Expected Concurrent HES business users	50
2	Expected Concurrent Meter Installation App user	100

SW.23.6. MPLS/VPN performance parameters:

SI No	Particulars	Count
1	Network Latency	<= 80 ms
2	Network Packet Loss	<= 0.3%
3	jitter	25 ms or better

SW.24. Project Management:

SW.24.1. General Requirements: The Bidder shall assign a project manager with the authority to make commitments and decisions that are binding on the bidder. WBSEDCL will designate a Nodal officer to coordinate all project activities. All communications between utility and the Vendor shall be coordinated through the project managers/ nodal officer. The project managers shall also be responsible for all communications between other members of the project staffs including sub- contractor, if any.

SW.24.2. Project Schedule: The detail project implementation schedule shall be submitted by the Bidder after award for Utility's approval, which shall include at least the following activities:

SW.24.2.1.1 Installation Schedule
SW.24.2.1.2 Factory & Site Testing Schedule
SW.24.2.1.3 Detailed of MPLS/VPN link
SW.24.2.1.4 Implementation Schedule component wise
SW.24.2.1.5 Integration schedule
SW.24.2.1.6 UAT Schedule
SW.24.2.1.7 Training schedule
SW.24.2.1.8 Detailed list of Software, Hardware, Cloud specifications
SW.24.2.1.9 Documents, Data Requirement Sheet, Proposed system architecture
SW.24.2.1.10 SLA reports, Monthly reports, Resource Deployment plan

The project implementation schedule shall include the estimated period for completion of each component, FAT & UAT testing and its linkage with other activities.

SW.24.2.2. Progress Report: A progress report shall be prepared by the project manager for each month against the activities listed in the project schedule. The report shall be made available to Utility on a monthly basis, e.g., the 10th day of each month. The progress report shall include all the completed, ongoing and scheduled activities and transmittals issued and received for the month.

SW.24.2.3. Transmittals: Every document, letter, progress report, change order, and any other written transmissions exchanged between the Vendor and utility shall be assigned a unique transmittal number. The Vendor shall maintain a correspondence index and assign transmittal numbers consecutively for all Vendor documents. Utility will maintain a similar correspondence numbering scheme identifying documents and correspondence that utility initiates.

SW.24.2.4. **Review Meeting:** Progress meetings shall be scheduled by the utility and attended by the Project Manager 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 Vendor shall also attend technical meetings as and when required by WBSEDCL 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.

SW.24.2.5. **Document Review and Approval Rights:** To ensure that the proposed systems conform to the specific provisions and general intent of the Specification, the Bidder shall submit documentation describing the systems to the Utility for review and approval. The employer will respond with written comments to the Bidder within thirty (30) Working days after receipt of the documents. Documents requiring correction must be resubmitted by the Bidder to the employer within thirty (30) working days. The employer will respond to resubmitted documents within fifteen (15) working days after receipt of the document. No implementation schedule relief is to be implied for documents requiring correction and resubmission to the employer. The employer shall have the right to require the Bidder to make any necessary documentation changes at no additional cost to the employer to achieve conformance with the Specification. Any purchasing, manufacturing, or programming implementation initiated prior to written the employer approval of the relevant documents or drawings shall be performed at the Vendor risk. Review and approval by the utility shall not relieve the Vendor of its overall responsibilities to satisfy system functions and performance requirements in accordance with the Specification. To help the utility manage the review and approval of documents during any given period, the bidder shall stagger the release of documents over the time allocated in the project schedule. The number and size of documents shall be factored into the document release schedule. At any time, not more than five (5) documents shall be submitted to the employer for review and approval.

SW.25. Key Resource Planning: The bidder should have minimum 15 no technical persons on roll of the company having relevant experience. The key expert's profile as declared by the bidder shall remain deployed to this project during the entire implementation period with successful 'Go-live' of entire system. The Bidder must demonstrate that it will deploy at least the following personnel for the key positions that meet the following requirements:

SW.25.1. Resource qualification/ Experience criteria:

The IA shall appoint at least the following personnel dedicated for the Project

1. Project Manager: She / he shall have the authority to make commitments and decisions that are binding on the IA. 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.

2. Site Engineer: The Site Engineer should be an expert in installation and management of Smart Meters, communication network, last mile connectivity and they will manage overall installation and commissioning of field devices. 5 no Site Engineers will remain stationed at each WBSEDCL's zone office location wise for the complete project engagement period.

3. Communication Expert: An expert in communication protocols and in implementing applications using different communication technologies and ensuring communication inter-operability across applications/functionalities.

4. Metering Expert: An expert in metering, metering IS, meter testing, different meter tamper or events and can manage different metering related issues ensuring availability of different meter data as per standards.

5. **System Administrator**: An expert in system administration as well as a Cloud system expert will monitor different resource utilization by applications, define and monitor different manage services of cloud.

6. 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.

7. Application Domain Expert: Expert must having experience in HES installation, configuration and Integration with MDMS system should be considered for this role. Along with knowledge of Android app development is also preferable.

8. 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.

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.

The project manager shall be responsible for bringing in the Cyber Security expert at the appropriate stage in the project as and when required.

Sl. No	Position	No.	Minimum Qualification	Minimum Work Experience	Minimum Relevant Work Experience
1	Project Manager	1	Graduate in Electrical/ Electronics & Communication	15	5
2	Site Engineers	5		5	2
3	Communication Experts	2		5	2
4	Metering Expert	2		5	2

5	System Administrator	1	MCA/B.E/B.Tech Electronics & Communication/Compute r Science/IT	5	2
6	System Integration Expert	1			
7	Application Domain Expert	2		5	2
8	Cyber Security Expert	1		5	2

SW.25.2. The Bidder shall provide the CVs of the proposed personnel in the relevant Forms included in ANNEXURE-IX Sample Forms of the bidding documents.

SW.25.3. For the field activities, bidder shall propose a detailed Man-power Deployment Plan with the technical bid document.

SW.25.4. Above mentioned requirements are minimum, however for all field activities and requirements to meet the project timelines, bidder to propose their project team.

SW.25.5. Deployed Key Personnel's can be replaced from the assignment only with a person of similar/higher experience and qualification subject to approval from WBSEDCL.

SW.25.6. Bidder to submit a detailed resource deployment plan for the entire project timeline.

SW.25.7. WBSEDCL has all rights to reject any under qualified, low experienced resource at any time.

SW.26. Reporting Requirement:

SW.26.1. Complete system/ HES System shall provide following daily, weekly and monthly performance and analytical reports. Reports should be system generated only and can be exported in various formats such as HTML, PDF, CSV, XLS. The scope shall include but not limited to the requirements given elsewhere in the Technical specification.

Utility reserve the right to add to the list in consultation with implementing agency without any additional financial liability to the utility.

Sl No	Description Of Report	Frequency
1.	Metering Report: Count of data against different profile parameters.	Daily
2.	Meter Billing data availability with AMI and CMRI flag	Monthly

3.	Remote reconnection and disconnection event Report: with mentioning number of attempts Success/ Fail flag, Order received from MDM with actual execution time stamp.	Daily/ Instant
4.	Meter analytical data availability report.	Daily
5.	Message Log Report – Events & Alarms.	Daily
6.	Theft and Tamper Alert: as per IS 15959 Part 2Report	Daily, Monthly and User Selectable Time Period
7.	Availability Report of HES, MDM Interface/ Integration Bus, Cloud and network components	Daily
8.	Count of On-demand Meter Read request with Success/ Fail Polling Flag	Daily, Monthly and User Selectable Time Period
9.	Report on Meter Firmware upgradation request with Success/ Fail Flag	Daily, Monthly and User Selectable Time Period
10.	Report on all type of Service Order from MDMS/ HES with timestamp	Daily, Monthly and User Selectable Time Period
11.	Availability Report of HES, Meter Installation app etc..	Daily
12.	Authentication Failure Report	Monthly
13.	Unauthorized access report	Monthly
14.	Network Report with any firewall policy change	On Demand
15.	Cyber Security Reports	Monthly

SW.27. Documentation Scope:

SW.27.1. General: To ensure that the proposed systems conform to the specific provisions and general intent of the Specification, the Vendor shall submit documentation to utility describing the systems for review and approval. Further the Vendor shall also submit the drawings / documents for all the hardware & software required for installation, testing and commissioning and thereafter operation of the system. The Vendor shall obtain approval of utility for the relevant document at each stage before proceeding for purchase, application development, system deployment, testing, training etc**.**

SW.27.2. Instructions: Documents shall have unique identification No. and every revision shall be mentioned. The Vendor shall submit three (3) hard copies of each document/drawing for Utility's review and approval along with soft copy with each submission. After approval two (2) sets of all the documents shall be submitted as final documentation. Any changes observed during field implementation shall be incorporated in the as-built drawing and two copies of same shall be submitted to

utility on electronic media in pdf format. The Vendor shall also supply two (2) sets of Technical User manuals/guides/O&M manuals/manufacturers catalogues for all the hardware & software supplied under the contract. The user manual shall at minimum include the principle of operation, block diagrams, troubleshooting and diagnostic and maintenance procedures. Considering all the components of the system the following documents/drawings shall be required under the system.

SW.27.3. Hardware Documentation Requirements: The following document shall be submitted as applicable for the subsystem:

SW.27.3.1. System description documents (Overview)
SW.27.3.2. Data requirement sheets for all items
SW.27.3.3. Functional description document
SW.27.3.4. Database documents
SW.27.3.5. Drawings/Documents for manufacturing/assembly of the equipment/system
SW.27.3.6. Drawings/Documents for installation of the equipment/system at site
SW.27.3.7. Installation Progress Document: Including documentation of date of installation, make and meter ID of existing replaced meter, meter ID of new meter, consumer account number, GPS coordinates, unmetered connection, existing meter status (OK, failed, meter tampering) , line theft, etc. Where applicable Vendor may, for recordkeeping, take photographs/ videos of installation site on approval from [utility] Software description/design documents for each module
SW.27.3.8. Factory test procedure and report
SW.27.3.9. Manuals for each equipment
SW.27.3.10. System configuration parameter
SW.27.3.11. Site testing procedure and report
SW.27.3.12. Training documents
SW.27.3.13. System administrator documents
SW.27.3.14. User guide
SW.27.3.15. Software licenses
SW.27.3.16. Type test reports
SW.27.3.17. Cable sizing calculations
SW.27.3.18. Inventory of the hardware
SW.27.3.19. General and internal arrangement drawing of panels indicating modules, components location etc.
SW.27.3.20. Installation drawing
SW.27.3.21. Schematic drawing.

SW.27.4. Software Documentation Standards: The documents to be submitted shall include the following information.

SW.27.4.1. **Software Inventory:** An inventory of all software shall be maintained by the IA. The IA shall submit the following inventory lists: the preliminary inventory list at the time of the Functional Description document approval, an updated inventory list immediately prior to the start of the testing, and the final inventory list at the time of system commissioning. The inventory shall include the name of each program, a cross reference to pertinent Vendor documents,

language and libraries used, and an indication of whether the program is to be standard, modified, or custom.

SW.27.4.2. **Functional Description:** Functional description documentation shall be provided for each function described in this specification. It shall include the following information for each function.

SW.27.4.2.1 Introduction describing the purpose of the function with references to other documentation to aid the reader's understanding of the functions performed.

SW.27.4.2.2 Performance requirements that describe the execution periodicity and the tuning parameters that control or limit the capabilities of the software.

SW.27.4.2.3 Complete description of the operation, data and logic interfaces with other functions.

SW.27.4.2.4 Sample displays where applicable.

SW.27.4.3. **Software Design:** Software design documentation shall be provided for each function before the Acceptance Test. It shall include detailed descriptions of the following items.

SW.27.4.3.1 The overall organization and architecture of the software logic such as a breakout of the software into software modules.

SW.27.4.3.2 Mathematical algorithms and formulae.

SW.27.4.3.3 Complete description of the algorithms, operation and the data and logic interfaces with other functions

SW.27.4.3.4 Data dictionary in which the following (as applicable) information for each data item in tables, file, and array is provided: (1) Name (2) Purpose, (3) Location, (4) Length of data item, and (5) Initialization.

SW.27.4.3.5 Databases internal and external to the software, along with a description of all inputs required and the output produced by the software modules.

SW.27.4.3.6 Interfaces with other software modules.

SW.27.4.3.7 Design limitations such as field length and the maximum quantity of data items that can be processed.

SW.27.5. **Database Documentation:** Database documentation shall describe the structure of the database. The documentation shall define the individual elements (files, records, fields, and tables) and their interrelationships. Portions of the database developed specifically for Owner's systems shall be identified. Documentation shall also be provided that instructs the user in the preparation of data to be used for the databases, including:

SW.27.5.1. The overall organization of input records

SW.27.5.2. The format of each data record

SW.27.5.3. Each data field and the valid entries pertaining to the fields.

Sufficient database documentation shall be provided to enable the database to be updated or regenerated when inputs are changed and added, programs are modified, and new programs are added.

SW.27.6. User Documentation: User documentation shall contain detailed operating instructions and procedures. Instructions and procedures shall be explained step-by-step with an explanation of how each step is performed, which parameters can be adjusted, and the effects obtained by varying each parameter. Additionally, the user documentation shall describe:

SW.27.6.1. All user guidance and error messages, along with the steps necessary to recover from errors

SW.27.6.2. The user interface including displays and keyboard operations used to control, review the input and output produced by the function. All displays relevant to the function shall be included along with a description of each dynamic display field.

SW.27.6.3. Alarms and messages issued by the function and the conditions under which they are generated

SW.27.6.4. Procedures to be followed for computer system restarts, failures, and failovers.

SW.27.7. System Administration Documentation: System administration documentation shall be provided to guide utility personnel in the operation and procedures required to generate and update the systems, including system software, database, application software and other elements of the systems. System administration documents shall be provided for the following items:

SW.27.7.1. Network communications management
SW.27.7.2. Cloud resource configuration
SW.27.7.3. System performance monitoring
SW.27.7.4. System restart/failover management and diagnostic procedures
SW.27.7.5. System generation and management
SW.27.7.6. Database generation and management
SW.27.7.7. Display generation and management
SW.27.7.8. Report generation and management
SW.27.7.9. Diagnostic programs
SW.27.7.10. Software utilities
SW.27.7.11. Software maintenance
SW.27.7.12. Application software parameters and tuning guides
SW.27.7.13. Web administration
SW.27.7.14. Other vendor supplied system software not included above.

SW.27.8. Test Documentation: Documentation for all type of component and overall system tests shall be provided.

SW.27.9. Training Documentation: Training documentation shall be provided for all courses in accordance with the requirements.

SW.28. Test and Inspection: This test and inspection clause is applicable to for complete system and its sub-components, unless some special testing is mentioned for any sub-components (Meter) of the project. All the materials which will be supplied shall undergo pre dispatch inspection by WBSEDCL officers. Before supply of items, clearance from WBSEDCL is required.

SW.28.1. Test Plans & Procedures: Test plans and test procedures shall be provided by the IA, for all tests to ensure that each factory and field test is comprehensive and verifies all the features of the equipment are tested. The IA 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.

SW.28.1.1. Test Plan: 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 WBSEDCL 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;

SW.28.1.2. Test Procedure: 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.

SW.28.1.3. Test Records: The complete record of all factory and field acceptance tests results shall be maintained by the designated Project Manager of IA. The records shall be maintained in a logical form and shall contain all the relevant information. The test reports shall be signed by the testing engineer and the engineer witnessing the tests. The records shall be keyed to the test procedures. The following items shall be included in the test records:

(a) Reference to appropriate test procedure;

(b) Date and Place 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 test engineer and WBSEDCL's representative;
(f) Provision for comments
(g) Copies of any variance reports generated
(h) Copies of reports, display copies, and any other hardcopy generated as part of the test.

SW.28.1.4. **Reporting of variances:** Starting from the dry run test period, a variance report shall be prepared by IA personnel each time a deviation from the requirements of this Specification is detected in areas such as system functions, design parameters, performance, documentation, test plans, and test procedures. 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) Estimated date and time when variance is expected to be fixed;
(f) Description of the corrective actions taken (to be completed as part of the variance resolution process;
(g) Dated signature lines for the QA/QC and WBSEDCL's 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 IA 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 IA at the end of the current session but prior to further testing

(c) Class 3: Testing will continue, and the variance will be evaluated and corrected at a mutually agreed upon time.

The class shall be assigned by the QA/QC representative with approval from WBSEDCL authority.

The IA 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).

SW.28.1.5. 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 Smart Metering systems operating environment can be recreated starting with an uninitialized 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 Systems shall be taken on the archive media so that 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 IA using the test plans and test procedures.

SW.28.2. 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.

SW.28.2.1. The IA 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 NABL accredited labs.

SW.28.2.2. Type test certificates should not be older than 3 years as on Bid Submission Date.

SW.28.2.3. 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 IA.

SW.28.2.4. For pluggable NIC modules, the type tests shall be carried out with the NIC

module integrated in the meters being supplied under the project.

SW.28.2.5. In case of failure during any type test, the IA 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.

SW.28.2.6. Documentation for all factory, field, and availability tests that apply to the complete Smart metering system shall be provided in accordance with the requirements defined in this section of specification.

SW.28.3. Quality Assurance and Quality Control Program: The Project Manager of IA should appoint an QA/QC Manager either directly or through its authorised representative, who shall be responsible for all witness testing, approval of test records and in general, management of the QA/QC program of the project**.** 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 IA'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. Instructions and records for quality assurance shall be controlled and maintained at the system levels. The IA shall describe its QA/QC program in the project kick-off and shall submit its QA/QC Manual for review. The QA/QC program shall provide for prevention and ready detection of discrepancies and for timely and positive corrective action. The IA shall document objective evidence of quality conformance. The assigned officer from WBSEDCL shall have the right to carry out Quality Audit and Quality Surveillance of the systems and procedures of the IA'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:

SW.28.3.1. Review of all the IA's/ its sub-contractors drawings, engineering data etc.

SW.28.3.2. 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.

SW.28.3.3. Inspect, accept or reject any equipment, material and work under the Contract in accordance with the specifications.

SW.28.3.4. Issue certificate of acceptance

SW.28.3.5. Review and suggest modification and improvement in completion schedules from time to time; and

SW.28.3.6. Monitor the Quality Assurance program implementation at all stages of the works.

SW.28.4. Software Development Testing: The following testing steps are usually employed in the project lifecycle. The Implementation Agency is expected to follow these steps:

SW.28.4.1. **Unit Testing:** In unit testing, each piece of code has to be rigorously tested. At this stage testing is done according to the priority of path of code. All the test results are logged in the defect logging tools. After the completion of testing, code is corrected for defect logs. This process is iterative till criteria for

successful testing is reached.

SW.28.4.2. **Integration Testing -** Upon completion of unit testing, integration testing begins. The purpose is to ensure distinct components of the application still work in accordance to customer requirements. Test sets will be developed with the express purpose of exercising the interfaces between the components. This activity is to be carried out by the Test Team. Integration test will be termed complete when actual results and expected results are either in line or differences are explainable/acceptable based on client input.

SW.28.4.3. **Incremental Integration Testing -** Continuous testing of an application as new functionality is added.

SW.28.4.4. **System Testing -** System testing is performed when all the components are delivered to central repository prior to the release of the software. The testing is done on priority basis of business processes. All the defects are logged and assigned to respective component owners. The component and unit testing is performed after the correction of code. However, it may depend on size and type of individual test specifications. Impact analysis is useful to narrow done testing efforts by identifying critical test cases affected due to code change.

SW.28.4.5. **Pre-Production Testing –** Pre-Production testing is done simulating the production load. Test data is either prepared or generated from the tools. This testing is used to evaluate performance, load capacity and concurrency. Load testing tools can also be used for this purpose.

Following special types of testing are done during Pre-Production Testing Phase:

SW.28.4.6. **Regression Testing -** The objective of regression testing is to ensure software remains intact. A baseline set of data and scripts will be maintained and executed to verify changes introduced during the release have not "undone" any previous code. Expected results from the baseline are compared to results of the software being regression tested. All discrepancies will be highlighted and accounted for, before testing proceeds to the next level.

SW.28.4.7. **Performance Testing -** Although performance testing is described as a part of system testing, it can be regarded as a distinct level of testing. Performance testing will verify the load, volume, and response times as defined by requirements.

SW.28.4.8. **Load Testing** - Testing an application under heavy loads, such as the testing of a web site under a range of loads to determine at what point the systems response time degrades or fails.

SW.28.4.9. **Installation Testing -** Testing full, partial, or upgrade install/uninstall processes. The installation test for a release will be conducted with the objective of demonstrating production readiness. This test is conducted after the application has been migrated to the client's site. It will encompass the inventory of configuration items (performed by the application's System

Administration) and evaluation of data readiness, as well as dynamic tests focused on basic system functionality. When necessary, a sanity test will be performed following the installation testing.

SW.28.4.10. **Security/Penetration Testing** - Testing how well the system protects against unauthorized internal or external access, wilful damage, etc. This type of testing may require sophisticated testing techniques.

SW.28.4.11. **Recovery/Error Testing -** Testing how well a system recovers from crashes, hardware failures, or other catastrophic problems.

SW.28.5. **Factory Acceptance Test :** The factory tests shall be conducted on all the equipment to be supplied under the project. It is expected that the FAT for equipment supplies shall happen in phases of delivery (Fat test schedule and LOT will be finalized mutually). For this a test cum development system environment shall have to be created for the Smart Metering system, with the HES, integrated MDM and Database application servers installed in the target cloud data centre. FAT 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

The FAT shall be carried out on the meter integrated with the NIC modules linking to communication module and HES. Communication failover has been agreed between tests shall be carried out to check a seamless failover of communication. All proposed Meters shall be checked with all proposed NIC modules for all type of communication technologies (4G fall back to 3G/2G) selected for the project.

SW.28.5.1. **Factory Test Requirements:**

(a) The database displays and the report formats developed for the central system by the IA 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 IA or its sub-contractor shall also carry out testing of the standard protocol implementation for successful integration before the FAT starts.

(d) All hardware and software associated with Smart Metering Systems shall be staged and completely tested with simulated data at the IA's facility.

SW.28.5.2. **Hardware Integration Test:** The hardware integration test shall confirm that the hardware conforms to this Specification and the IA-supplied hardware documentation. 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.

SW.28.5.3. **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:

SW.28.5.3.1 Inspection of all equipment for conformance to drawings/document and satisfactory construction and appearance;

SW.28.5.3.2 Testing of the proper functioning of all software, including test cases with normal and exception user-entered inputs and responses;

SW.28.5.3.3 Simulation of local error and failure conditions;

SW.28.5.3.4 Verification that ultimate expansion requirements are met;

SW.28.5.3.5 Verification of data link interfaces with other Central systems;

SW.28.5.3.6 Verification of Field Device communication interfaces (with failover) and data link interfaces with other central systems. This shall include the tests of proposed makes of meters with proposed types of NIC modules;

SW.28.5.3.7 Simulation of Field Device and data link communication errors and channel failures, including incorrect check codes and random channel noise bursts;

SW.28.5.3.8 Test of MDMS integration with major functionalities;

SW.28.5.3.9 Testing of all user interface functions, including random tests to verify correct database linkages;

SW.28.5.3.10 Simulation of hardware failures and input power failures to verify the reaction of the system to server and device failure;

SW.28.5.3.11 Demonstration of all features of the database, display, and report generators and all other software maintenance features;

SW.28.5.3.12 Demonstration of the software utilities, libraries, and development tools;

SW.28.5.3.13 Verification that the computer system meets or exceeds performance requirements;

SW.28.5.3.14 Verification of the accuracy of hardware and software documentation via random tests;

SW.28.5.3.15 Sample check of meter calibration accuracy and testing of spare parts;

SW.28.5.4. **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 IA-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.

SW.28.5.5. **FAT Inspection:** All FAT will be carried out by joint inspection of WBSEDCL's representative and QA/QC manager from IA. 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 WBSEDCL authority.

The vendor will have offered the materials in writing for material inspection. The vendor shall intimate at least 7 days in advance through notice(s) about the readiness of material for dispatch commensurate with specific delivery schedule so as to enable the purchaser to depute his representative for inspection testing and checking of the material/equipment (**Expenses will be borne by the purchaser)**. For this purpose, the date of receipt of the letter in the office of the purchasing authority shall be deemed as the date of call for inspection and not the date mentioned in the letter and the date of dispatch. The designated officer/ representative of WBSEDCL shall on giving seven days, notice in writing to the contractor setting out any grounds of objections which he may have in respect of the work, be at liberty to reject any drawing and all or any plant, or workmanship connected with such work which in his opinion are not in accordance with the contract or are in his opinion defective for any reason whatsoever.

If 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 vendor 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 purchaser reserve to him the right of having any inspection of special test of a reasonable nature at contracts premises or at sites in addition to those prescribed in applicable standards and the enclosed technical specification. ln case of inspection for more than two times for the same offered lot due to vendor's default, a penalty amount of Rs. 25,000 /- (excluding GST) against each inspection will be payable by the bidder to the account of WBSEDCL. Unless the inspection is specifically waived no material shall be dispatched without inspection and clearance for dispatch by the purchase's representative. The purchaser reserves the right to reject all or any part of the material being manufactured of awaiting dispatch, due to any defect or deviations from the standard specifications prescribed as observed during the Inspection.

In case of any dispute/difference in this regard the decision of the Chief Engineer (lT&C) shall be final and binding. The purchaser also reserves the right to get the material/equipment tested in any recognized Government Laboratory & claiming any

compensation or rejecting the material/equipment, if not found in accordance with the specification. All charges consequent to such rejection and replacement/rectification shall be borne by the supplier.

The test shall be considered complete when

(a) when all variances have been resolved;

(b) all the test records have been filed;

(c) Assigned officer from WBSEDCL acknowledges in writing the successful completion of the test.

SW.28.5.6. **Dispatch:** The Material Dispatched Clearance Certificate (MDCC) for all hardware shall be issued only after successful completion of FAT as per specification. FAT quantity will be decided depends on LOT sizing. The data exchange between central systems shall also be simulated in the factory test environment. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by WBSEDCL. Following documents shall be sent along with material (in soft copy/hard copy):

a. Govt. certified/accredited lab testing certificate
b. Test reports
c. MDCC issued by WBSEDCL
d. Invoice in duplicate
e. Packing list
f. Drawings & catalogue
g. Guarantee / Warranty card
h. Delivery Challan
i. Other Documents (as applicable)

SW.28.6. Field Installation and Integration Test (FIIT): Before the start of the FIIT, the following steps have to be completed:

SW.28.6.1. All field level hardware which have undergone FAT shall be installed at the site and the installation report signed off;

SW.28.6.2. Before the delivery of the first lot of field devices (Meter with NIC), the production hardware (servers, WS, LAN/Routers, FW, etc.) and software(HES integrated with MDMS) shall be provisioned at the cloud data centre.

SW.28.6.3. All MPLS links should be tested up and running, integration of CSP to WBSEDCL Data center should be completed;

SW.28.6.4. The installed field hardware shall be configured and registered in the production environment of the cloud data centre;

In the FIIT tests regime, the minimum 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 IA.

SW.28.7. Site Acceptance Test (SAT): SAT shall be carried out with Smart Meters 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 minimum of 5,000 meters from 1st Lot Smart Meters & NIC. The SAT for remaining meter population shall be staged on monthly basis based on the total supply (LOT wise), installation and integration of Smart Meters (along with its related hardware and software equipment).

The SAT shall exhibit generally all functions of the equipment. The list of final tests to be carried out in the field shall be listed in the site-testing document by the IA. Among others, the site testing document shall include the following minimum performance tests:

SL NO	Data Type	Parameter	Performance Requirement
1	Load Profile Data Read	One-month block load profile for installed meters	From 95% of the meters in 12 hours after the midnight
2	Billing Profile Data Read	Billing profile data for installed meters	From 95% of the meters in 24 hours after the midnight
3	Daily Profile Data Read	7 days block load profile for installed meters	From 95% of the meters in 12 hours after the midnight
4	Instantaneous Data Read	Current Instantaneous data	From 95% of the meters in 8 hours of scheduled action time
5	On-Demand Remote reads of meters	Collection of 7 days of interval energy or similar	From 90% of the meters in 30 minutes
6	Remote connect / disconnect	Action to response for individual meter	Less than 30 mins
		Action to response for Group of meters	From 99% of the meters in 6 ours
7	Ping Response with acknowledgement/ response for selected meters	For installed meters	Action performed at 99% of meters within 2 hours
		For an individual meter	Action performed within 180 seconds
8	Integration with MDMS	Processing MDMS request	99.9% request should be processed within 30 sec
9	Meter loss and restoration of supply	Receiving of alert for all affected AMI meters	Alert to be received within 30 minutes for 60% of meters
10	Meter Tamper Alerts	Receiving of alert for an individual meter	Alert to be received within 30 minutes
11	Power Quality Alerts	Receiving of alert for an individual meter	Alert to be received within 30 minutes

12	Firmware upgrade with acknowledgement/ response for selected meters	For installed AMI meters	Action performed at 99% of meters within 12 hours
13	Remotely altering settings in meter	For installed AMI meters	Action performed at 99% of meters within 6 hours
15	Remotely read events logs	For reading the full event log for installed AMI meter	Action performed at 95% of meters within 6 hours
16	Prepaid Recharge	Payment success to meter update (on receiving after HES)	Within 2 hour
17	Utility User Interface	Manual data entry of new value appears on screen	Less than 60 secs
		Acknowledgement of any action request	Within 60 secs
		Display update rate	30 secs
18	Disaster Recovery Capability	RTO	Less than 4 Hours
		RPO	Less than 30 minutes

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, meters will be eligible for issuance of relevant commissioning certificate.

SW.29. Operational Go Live & Final Acceptance: The Operational Go Live of the Smart Metering System shall be considered as completion of the SAT for initial 5,000 of Smart Meters (along with its related hardware and software equipment) supplied installed and integrated. IA's obligations for Operational Go Live of the system shall be deemed to be met when the following milestones are achieved:

(a) Supply, installation & integration of minimum 5,000 of Smart Meters (along with its related hardware and software equipment)

(b) Successful completion of SAT for minimum 5,000 of Smart Meters;

(c) Successfully integration of MDMS with HES, Utility Portal with dashboard & Reporting; Meter installation mobile app with full functionalities;

(d) Successful completion of system availability test;

(e) Successful completion of the following minimum AMI system use cases:

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
1	Read Demand & Energy Data Automatically from Customer & DT Premises	Requesting instantaneous, interval & events data from meters	MDM	HES	Meter no, Reading date & time, reading params (KWh, KVAh, KW etc.)
		Acquire instantaneous, interval / events data from meters by HES which then reaches MDM system.	HES	MDM	Meter no, Reading date & time, reading params (KWh, KVAh, KW etc.)
		At scheduled freq. HES sends data to MDM Consumption details will be 15 min block data, and data could be incremental to what was sent by meter in preceding instance	HES	MDM	Meter no, reading date & time, KW, KVA, KWH, KVAH, PF
2	Meter disconnection/ reconnection for Consumer Meter	Meter Connect / Disconnect operation	MDM	HES	Meter no, group of meters, instruction to close switch
		Connection Status Update Request	MDM	HES	Meter no, group of meters, switch status
		Connection Status Update	HES	MDM	Meter no, group of meters, switch status
3	Utility detects tampering or theft at site	Tamper events captured by meter sent to HES which in turn reaches MDM for further action.	HES	MDM	Meter no, tamper Code / description, tamper occurrence date & time
		Notify utility personnel for site inspection	MDM	Email/SMS gateway	Consumer number, Meter Number, Tamper code, Address, Lat long
		On detection of valid tamper event or malfunction, connection is disconnected.	MDM	HES	Customer no, meter no, action to be triggered(disconnect), action date & time
		Tamper event shared with SAP-ISU. Billing determinants are updated for tamper invoicing	MDM	SAP-ISU	Meter no, action (disconnect)
		Meter re-connection order once tamper issue is resolved	MDM	MDM	Meter number, action (connect)

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
		HES sends re- connect command to meter (thru DCU/ACP)	HES	Meter	Meter no, action (re-connect)
4	Missed interval readings	On identifying missed interval, MDM will re acquire data for the missing period from meter	MDM	HES	Meter no, from date & time, to date & time (for which data is missing)
		Missed Interval and Reads Data acquired by MDM	HES	MDM	Meter Number, readings with date & time
5	Connection has an outage	Power Outage Notification (PON)	HES	MDM	Meter no, Outage Date & Time, Power On Off count
6	Connection restore from outage	Power Restoration Notification (PRN)	HES	MDM	Meter no, Restoration Date & Time, Power On Off count
		Sharing Outage / Restoration Notification	MDM	OMS/ ISU	Meter number, event date and time, event (outage/restoration)
		Meter read request from OMS to identify service outage / restoration	OMS/ GIS	MDM	Meter Number,
		Meter ping status sharing to OMS/ GIS	MDM	OMS/GIS	Meter Number, status
7	Remote firmware upgrades/ meter configuration changes	Configuration Commands: Change tariff parameters, Synchronize clock, Registers reset (status, maximum, tampering)	MDM	HES -> Meter	Meter number, tariff parameters, registers status, event type and priority
		Status update of Firmware / Configuration	Meter-HES-	MDM	Flag value
8	Load monitoring at demand side	When there is a load violation event recorded in the meter, the information is sent to the control center	Meter	HES	Meter no, max demand, date & time of load violation

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
9	New Consumer Connection	Receive pre & post-paid new	Receive pre & post-paid new	Receive pre & post-paid new	Receive pre & post-paid new
		Verify new consumer has paid as per regulation	Verify new consumer has paid as per regulation	Verify new consumer has paid as per regulation	Verify new consumer has paid as per regulation
		Generate meter installation order	MDM	ISU-CRM	Consumer ID & details
		Receive meter installation report	WFM	MDM	Meter number, DT no, Feeder & reading
		Requesting instant, interval & events data from meters	MDM	HES → Meter	Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.)
		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.)
		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.
10	Consumer Registration in Consumer Portal/ App	Consumer clicks on new user on consumer portal/ App, provides RMN or email ID and submits data	Portal/ App	MDM	OTP
		Utility receives request for registration and sends OTP after verification	MDM	Email/Message Gateway	
		Consumer submits OTP	Portal/ App	MDM	

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
		Consumer receives registration detail	MDM	Email/Message Gateway	Login ID and default password
		Consumer submits first login request	Portal/ App	MDM	
		System seeks password change	MDM	Portal/ App	
		Consumer changes default password	Portal/ App	MDM	
11	Pre-piad consumer recharge	Consumer logs into Portal / Mobile App	Mob App / Portal	UI	Login
		Consumer fills-in required detail in UI and requests recharge	UI-> Portal App	ISU payment gateway	Consumer ID, Recharge amount
		Consumer selects payment method	ISU payment gateway	Net banking /Credit Card / Wallet etc.	
		Consumer receives payment acknowledgement	Payment Gateway	Prepaid App→Portal →UI	
		Calculate credit balance for prepaid consumer & update prepaid meter	SAP-ISU Prepaid App	MDM->HES->Meter	Consumer credit balance (virtual token)
		Notify credit balance to consumer	SAP-ISU Prepaid App	Email/SMS Gateway	Credit Balance
12	Demand read of meters from consumer premises	Requesting instantaneous, interval, load profile & events data from meters	MDM	HES->Meter	Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.)
		Acquire instant, interval, load profile & events data from meters by HES which then reaches MDM system	Meter->	MDM	Meter Number, Reading date & time, reading params (kWh, kVAh, kW etc.)

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
13	Staff User Access to Utility Portal	User logs in to Portal	Portal	MDM	Login with appropriate credentials
		User selects available functions	MDM	Portal → UI	
		User logs out	Portal → UI	MDM	
14	Time synchronization	Sync up of meters / DCUs/ master data and Network Hierarchy in case of installation of new meters / DCUs	HES	MDM	Network identification info including DCUs
15	Metering network changes	Change in Meter / DCU Network Hierarchy	HES	MDM	Network identification info including data concentrators

SW.29.2. Performance Testing - The bidder has to test and demonstrate the operational performance of the entire system after completion of entire scope. Bidder should note that WBSEDCL can appoint a third party agency for conducting any part of above testing procedures (in addition to the testing carried out by the bidder).

SW.30. Training and Handholding: General requirement for training to be imparted is as follows: -

- ✓ Training shall be conducted by IA/ OEM's personnel who are experienced instructors and speak understandable English/Hindi/Bengali.
- ✓ The bidder shall provide training to various user groups nominated by utility. The bidder shall provide the Training Approach in the response.
- ✓ All necessary training material shall be provided by the Bidder. 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.
- ✓ Training materials, including the documents provided to the trainees as well as handouts, shall become the property of utility. utility reserves the right to copy such materials, but for in-house use only.
- ✓ 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.
- ✓ The training will consist of a curriculum of courses to address the issues of system operation, business-wide application, changed business processes and general use of the new system.

- ✓ The recommended training material can be in paper / electronic media with courses on used software fundamentals, business process overview, job activity training, and delivery options being on-line, CBTs, instructor led class rooms, etc.
- ✓ Representatives from the IA, 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.

The training modules shall include but not limited to:

- ✓ System Administration & Configuration
- ✓ Software and application Installation and Trouble-Shooting
- ✓ Cloud management, administrative access, trouble shooting etc.
- ✓ Integration Management
- ✓ Application Management
- ✓ Smart meter installation
- ✓ NIC installation and configuration
- ✓ HES reporting etc.

The bidder shall be required to organize following training for the utility personnel:

Professional Training - This is the training for the core group (Implementation Team) of the utility. This team will comprise of members from all the Business Functions, Metering and IT of WBSEDCL. Each member would be trained in the relevant function / module. This Training would be required to be given to approximately 15-20 personnel (around 2-3 groups) of WBSEDCL. It is the responsibility of bidder to deliver this training. Standard curriculum designed and agreed by the owner for hardware, software and network preferably from the OEM partner or OEM's certified training partner shall be arranged for each group. Part of these trainings shall be conducted on-site.

End User Training - The bidder will provide training to WBSEDCL's team (Trainer's Team) on a "Train the Trainer" basis. The Owner's team so trained will then train all of the WBSEDCL's employees. It is estimated that this training by selected bidder will require around 5 groups (zone wise including HQ), with each group comprising of around 10 to 15 persons. These training sessions will be required to be conducted at different zonal offices of WBSEDCL.

SW.32. Required Certificates:

Installation Certificate: After Successful installation of Smart Meter in circuit with all necessary accessories, installation certificate as per ANNEXURE-XVI should be submitted for bill claim**.** Installation certificate is also required for re-installation or replacement of meter also.

Commissioning Certificate: Vendor can apply for Commissioning certificate for any installed smart meter only after entire system acceptance and declaration of successful system Go-Live i.e installation & commissioning (with successful trial-run) of all equipments (meter, nic card, communication module) with creating the application with initial database and user management

(Cloud system, HES system) and integration with existing MDMS system with Set up of MPLS link.

The concerned Supervising Officer for all site offices shall sign "Commissioning Certificate" for:

Successful commissioning of Smart Meter with all necessary accessories at Consumer Premises and Handover of all user id and password to their respective user assigned for that site tested by successful login (A)

Satisfactory hands-on live training on how to use and operate the system.

The format for Commissioning Certificate is available in ANNEXURE-XVII.

Performance Certificate: The vendor shall prepare performance certificate as per ANNEXURE-XVIII for monthly billing invoice. Performance parameters are only be considered from system generated reports only. A Consolidated performance report considering other SLA parameters (from SLA tool report) need to be prepared to justify monthly invoice.

Technical Specification [TS]

The main objective of AMI is to establish / enable two-way communication between smart energy meter and Head End System (HES) to enable remote reading, monitoring & control of electrical energy meters and electrical network meters to serve as repository of record for all raw, validated and edited data. The sanitized data may be subscribed by other utility function for higher order analysis and billing and collection engine etc. The Advanced Metering Infrastructure helps utility to manage their resource and business process efficiently.
The required Sub-system of AMI (Smart meter to HES) system shall support at-least but not limit the following functionalities:

a) Remote Meter data reading (Scheduled / Instantaneous) at configurable intervals (push/pull);
b) Time of Use (TOU)/ TOD metering;
c) Post-paid functionality (by default) with provision of pre-paid functionality without need for any additional infrastructure;
d) Support Net Metering for adding renewal energy sources to circuit efficiently;
e) Alarm/Event detection, notification and reporting;
f) Load Limiter and connection/ disconnection at defined/on demand conditions which can be configured remotely in advance;
g) Network Monitoring System for the field area network (NAN/WAN), Remote firmware upgrade, configuration of network nodes and system time synchronisation across all devices to ensure accuracy of time stamping;
h) Integration with existing MDMS systems;
i) Import of CMRI meter reading data;
j) Security features to prevent unauthorized access to the HES including Smart Meter & meter data etc.;
k) The System should accurately maintain system time synchronization across all devices to ensure accuracy of data;
l) System shall adhere with the appropriate security algorithm for encryption and decryption as for data exchange between filed devices and HES per IS16444 and follow cyber security guidelines for data security;

IA may design appropriate architecture for providing metering solution. IA is free to decide upon the best solution out of all the available options. However, the entire responsibility of fully functional system shall rest with the IA in order to meet the performance levels as given in this document.

Following core components of AMI shall be provided:

1. 1-Phase Whole current Smart Meter with meter box
2. 3-Phase whole Current Smart Meter with meter box
3. NIC card and Communication Infrastructure

4. Head End System (HES) and Network Management System (NMS)
5. Cloud Service provider (CSP)
6. Meter installation Mobile App (Android Based)

TS.1. Technical Specification of Single Phase Whole Current Smart Meter and Meter Box:

This specification covers the following for single phase 5-30A static whole current watt hour smart meters of accuracy class 1.0 with modular pluggable communication modules and integrated load control switches along with pilfer proof meter box to house the meter with its accessories.

TS.1.1. Scope:

TS.1.1.1. Design, manufacture, testing at manufacturer's works before dispatch, packing, delivery and submission of all documents.

TS.1.1.2. The meter shall have bidirectional communication capability through all of the communication technologies defined in IS 16444 and shall communicate with DCU/Gateway Access Point / HES as per the choice /requirement of the utility.

TS.1.1.3. Smart meter shall be with provision of TOD (Time of Day) tariff, also capable of recording and displaying energy in kWh and demand in kW for single phase two wire A.C. loads

TS.1.1.4. Meter shall support on demand data fetching read, remote firmware upgrading, different types of event detection etc.

TS.1.1.5. The meter shall have different import and export registers so that it can be used as net meter also with renewable generation resources.

TS.1.1.6. The meter can shall have capability to function in both post-paid and pre-paid mode and any mode can be enabled remotely.

TS.1.1.7. Any All accessories / hardware required for installation, commissioning and operation for the meter shall have to be provided.

TS.1.1.8. It is mandatory that in case of all manufacturers, the offered meter shall be ISI marked and bidder shall have to furnish valid BIS certification along with the offer.

TS.1.2. Applicable Codes & Standards: The meters covered in this specification shall conform to the latest editions and amendments of the following Indian/CEA/IEC Standards and shall conform to the regulations of local statutory authorities, unless specified separately elsewhere in this specification.

Sl. No.	Standard	Description
1.	Indian Electricity Act	IE Act 2003
2.	CEA Metering Regulations: 2006	Installation and operation of meters with latest amendments.

3.	CBIP Manual (Pub no.-325)	Standardization of AC Static Electrical Energy Meters
4.	RERC Regulation	On installation and operation of meters dated 29.05.2007.
5.	IS 16444 (Part 1) with latest amendments	AC Static Watt hour Smart Meters, Direct Connected Class 1 and 2
6.	IS- 13779: 1999	AC Static Watt-hour Meters, Class 1 and 2 – Specification
7.	IS- 15884: 2010	Alternating current direct connected static prepayment meters for active energy (Class 1 and 2) – Specification
8.	IS- 11448:	Application guide for AC Electricity meters
9.	IS 15959 Part 1, Part 2 with latest amendments	Data Exchange for Electricity Meter Reading, Tariff and Load Control-Companion Standards
10.	IS15707:2006	Testing Evaluation Installation and Maintenance of AC Electricity Meters.
11.	IS : 9000	Basic Environmental testing Procedures for Electronic & Electrical items.
12.	IS:12346(1988)	Specification for testing equipment for AC Electrical Energy meter
13.	IEC 62052–11	Electricity metering equipments (AC) – General requirements & test conditions Part II metering equipments.
14.	IEC 62053-21	Electricity Metering equipments (AC)- particular Requirements – Part – 21 Static meters for active Energy (class 1 & 2)
15.	IEC – 61000-4-5 (2001-04)	Electromagnetic Compatibility (EMC)-Testing and measurement Techniques, Surge immunity test
16.	IEC 61358:1996	Acceptance inspection for direct connected AC static Watt hour meter for active energy (class 1 & 2)
17.	IEC 62053-61	Electricity Metering Equipment (a.c) Particular requirement- Part- 61 -Power consumption and voltage requirements.

In case of any conflict or discrepancy the order of precedence shall be as follows:

a. IS
b. IEC
c. CBIP technical report-325 (with latest amendments, if any)

In case of any difference between the provisions of these standards and the provisions of this specification, the provisions contained in this specification shall prevail.

NOTE: All requisite tests shall be carried out on the meters which are required to check its conformance to the above-mentioned standards

TS.1.3. Climatic conditions for installation: The meters to be supplied against this specification shall be capable of performing and maintaining required accuracy under extreme hot, cold, tropical and dusty climate and solar radiation typically existing in state of West Bengal (India). The meter shall be required to operate satisfactorily and continuously under the following tropical climatic conditions.

Sl No.	Parameter	Value
1.	Maximum ambient air temperature	55°C
2.	Maximum ambient air temperature in shade	45°C
3.	Maximum temperature attainable by the meter	60°C (when exposed to sun)
4.	Minimum ambient temperature	-10°C
5.	Average daily ambient air temperature	40°C
6.	Maximum relative humidity	95%
7.	Number of months of tropical monsoon condition	5 months
8.	Maximum altitude above mean sea level	3000 meters
9.	Average annual rainfall	100 mm to 1500 mm
10.	Maximum wind pressure	200 kg/sq. m
11.	Permitted noise level	45 db

Note: The weather of West Bengal is semi-arid type. Temperatures remain comparatively on the higher end all around the year. Heavy lightning also occurs during the month of June to September.

TS.1.4. Supply/Installation System Data:

Sl No.	Parameter	Value
1.	Type of Installation	Outdoor
2.	System	AC, 1 Phase 2 Wire
3.	Rated Frequency	50 Hz ±5%
4.	System Neutral	Solidly Earthed

TS.1.5. General Technical Requirement:

Sl. No.	Parameter	Requirement
1.	Meter Type	Single phase, two wire static whole current Watt Hour Smart Meter comprising of measuring elements, display, memory, load switch with pluggable bidirectional communication module all to be housed in pilfer proof meter box.
2.	Connection	Direct (Whole Current)
3.	Reference and Operating Voltage	Reference Voltage (V_{ref}) : 240 V (Ph-N) Operating Voltage: Meter shall be operational with required accuracy from 60% V_{ref} to 120% V_{ref} However, meter shall be capable to withstand ~~with~~ the maximum system Voltage of 433 V (Ph-Ph) for a period of atleast 1 hour
4.	Rated Current	Base Current (I_b) : 5 A Maximum Current (I_{max}) : 30 A
5.	Starting current	Starting Current: The meter should start registering energy at 0.2 % of

	& Running at no load	basic current at unity power factor and first pulse must appear-within 10 minutes (i.e. time between two consecutive pulses). Running at no load: When 60%Vref and 120%Vref voltage are applied and no current flows in the current circuit, the test output of the meter must not produce more than one pulse.
6.	Operating Frequency	50Hz ± 5%
7.	Reference Conditions for testing the performance of the meter	V_{ref} : 240V ± 1 % Frequency: 50hz ± 0.3% Temperature: $27^{O}C \pm 2^{O}C$
8.	Accuracy Class	1.0 (shall comply with accuracy requirements under IS 13779)
9.	Meter constant	Imp/ unit (Bidder to specify)
10.	Power Factor Range	Zero lag to Unity to Zero lead
11.	Meter category	Meter shall comply with D1 category of IS 15959 (Part 2)
12.	Power Consumption	Power consumption of the smart meter with integrated communication modules and load control switch shall be as per IS 16444 (Part 1)
	in voltage circuit	Meter shall comply with clause 6.10.1.1 of IS:16444 (Part 1)
	in current circuit	Meter shall comply with clause 6.10.1.2 of IS:16444 (Part 1)
13.	Mechanical requirements	As per clause 6.5 of IS 16444(Part 1)
14.	Calibration	Meter shall be calibrated through software at factory and modification in calibration shall not be possible at site by any means or external influence. However, configuration of parameters allowed for field reconfiguration shall be possible through wired or Over the Air (OTA) communication.
15.	Insulation and Impulse test	Meter shall comply with IS 16444 (Part 1)
16.	Minimum Insulation resistance	Minimum Insulation resistance at test voltage 500 ± 50V dc a) Between frame & current, voltage circuits as well as auxiliary circuits connected together: 5 MΩ b) Between each current (or voltage) circuit & each and every other circuit.: 50 MΩ
17.	Influence of supply voltage	Meter shall comply with clause 4.4.2 of IS 15884
18.	Short time over current	Meter shall comply with clause 4.4.3 of IS 15884
19.	Immunity to phase and earth fault	Meter shall comply with clause 9.6 of IS 13779
20.	Influence of Self Heating	Meter shall comply with clause 4.4.4 of IS 15884
21.	Influence of heating	Meter shall comply with clause 4.4.5 of IS 15884
22.	Environmental	Meter shall be suitable for environmental conditions as mentioned below

	Condition	
23.	Temperature Range	Operation range: -10^{O}C to 60^{O}C
24.	Relative Humidity	0 to 96 %
25.	Resistance against heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per IS 13779.
26.	Resistance against Climatic influence	Meter shall comply with clause 12.6 of IS 13779.
27.	kVAh Calculation	Meter shall be programmed for "Lag only configuration" i.e. lead to be treated as unity PF for kVAh calculation.
28.	Initial start-up of meter	Meter shall be fully functional within 5 seconds after reference voltage is applied to its terminals.
29.	Display	Backlit LCD, minimum 6+1 digits
30.	Communication Capability	Meter shall have the ability to communicate with Head End System (HES) ~~on~~ with any one of the communication technologies mentioned in IS 16444 (Part 1) , i.e, (RF/PLC/ Cellular) in a secure manner. The selection of communication technology shall be as per the site conditions and as per design requirement to meet the performance as per agreed Service Level Agreements (SLAs). In case of Plug-in type communication module, the meter shall log communication module removal /non responsive event with snapshot.
31.	Software	The bidder shall supply software for wired (CMRI/HHU/mobile app and laptop) and remote (preferably web based; for AMI) connectivity. The bidder shall also provide required training of usage of software free of cost.
32.	Communication Layer Protocol	Shall have to comply with clause 9.3 of IS 16444 (Part 1)
33.	Alternative data retrieval	In case of meter damage, data stored in meter memory (NVM) shall be retrieved using a jig. Bidder need to provide such jigs free of cost (1 jig on each 10,000 meters). Jig shall be designed such that NVM can be plugged easily on it for data retrieval.
34.	Testing as part of Technical Evaluation	Sample meter with all accessories including communication module & load switch and software shall be tested at WBSEDCL's Testing Laboratory as part of technical evaluation of the offered smart meter. Requisite infrastructure needed for simulating the environment beyond the meter testing facilities, i.e, for load switching capabilities, data exchange and communication capabilities are to be provided by the bidder during this testing.
35.	Test and Test Conditions	Test and Test Conditions shall be guided by clause 10 of IS 16444(Part 1). Note: i. The smart meters shall be subjected to specified test for meteorology, for load switching capability, for data exchange and for smart meter communicability. ii. The tests shall include Type Tests, Routine Tests and Acceptance Tests.

36.	Data Retention	AS per CEA Regulations.

TS.1.6. Constructional Requirement:

Sl No	Parameter	Requirement
1.	**General**	a) The meter shall be compact in design. The entire construction 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. b) All insulating material used in the construction of meters shall be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion during operating life by providing suitable protective coating. c) Meters shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following shall have to be ensured: i. Personal safety against electric shock ii. Personal safety against effects of excessive temperature iii. Protection against spread of fire iv. Protection against penetration of solid objects, dust & water
2.	**Meter Body**	a) The meter shall be housed in a safe, high grade, unbreakable, fire resistant, UV stabilized insulating material of good dielectric and mechanical strength, The casing shall be of projection mounting type made up of virgin polycarbonate material. b) The meter cover shall be transparent with viewing window for easy reading of displayed parameters and observation of operation indicators. c) The meter base may not be transparent, but it shall not be black in colour. d) The meter casing shall not change in shape, colour, size, and dimensions when subjected to UV test as per ASTMD 53 for 200 hrs. e) It shall withstand 650 ℃ glow wire test and heat deflection test as per ISO 75. f) For testing of changing colour72 hrs on UV test is applicable. g) Meter body shall be sealed in such a way that opening of meter base and cover is not possible without breaking the seals.

		h) Thickness of meter body (Base and Terminal cover) shall be 2mm minimum.
3.	Other Constructional Features	a) The meter shall be supplied with a transparent extended terminal block cover (ETBC). b) The terminal block shall be made of high grade non-hygroscopic, fire retardant, fire resistant material having good dielectric and mechanical strength with brass inserts for connecting terminals. c) The bidder shall submit relevant documents regarding the procurement of polycarbonate material. The polycarbonate material of only the following manufacturers shall be used: i. G.E. Plastics/SABIC LEXAN 943A, or equivalent like 123R for Top cover & Terminal cover/ LEXAN 503R or equivalent like 143R for base & Terminal Block. ii. BAYER Grade corresponding to above iii. DOW Chemicals- - DO – iv. MITSUBISHI- - DO – v. TEJIN- - DO – vi. DUPONT- - DO – d) The ETBC shall not be easily detachable from the base and be secured to the base using a hinge or with any other suitable arrangement without hinge. e) ETBC shall be closed at the bottom to prevent access for wires to terminal holes. f) The terminal cover shall have provision for cable entry from the bottom. g) The terminal cover shall have sufficient space for incoming and outgoing cable such that these can pass without stressing and damaging the terminal cover. h) Diagram of external connections shall be embossed clearly on inside portion of terminal cover. i) Meter terminals shall be marked and this shall appear in the diagram. j) Clearances shall be as per IS 16444 (Part 1). k) All electrically live screws shall be of tinned or nickel plated brass material. l) All the fixing holes shall be such designed that once the meter is mounted, the screw heads shall not be accessible. m) The meter should be fitted with SHUNT for measuring current in the phase element. The Neutral element may have either C.T. or SHUNT or HALL EFFECT SENSOR with proper isolation. The shunts, used in current circuit must be of high quality having high thermal stability and temperature co-efficient. The shunts shall be E-Beam / Spot welded. In case of Hall Effect Sensor, meter shall record as per requirement of technical specification in normal and tamper conditions.

		n) Top cover and base shall be fixed in such a manner that it shall be break to open type, i.e, ultrasonically or chemically welded. In case any attempt is made to separate the meter cover from the base by using any tools / implements / device, there shall have to be visible evidence of tampering or attempt to open. o) Meter shall have a permanent indication in its display as well as logging of tamper in case of removal of top cover, even in power off condition and it shall not disappear even if cover is re-fitted. It shall have to be treated as a non roll over event.
4.	**Fixing Arrangement**	a. The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there shall be no risk of loosening or undue heating. b. Meter shall have 2 (two) screws in each terminal for effective clamping of cables. c. The screws shall not have pointed ends at the end of the thread. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life of the meter should be such that the risk of corrosion resulting from contact with any other metal part is minimized. d. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material. e. All terminals and connecting screws and washers should preferably be of tinned / nickel plated brass material. f. The terminals and all connecting screws shall be capable of withstanding a current of 150% of Imax atleast for two hours, continuously. g. The meter shall be capable of providing phase to neutral protection up to 433 V for 1(one) hour.
5.	**Sealing Arrangement**	a) The sealing screws used for the meter cover shall be fixed upside down so that these are tightened from the rear and for screw less design also for fixing the base and cover provision for sealing must be there. b) A run through screw (stud) has to be provided from bottom side & sealing is to be done on the top side of the meter. c) Two independent sealing screws are to be provided at each sides of the meter casing. d) The sealing screws shall be Tinned Brass or Nickel Plated Steel/Brass. In addition to the sealing screws provided to the meter cover, the sealing screws of the terminal cover shall also be Tinned Brass or Nickel plated steel. e) Meters must be supplied with two no. of manufactures' seals fixed between meter base and cover at both sides. If lock /click fit integrated seals are used in sample meters, acceptability of said seal will be decided after through checking.
6.	**Ingress Protection**	IP 51 or better Meter shall comply requirement of clause 6.9 and 12.5 of IS 13779
7.	**Output device**	a) Meter shall have flashing LED visible from the front to represent energy (active and reactive) recording. Resolution shall be such that satisfactory accuracy test

		can be conducted at the lowest load in less than 5 minutes and starting current test in less than 10 minutes. b) Meter shall have provision on LCD for indicating communication status. c) Meter shall have indicator on LCD for displaying the status of load switch.
8.	**Real Time Clock (RTC)**	a) The meter shall have internal real time crystal clock to set date and time. b) The Real Time Clock (RTC) shall have long life, at least 10 years. c) RTC shall have separate battery backup. d) Meter shall have capability of time synchronization through optical port/ remote communication with proper authentication.
9.	**Battery**	Meter shall have Lithium / Lithium ion battery with guaranteed shelf life of 10 years and capacity life of 15 years. In case of battery removal or total discharge same shall not affect the working & memory of the meter even in case of single wire power condition.
10.	**Memory**	Non-volatile memory (NVM) independent of battery backup, shall retain data up to 10 year without any auxiliary power.
11.	**Meter reading in Power Off condition**	It shall be possible to read the meter during power off condition. It shall also be possible to read the meter through NIC or with CMRI / Laptop in this condition. If battery is used for the same, it shall have to be a separate battery and not the one used for RTC, i.e., the RTC battery and the battery used for display during power off condition shall not be the same.
12.	**Self-Diagnostic feature**	The meter shall be capable of performing complete self diagnostic check to monitor integrity of data in memory location all the time. The meter shall have indication for unsatisfactory / non-functioning / malfunctioning of the following: a) RTC b) All display segments c) Battery d) Non-volatile Memory (NVM) e) Synchronization of time of meter & HES clock from MDAS instantly for less than 3 minutes and through HES for more than 3 minutes with alarm at HES.
13.	**Load Control Switch**	Smart meter shall be equipped with integrated load control switches to control flow of electricity to the load with connect/disconnect commands as per functional need of the system. Load switch shall be in compliance to IS 15884 and IS 16444. Meter shall be remotely settable to support double pole relay for connection/disconnection. The phase and neutral relay shall connect/disconnect on the following conditions: a) Over current b) Load control limit

<table>
<tr><td></td><td></td><td>
c) Pre-programmed Tamper conditions (like, Meter Cover open detection, Neutral disturbance, Magnetic Interference and single wire etc.).
d) Disconnect signal from Utility Control Centre such as balance unavailable in case pre-paid facility is availed by consumer
Load Control limits shall be remotely programmable.
The reconnection mechanism shall also be remotely programmable.
The brief technical particulars of this load switch are furnished below:
<table>
<tr><th>Sl No.</th><th>DESCRIPTION</th><th>Requirement</th></tr>
<tr><td>1</td><td>Operating Voltage range</td><td>Vref (-40% to +20%).</td></tr>
<tr><td>2</td><td>Operating Current range</td><td>IS 16444</td></tr>
<tr><td>3</td><td>Maximum switching power</td><td>22 kVA per phase/ per IS 15884 Annex G</td></tr>
<tr><td>4</td><td>No. of poles</td><td>Double pole in a single relay</td></tr>
<tr><td>5</td><td>Operation of switches</td><td>Simultaneous</td></tr>
<tr><td>6</td><td>Utilization Categories</td><td>UC3</td></tr>
<tr><td>7</td><td>Min. number of operation</td><td>3000 (close, open each)</td></tr>
</table>
</td></tr>
<tr><td>14.</td><td>Performance requirement for load switching</td><td>Utilization category of the load switch shall comply with IS 15884.</td></tr>
<tr><td>15.</td><td>Communication module of meter for AMI</td><td>a) Smart meter shall have provision for plugging-in communication module (NIC card) as per clause 1.2(b) of IS 16444(Part 1).
b) Meter shall have provision for supporting both the variants of communication module.
c) The module shall be able to connect to NAN or WAN (as per the plugged RF or Cellular module) for two-way communication and any of these two will be used at a time.
d) Meter shall log communication module removal as an event.</td></tr>
<tr><td>16.</td><td>Meter Sealing Arrangement</td><td>a) Reliable sealing arrangement shall be provided to make the meter tamper evident and to avoid fiddling or tampering by unauthorized persons.
b) Sealing should be in accordance with IS and CEA metering regulations with latest amendments.
c) Approval shall be taken from purchaser for location of seals.
d) Adequate sealing provision shall be provided in case of exposed optical port.
e) In case of plug in communication module, sealing arrangement shall be provided for the same also.</td></tr>
<tr><td>17.</td><td>Manufacturer’s / WBSEDCL Seals</td><td>a) All meters shall be sealed by the manufacturer at its works with 2 (two) no. of polycarbonate seals with manufacturer’s logo and sequential numbers.</td></tr>
<tr><td>18.</td><td>Name Plate and marking</td><td>Meter shall have clearly visible, indelible and distinctly marked name plate in accordance with clause 11 of IS 16444 (Part 1).</td></tr>
<tr><td>19.</td><td>Connection Diagram</td><td>The connection diagram of the meter shall be clearly shown on terminal cover.</td></tr>
</table>

TS.1.7. Functional Requirement:

S.No.	Parameter	Requirement
1.	Meter category	D1 as per IS 15959 (Part 2).
2.	Data Security	Advanced Security outlined in clause 7.1.2 of IS 15959 (Part 1)
3.	Encryption for data communication	As per clause 7.1 of IS 15959 (Part 2)
4.	Encryption and Authentication For Data Transport	As per clause 7.2 of IS 15959 (Part 2)
5.	Key Requirements and Handling	As per clause 7.3 of IS 15959 (Part 2)
6.	IP Communication Profile Support	As per clause 8 of IS 15959 (Part 2). Note: Meter shall support TCP-UDP/ IP communication profile for smart meter to HES.
7.	Self- Registration	Last mile mesh network must support auto-registration and self-healing. Meter once powered up should be self-detected and its basic name plate details should be transferred to HES.
8.	List of Parameters for Category D1	As per Clause 11.1 of IS 15959 (Part 2)
9.	Instantaneous Data	As listed in Table A1 of IS 15959 (Part 2)
10.	Billing Profile Data	Billing profile parameters are as listed in Table A4 of IS 15959 (Part 2) Notes: a) At the end of each billing cycle, meter shall generate and store in memory parameters as per provisions provided in clause no. 14 of IS 15959 (Part 2). b) Support for selective access shall be provided for billing parameters as per clause no 11.3 of IS 15959 (part 1). c) The current cycle billing parameters shall be readable as the values of the latest billing period, on demand. This shall be in addition to the last 6 billing period data which shall be available in the profile buffer as the last 6 entries in the buffer.
11.	MD reset	24:00 Hrs. of last day of each month.
12.	Billing period counter	Cumulative billing period counter since installation and available billing periods shall be provided as per clause 11.2 of IS 15959 (Part 1).
13.	Selective access of billing data	By entry.
14.	Billing period reset mechanism	As per clause 10 of IS 15959 (Part 1)

15.	MD Registration	Block window with programmable integration period as per requirement. (Default period : 30 min)
16.	Load Data survey/ Interval Data	As per IS15959 (Part 2) Load Survey data shall be measured and recorded at the end of each interval for last 60 days.
17.	Daily Load Profile	As detailed in Table A3 of IS 15959 (Part 2) The parameters listed in this table shall be logged at midnight (00:00 hrs) everyday and data shall be preserved for last 60 days.
18.	Name Plate Details	As detailed in Table A12 of IS 15959 (Part 2)
19.	Programmable parameters	As detailed in Table A13 of IS 15959 (Part 2) Note: The parameters can be programmed remotely by HES and locally by authorized devices (CMRI, laptop) through serial communication port via proper access rights. Every transaction shall be logged in non-volatile memory of the meter with date and time stamp.
20.	TOD Metering	As per clause 9 of IS 15959 (Part 1) The meter shall have facilities to record active energy, apparent energy and MD in at least 8 time zones. The time zones shall be user programmable remotely through HES and locally by authenticated MRI/Laptop/RMR command. Necessary software for the same is to be provided by the bidder. At present TOD timings will be programmable as follows: TOD 1: 06:00 Hrs. to 17:00 Hrs. TOD 2: 17:00 Hrs. to 23:00 Hrs. TOD 3: 23:00 Hrs. to 06:00 Hrs.
21.	Push Services	As per clause no. 6 of IS 15959 (Part 2) Note: There shall be a provision for the smart meter to automatically notify data, events, and messages to a destination client system in an unsolicited manner (without a request from a client).
22.	Periodic push (SM to HES)	As per clause no. 6.1.1 of IS 15959 (Part 2) Note: a. In this service the selected objects list is to be notified periodically by the smart meter to HES. b. Meter shall be able to push the following objects including some instantaneous parameters to HES at predefined intervals: i. Device ID ii. Push setup ID iii. Real Time clock- Date and time

		iv. Voltage v. Phase current vi. Signed Power factor vii. Apparent power KVA viii. Active power Kw ix. Cumulative Active Energy kWh (Import) x. Cumulative Apparent Energy kVAh (Import) xi. Cumulative Active Energy kWh (Export) xii. Cumulative Apparent Energy kVAh (Export) c. Other attributes as per IS 15959 (Part2) i.e. Send Destination, Communication Window, Randomization Time Interval, number of retries and repeat delay shall be decided in the event of manufacturing.
23.	Event push (SM to HES)	As per clause no. 6.1.5 of IS 15959 (Part 2) Note: In this service the smart meter is to report to HES status change of any of the identified events.
24.	Firmware upgrade	As per clause 9 of IS 15959 (Part 2) Note: i. Smart meter shall support remote firmware upgrade feature ii. Firmware upgrade shall be limited to the communication firmware only. iii. Firmware upgrade shall use the Image transfer classes and mechanisms specified in IEC62056-6-2 and IEC62056-5-3.
25.	Disconnection mechanism	As per clause 11.1 of IS 16444 (Part 1) Note: i. List of events for disconnection to be pre-programmed shall be provided by utility. ii. Load Control limits shall be programmable locally and remotely. iii. Meter shall use the disconnection control object as defined in clause 10 of IS 15959 (Part 2). iv. Relay for connect/disconnect shall comply all relevant requirements of IS 15884 **Disconnection Logic must be programmable at the time of installation
26.	Reconnection mechanism	As per Clause 11.2 of IS 16444 (Part 1) Note:

		i. Reconnection shall be done from HES except for over current and load control limit. In case of failure of communication / HES, reconnection shall be possible through Handheld Device (CMRI/mobile app) locally via proper security. ii. Reconnection in case of prepayment meter shall be as per prepayment profile and balance/credit availability in the meter. **Re-connection Logic must be programmable at the time of installation
27.	Load switch event logging	As per clause 11.5 of IS 16444 (Part 1) Note: Meter shall log with date time and other relevant parameters, all connections and disconnections as events.
28.	Status of Load Switch	As per clause 11.4 of IS 16444 (Part 1) Note: Indication of status of load switch (i.e, connected/ disconnected) shall be available on display as well as at HES. Connection and disconnection should be logged as events.
29.	First breath and last gasp	As per clause 11.7 of IS 16444 (Part 1) Smart Meter shall detect "First breath"(power on) and "Last gasp"(power off) condition and communicate to HES.
30.	On demand readings	On request from HES
31.	Schedule for meter readings	Programmable through HES

TS.1.8. Anti-tamper and Fraud Detection Requirement: The meter shall offer a link less design i.e. there shall be no isolation link provided between the current and voltage circuits and hence there would not be any possibility of tampering with the same. Tamper/ Event recoding shall follow IS 15959 (Part-2) and would log the event and send alarm at Head End System. The meter shall be capable of recording the following tamper events in memory.

Event Logging Details:

1.	Current Related	As listed in table A5 of IS 15959 (Part-2)
2.	Earth Tamper	In case of earth tamper, apart from logging the event, continuous indication through LED flag or icon on display shall have to be provided
3.	Power Related	As listed in table A6 of IS 15959 (Part-2/3??)
4.	Power Off /On	Meter shall log Power Off event occurrence if the phase voltage is absent beyond a threshold period.

5.	Low Voltage Event Logging	Meter shall log Low Voltage Event in case the voltage reaches below a threshold value beyond a threshold period.
6.	Protection against HV spark	In case a spark of up to 35 kV is applied externally to the meter including its communication port with its cover in place, using a spark gun / ignition coil, meter shall either remain immune & continue to record energy with allowable accuracy or log the event.
7.	Others	As listed in table A8 of IS 15959 (Part-2)
8.	Neutral disturbance	Meter shall log all events when AC/DC Pulsating Voltage is injected in neutral circuit especially when it can affect the recording of energy.
9.	External Magnetic Interference	a) The meter shall either remain immune to tamper through application of external magnetic field (AC electromagnet or DC magnet) as per value specified in CBIP 325 or if the metering gets affected then meter shall record energy with I_{max}, rated voltage and unity P.F. as per CBIP 325 and same shall also be logged as event with date & time. b) In case of abnormal permanent magnetic field, either meter shall remain immune or if the metering gets affected then meter shall record energy with I_{max}, rated voltage and unity P.F and it shall also be logged as event with date & time. c) The meter shall be provided with built in logic/ indication and sensor to detect event as tamper beyond meter's magnetic immunity level and also display such occurrences. The meter accuracy ~~or~~ shall not be affected by permanent magnetic field up to meter's magnetic immunity level. d) At the time of restoration of magnetic tamper the event shall be logged with actual parameters.
10.	Single wire power	Meter shall be immune (error within $\pm$4%) and shall start energy recording for connected load above 0.5 A
11.	Non rollover events	As listed in table A9 of IS 15959 (Part-2) For these events, only date and time shall be captured.
12.	Top cover open	Meter shall detect opening of top cover and this event shall be logged as non roll-over event. This even shall not have any associated restoration.
13.	Connection Related Tamper Conditions	The meter shall not get affected by any remote control device specified under CBIP 325 & shall continue recording energy.
14.	I/C & O/G Interchanged	Meter shall record forward energy within acceptable limits of error specified for accuracy class 1.0. (IS?) Note: Not applicable for Import-Export Mode
15.	Phase & Neutral Interchanged	Meter shall record forward energy within acceptable limits of error specified for accuracy class 1.0. (IS?) Note: Not applicable for Import-Export Mode
16.	I/C (Phase & Neutral) Interchanged, Load Connected to Earth	Meter shall record forward energy within acceptable limits of error specified for accuracy class 1.0. (IS?) Note: Not applicable for Import-Export Mode

17.	I/C Neutral Disconnected, O/G Neutral & Load Connected to Earth	Load switch of the meter shall disconnect the load to avoid load drawing under this condition
18.	I/C Neutral Disconnected, O/G Neutral Connected to Earth Through Resistor & Load Connected to Earth	Load switch of the meter shall disconnect the load to avoid load drawing under this condition
19.	I/C Neutral connected, O/G Neutral Connected to Earth Through Resistor & Load Connected to Earth	Meter shall record forward energy
20.	Event Logging	a. Minimum 200 no. of events with date and time stamp preferably along with snapshots of V, I, PF and kWh shall be retained in memory. b. The logging will be on FIFO basis. c. Occurrence and restoration are considered as separate event d. For each occurrence event captured, the cumulative tamper count shall be incremented. e. Selective access shall be provided as per clause 11.3 of IS 15959 (Part 1).
21.	Parameter Snapshot	Parameters as per table A11 of IS 15959 (Part 2) are to be captured during occurrence and restoration of logged events.
22.	Tamper Indication	Appropriate Indications/Icons for all tampers shall appear on the meter display either continuously or in auto display mode.
23.	Tamper Logics	As per Annexure-II
24.	High Frequency Jammer	Meter shall have to be immune on this test.

TS.1.9. Meter Display: The measured value(s) shall be displayed on a Liquid Crystal display (LCD) register. The display shall have backlit capability for easy reading from meters. When the LCD is placed at a constant temperature of 65°C for a period of 30 minutes in operating condition and 80°C for 30 minutes under de-energized / storage condition, it shall not get deformed.

1.	LCD Type	STN/HTN Liquid crystal with backlit capability
2.	Viewing angle	a) Display shall have 35 degree up & down viewing angle from eye level. b) The display visibility shall be sufficient to read the meter mounted at a height of 0.5 m as well as at the height of 2 m.
3.	Display of	Every meter shall have a unique alpha-numeric serial no. for displaying

	Meter Serial No	either in 9 complete places or in billboard fashion in "Separate Scrolling Mode". The meter serial number shall also be programmed into meter memory for identification through communication port.
4.	Register	The register shall be able to record and display starting from zero, for a minimum of 2500 hours, the energy corresponding to rated maximum current at reference voltage and unity power factor. The register shall not roll over in between this duration. The kWh energy registration shall take place with at least 6 + 1 digits.
5.	LCD language	English
6.	Display Mode: Auto	The list of parameters to be displayed in auto mode shall be provided separately for prepaid meter, postpaid meter, export – import meter, meter with TOD facilities etc. The display time for each parameter and the auto cycle duration shall be programmable. The parameters shall be displayed sequentially as per specified list.
7.	Display Mode: Push Button	The list of parameters to be displayed in push button mode shall be provided separately for prepaid meter, postpaid meter, export – import meter, meter with TOD facilities etc. The parameters shall be displayed sequentially as per specified list. Instantaneous, cumulative, periodic data as well as history data, event details. Etc. shall be listed in each type of meter specified above.
9.	Permanent Display on LCD	a) Supply Indication b) NIC Card Status c) Relay Status d) Earth Load Indication e) "Meter Cover Open" Tamper event
10.	Display indications	a) Appropriate indications/flags for all tampers and self-diagnostic features b) Data Communication c) Relay Status
11	High Resolution Display	The meter shall also be capable of offering a high resolution display which shall enable conducting of dial testing in the shortest possible time and as a minimum, the meter shall be capable of offering a resolution of 4 digits after decimal & 2 digits before decimal for the high resolution kWh or 2 digits after decimal and 4 digits before decimal for the high resolution Wh, display.
12	Display Power Up in Absence of Main Power	The meter shall have the provision of providing the display of billing parameters (Auto Display) in absence of main supply. Press of push button shall activate the display to facilitate hands free meter reading with auto-off provision. Performance of battery backup must be as per requisite criteria specified elsewhere in this technical specification.

TS.1.10. Software & Communication:

1.	Communication Ports	Communication port required in meter are as follows.
	Optical	Meter shall have one optical port. It shall be compatible for data transfer over RS 232 standard
2.	Plug-in Communication Module (NIC)	The smart meter shall 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 meter and act as interface between the meter and HES.. The plug-In module shall be field swappable/ replaceable.
3.	Integration	The bidder must ensure bi-directional data communication between the meter and HES for both RF mesh or cellular communication technology.
4.	Software and support	a) The bidder shall supply following software and provide required training & manuals to use the same free of cost : I. Software for local communication, i.e, for HHU/CMRI/Mobile App and Laptop/PC. This software can be Android or Windows OS based. II. Software for firmware upgrading from remote and mass deployment. b) Bidder shall ensure integration of software with any of WBSEDCL system during the life of meter free of cost. WBSEDCL will provide all the required support for integration activity. c) The bidder shall have to ensure DLMS compliance of the meter for both local & remote communication through its Optical port and NIC card.
5.	Software for local communication	The manufacturer has to provide software capable of downloading all the data stored in meter memory through CMRI/HHU/Mobile app/Laptop/PC. The manufacturer shall also provide software for android or windows based HHUs along with software for traditional CMRI/HHU devices. The bidder has to ensure that all required reading and diagnostic tools are available with them to ensure SLA as mentioned in Tender. Specification and costing of these tools shall be shared with WBSEDCL in case WBSEDCL wants to maintain their own devices.
6.	Training	Manufacture shall impart training to WBSEDCL personnel for usage of software
7.	Port protection	All ports shall be optically isolated from the power circuit.

8.	Operation	Optical port and NIC Card shall work independently. Failure of one (including display) shall not affect the working of the other.
9.	Communication protocol	As per IS 15959 (Part 2). Other protocols shall not be acceptable.
10.	Data transfer rate	Communication ports shall have to support data transfer rate of 9600 bps(minimum).

TS.1.11. Marking of Meter: The marking on the meter shall be in accordance with relevant clauses of IS 16444 and IS 13779. Colour of the Marking Plate will be Light Grey. The basic marking on the meter nameplate shall be as follows (all other markings as per IS 15959A2_R1 clause E - 10.1 shall also be there):

(a) Manufacturer's name & trade mark
(b) Place of manufacture
(c) Type Designation
(d) No. of phases & wires
(e) Meter serial number
(f) Month & year of manufacture
(g) Reference voltage
(h) Rated current
(i) Operating frequency
(j) Principal unit(s) of measurement
(k) Meter constant (imp/kwh)
(l) Class index of meter
(m) "Property of WBSEDCL"
(n) Purchase Order No. & Date
(o) Bar coded meter serial number along with month & year of manufacture
(p) BIS marking
(q) Firmware Version
(r) Communication technology for WAN or NAN (with carrier frequency)
(s) Symbol of load switch

TS.1.12. Guaranteed Technical Particulars: The bidder shall furnish all the necessary information as desired in the Schedule of Guaranteed Technical Particulars and data, appended with this Specification. If the bidder desires to furnish any other information in addition to the details as asked for, the same may be furnished against the last item of this (meter's) Annexure–I**.**

TS.1.13. Technical Deviations: Any deviation in Technical Specification as specified in the Specification shall be specifically and clearly indicated in a Deviation Format.

TS.1.14. Testing & Test Facilities At Manufacturer's Place:

TS.1.14.1. The manufacturer shall have to provide or arrange facilities for conducting all the tests specified in IS 16444 (Part 1) for pluggable type smart meters. The meter shall be subjected to tests for metrology, for load switching capability, for data exchange protocol and for smart meter communicability. The test for metrology shall include the "Type Tests, Routine Tests and Acceptance Tests" identified in IS 13779.

TS.1.14.2. The bidder shall indicate the details of the equipment/instrument/tools available at the manufacturer's premises for conducting the requisite tests as per relevant Standards. The bidder shall indicate the sources of all equipment/ instruments.

TS.1.14.3. The standard meters used for conducting tests, along with all other required equipment/instruments shall be calibrated periodically at any NABL Accredited Test Laboratory and test certificates shall be made available at manufacturer's works for verification of purchaser's representative.

TS.1.15. Sample Meter Testing at WBSEDCL's Testing Laboratory:

TS.1.15.1. Sample meter with all related accessories including communication module & load switch and software shall be tested at WBSEDCL's Testing Laboratory as part of technical evaluation of the NIT.

TS.1.15.2. The bidder will have to submit sample meters along with pilfer proof meter box and all the accessories including requisite software in sealed casing / carton along with relevant documents as per provision laid down in NIT.

TS.1.15.3. Requisite infrastructure needed for simulating the environment beyond the meter testing facilities, i.e, for testing of load switch functioning, local & remote bi-directional data exchange and communication capabilities are to be provided by the bidder during this testing.

TS.1.16. Inspection:

TS.1.16.1. The purchaser may carry out the inspection at the works of the meter manufacturer at any stage of manufacture. The manufacturer shall grant free access to the purchaser's representative at a reasonable time when the work is in progress. Inspection and acceptance of any meter manufactured as per this specification shall not relieve the supplier of his obligation of furnishing the meters in accordance with the specification and shall not prevent subsequent rejection if any meter is found to be defective.

TS.1.16.2. All acceptance tests and inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase.

TS.1.16.3. The Bidder shall provide all reasonable facilities without charge to the inspector, to satisfy him that the meter under reference is being furnished in accordance with this specification.

TS.1.16.4. The supplier shall keep the purchaser informed in advance, about the manufacturing programme for each lot so that arrangement can be made for inspection.

TS.1.16.5. The purchaser reserves the right to insist for witnessing the acceptance / routine testing of the bought out items. The supplier shall give at least 15 days' advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests.

TS.1.16.6. The purchaser reserves the right for type testing of any meter & meter casing etc. from any of the offered lots, received at any destination stores.

TS.1.17. Quality Assurance Plan: The design life of the meter shall be minimum 20 years and to prove the design life the firm shall have at least the following quality Assurance Plan:

(a) The factory shall be completely dust proof.
(b) The testing rooms shall be temperature and humidity controlled as per relevant standards.
(c) The testing and calibrating equipments shall be automatic and all test equipment shall have their valid calibration certificates from NABL accredited laboratory.
(d) Power supplies used in testing equipment shall be distortion free with sinusoidal wave- forms and maintaining constant voltage, current and frequency as per the relevant standards.

During the manufacturing of the meters the following checks shall be carried out:

i) Meter frame dimensions tolerances shall be minimum.

ii) The assembly of parts shall be done with the help of jigs and fixtures so that human errors are eliminated.

iii) The meters shall be batch tested on automatic, computerized test bench and the results shall be printed directly without any human errors.

The Bidder shall invariably furnish the following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of material offered.

- ✓ Statement giving list of important raw materials
- ✓ Names of sub-suppliers for the raw materials
- ✓ List of standards according to which the raw materials are tested
- ✓ List of tests normally carried out on raw materials
- ✓ Information and copies of test certificates in respect of bought out accessories
- ✓ List of manufacturing facilities available
- ✓ Level of automation achieved
- ✓ List of areas where manual processing exists
- ✓ List of areas in manufacturing process, where stage inspections are normally carried out of quality control and details of such tests and inspections
- ✓ List of testing equipment available with the bidder/manufacturer for final testing of equipment specified
- ✓ Test-plant limitations, if any, vis-à-vis type, special acceptance and routine tests specified in the relevant standards and this specification. These limitations shall be very clearly brought out in schedule of deviations.

The manufacturer laboratory must be well equipped for testing of the meters. They must have computerized standard power source and standard equipment calibrated not later than a year (or as per standard practice). The details of testing facilities available for conducting

a) The routine tests.
b) Acceptance tests shall be furnished with the bid.

TS.1.18. Guarantee: As per NIT

TS.1.19. Replacement Of Defective Meters: As per NIT.

ANNEXURE - I

GUARANTEED TECHNICAL PARTICULARS FOR SINGLE PHASE-2 WIRE SMART ELECTRONIC ENERGY METER OF ACCURACY CLASS 1.0

S. No.	Particulars	Remark by Bidder
1.	**Makers Name & Company**	
	a) Meter Serial No.	
	b) Manufacturer Name	
	c) Firmware Version for meter	
	d) Firmware Version for communication module	
	e) Year of manufacturer	
	f) Software for smart meter remote configuration	
	g) Web Based Software for Meter Data	
2.	**Model**	
3.	**Type of Meter**	
4.	**System voltage with variations**	
5.	**Standard to which the meter conforms**	
6.	**Current**	
	a) Basic current (i_b)	
	b) Minimum starting current	
	c) Current overloading capacity	
	d) Short time over current	
	e) Maximum current I_{max} continuously with accuracy	
7.	**Frequency with variations**	
8.	**Humidity**	
9.	**Temperature**	
10.	**Altitude**	
11.	**Class of index**	
12.	**Accuracy**	
	a) Current range	
	b) Voltage range	
	c) Frequency range	
	d) Temperature range	
	e) PF range	
13.	**Demand & integration Period**	
14.	**Specific Dynamic Range**	
15.	**Specified Working Range**	

S. No.	Particulars	Remark by Bidder
16.	**Pulse output**	
17.	**Register (Electronic)**	
18.	**Internal Meter Multiplying Factor**	
19.	**Terminal Connection**	
20.	**Meter earthing**	
21.	**Power loss in each current circuit at basic current in VA & watt**	
22.	**Power loss in each voltage circuit at reference in VA & watt**	
23.	**Display device**	
	a) Type of display i.e. LCD	
	b) Character size of display digits	
	c) No. of display digits for data	
	d) No. of display digits for parameter identification	
	e) Life of display unit (guaranteed)	
	f) Method adopted for display overflow	
	g) Indication of healthiness of potential & current	
	h) Provision of Latching Relay connection /disconnection status	
	i) Earth Load Indication (if condition occurred)	
	j) Meter cover open Tamper Event	
24.	**Maximum Demand**	
	a) Parameters available	
	b) Integration period	
25.	**Provision for MD reset**	
	a) Communication driven reset	
	b) Auto reset at 24:00 hrs at the end of each billing cycle	
	c) Type of MD computation	
26.	**Display parameters in auto scrolling mode**	
	LCD Test	
	Credit Balance in INR	
	Relay status	
	Meter Sr. No.	
	Date	
	Time	
	Cumulative kWh	
	Current month MD	
	Instantaneous Voltage	
	Instantaneous Current	
	Instantaneous Load KW	
	Tamper count	
27.	**Load Survey Parameters for last 60 days**	
	Real Time Clock – Date & Time	
	Current(I)	
	Voltage (V)	
	Block Energy – kWh-(Import)	

S. No.	Particulars	Remark by Bidder
	Block Energy –kVAh-(Lag)	
	Block Energy –kVAh-(Lead)	
	Block Energy –kVAh-(Import)	
	Block Energy – kWh-(Export)	
	Block Energy –kVAh-(Export)	
28.	**Programmable Parameters**	
	a) Real Time Clock - Date and Time	
	b) Demand Integration Period	
	c) Profile Capture Period	
	d) Single – action Schedule for Billing Dates	
	e) Activity Calendar for Time Zones etc.,	
	f) Time Zones script table	
29.	**MD integration**	
	a) Integration period of MD (Minutes)	
	b) Principle of operation	
30.	**Overall dimensions, weight & drawing**	
31.	**Reference standards**	
32.	**No. of digits displayed**	
33.	**Parameters read out by MRI / HHU**	
	a. Meter serial number, Model, Make	
	b. All parameters as specified in the bid document	
	c. Load Survey data.	
	d. Tamper events details of at least 200 records (in and out) with date and time **, (occurrence & restoration are considered separate event)**	
	e. Self-diagnostic details (Real time calendar, low battery)	
34.	**Communication interface available**	
	a) For calibration	
	b) For data transfer	
35.	**Non-volatile memory retention time in absence of power**	
36.	**Provision for connectivity (RS 232)**	
37.	**Max error due to variation in**	
	a) Voltage Variation - 15% to + 10%	
	b) Voltage Variation - 40% to + 20%	
	c) Current 2% to 600% of rated basic current	
	d) Frequency - +/- 5%	
	e) Temperature - + 70c	
	f) PF (0.0 lag -UPF-0.0 lead)	
38.	**Anti-Tamper Features**	
39.	**Power Supply back up**	
	a) For sorting recorded values	
	b) For taking reading	
	c) For downloading data	
40.	**Measuring principle employed for**	

S. No.	Particulars	Remark by Bidder
	a) KWH, KVAH	
	b) Maximum demand parameters	
	c) Power Factor	
41.	**Guarantee period offered for**	
42.	**Microprocessor**	
	a) Address in bits	
	b) Sampling rate	
43.	**Tamper and fraud proof provision for**	
	a) Meters	
	b) Software	
44.	**Sealing arrangement provided**	
	a) Meter body	
	b) Meter Terminal block	
	c) Communication Port	
45.	**Degree of protection against dust, moisture etc.,**	
46.	**Details of battery indication**	
	a) Guaranteed life of battery	
	b) Low battery indication	
	c) Internal battery	
47.	**Provision of real time clock**	
48.	**Self-diagnostic features**	
49.	**Facilities for conducting acceptance test and routine test in factory with additional acceptance & other acceptance tests.**	

ANNEXURE-II

Sl. No.	Tamper	Occurrence Threshold	Occurrence Time	Restoration Threshold	Restoration Time	Remarks	Mode
1	Reversal	Vx>60% of Vref and <115% of Vref Ix> 10% of Ib (direction is negative) P.F.>0.5	3 minutes	Vx>60% of Vref and <115% of Vref Ix> 10% of Ib (direction is positive) P.F.>0.5	3 minutes		Import
2	Single Wire/Neutral Missing	Ix> 20% of Ib (Maxiumum) Vx< 40% of Vref	3 minutes	Ix> 1% of Ib Vx> 50% of Vref	Immediate	Recording of energy must be started within 1 minute.	Import & Export

3	Neutral Disturbance	As per bidders' tamper logic.	3 minutes	As per bidders' tamper logic.	3 minutes	Recording of energy must be started within 1 minute.	Import & Export
4	Magnetic Tamper	As per bidders' tamper logic.	1 Minute	As per bidders' tamper logic.	1 Minute		Import & Export
5	Earth Tamper	Iph-In> 6% of Imax(maximum between phase and neutral current) Wattage>24 watt Vx> 60% of Vref And <115% of Vref P.F.>0.5	3 minutes	Iph-In< 6% Vx> 60% of Vref And <115% of Vref P.F.>0.5	3 minutes	Indication is Must. Logging may or may not be provided.	Import & Export
6	Cover Open	On Removal of Meter Cover the Meter will lock Cover Open Event with Date and Time Stamp, It must be reflected in Auto Display mode	Immediate	No restoration shall be allowed without due authorization	Immediate	Indication is Must and Logging should be provided	Import & Export

ANNEXURE-III

TECHNICAL SPECIFICATION FOR PILFER PROOF METER BOX SUITABLE FOR SINGLE PHASE STATIC SMART ENERGY METER

1. SCOPE:

This specification covers manufacture and supply of Pilfer Proof Meter Box (PPMB) suitable to house Single Phase Static Smart Energy Meter along detachable communication module and all other accessories.

The Meter Box shall be wall mounted type with ability to protect meter with its assembly against harsh weather. The box shall be anti-corrosive, dust proof, shock, vermin & water proof, pilfer proof, fire proof and UV stabilized. The enclosures shall not deform or melt when exposed to fire.

2. TECHNICAL REQUIREMENT:

The Meter Box i.e base and cover shall be made of hot press/injection moulded, unbreakable, high grade fire retardant Engineering Plastic (Acrylonitrile Butadiene Styrene)/Polycarbonate, with minimum thickness of 2.0 mm having good dielectric and mechanical strength. The material must be such that the Meter Box shall not change in colour, shape. size, dimensions when subjected to Ageing Test.

The Meter Box shall have top tapered surface and round corners to prevent any water logging on the top of meter cover. The overall dimensions of the enclosure shall be suitable for housing the single phase smart meter along with all its attachments/accessories as offered by the bidder and there shall be a clearance of 30 + 2 mm from top & both sides of the meter. Bottom side clearance shall be 75 + 5 mm from the lower edge of terminal block of the meter. Clearance from front side and back side of the meter shall be 15 + 2 mm and 10 + 2 mm respectively.

The Meter Box shall be capable of withstanding the mechanical, electrical and thermal stresses well as the effects of humidity which are likely to be encountered in service. At the same time the box shall ensure desired degree of safety. The material used shall be adequately stabilized against detrimental effect of light and weather. The surface appearance of the moulded parts must be smooth, non-porous and homogeneous, free of ripples, defects and marks. No fillers of fibres shall be visible at any place.

The box shall comply in all respect with the requirement of latest amendments of IS /ASTM. Applicable degree of protection shall be IP 42 or better.

All accessories like nuts, bolts, washers etc. shall be galvanized.

3. CONSTRUCTION:

3.1 The enclosure shall be single piece moulded with hot process compression moulding or injection moulding.

3.2 Dimension: To be specified by the bidder.

3.3 Hinge: A minimum of 2 nos. brass/stainless steel hinges in left side of the door and 1 no. brass/stainless steel hinge/stainless steel U type latch with locking arrangement in right side of the door shall be provided inside the enclosure. The hinges of the door shall be concealed and they shall be fixed to the flanges provided on the body and cover of the enclosure in such a manner that the door opens by a minimum of 120 degrees.

3.4 Suitable grove with locking arrangement shall be provided for opening of the enclosure door.

3.5 Fixing arrangement: The meter box shall have sufficient number of mounting brackets made out of same material as of meter box with provision for hole of suitable diameter for mounting the box on the wall or on wooden board with suitable screws.

3.6 Any other suitable arrangement for fixing the box may be accepted after verification.

3.7 Sealing arrangement: The Box shall have provision for sealing of the base with the cover to make it fully tamper proof.

3.8 Incoming and outgoing cable arrangement: Required number of holes at bottom with suitable diameter shall be provided in the box for cable/wire entry. The holes must be totally covered with neoprene rubber gasket (NRG). NRG will be punched for entry of incoming and outgoing cable/wire.

3.9 Base and Cover details: Thickness of the meter box shall not be less than 2.0 mm on all sides including door. The meter box shall have 4 mm thickness of the tongue and groove area. The meter box cover shall be made overlapping type having collars on all four (4) sides and shall be provided with Neoprene rubber gasket of minimum 2.5 mm dia to completely fit in the grooves of the base. The base of the meter box must have a groove to hold the gasket and the overlap of the top cover

with base shall be sufficient. The tongue of the base shall ensure proper sealing arrangement against ingress of rainwater and dust inside the box.
3.10 The Enclosures shall generally comply with the provision of IS 14772 or IEC 695. The enclosures shall be suitable for outdoor application. The enclosure shall be with good workmanship.
3.11 Soft neoprene/nitride rubber gaskets shall be provided all round wherever required for protection against entry of dust and water. The gasket shall conform to Type-III as per IS-11149. The enclosure shall comply with IP-42 or better degree of protection.
3.12 The Enclosures shall be of crystal clear (transparent) polycarbonate.
3.13 Marking/Embossing: The following information shall be clearly & indelibly embossed/laser printed on the cover and base of the Meter Box. No printed paper sticker will be accepted. The top & bottom corner of Meter Box Sl. No. shall be same for the particular Meter Box.

a) Property of WBSEDCL / For Use in WBSEDCL
b) Name/Brand name of Manufacturer
c) Meter Box Sl. No. (Embossed / laser printing on both the base and covers of Meter Box)
d) Sign of Danger

3.14 Submission of Sample: The bidder shall submit a sample Meter Box as per specification along with the sample meter as per provision laid down in NIT.
3.15 Type testing including material identification (IR Spectrometry test) of one meter box manufactured as per specification is to be conducted at any NABL accredited laboratory/CIPET by the supplier at their own cost after placement of order.
3.16 For type testing the meter box will be selected from the first offered lot of meter with meter box. If the type test results are not found satisfactory, the offered lot of meter along with meter box will be rejected.

4. Quality Control:

4.1 Type test reports from CIPET/NABL accredited laboratory as per Standard IS/ASTM shall be submitted. The type test reports shall not be more than 5 (five) years old. Acceptance tests as per IS/ASTM are to be carried out by the supplier in presence of WBSEDCL's representative.

4.2 Material of meter enclosure shall be tested for Heat Deflection Temperature, Exposure to Flame (Self-extinguishing) and Resistance to Heat & Fire (Glow wire) as per specification and Ref. Standard IS/ASTM.

5. General Construction Requirement:

5.1 Viewing Window: A viewing window as per drawing made up of scratch and break resistant, UV resistant, transparent Polycarbonate material shall be provided on the door for reading the meter without inconvenience. The minimum thickness of the viewing window shall be 2.0 mm (flashing with top). The viewing window shall be provided with fixed rain hood. The window shall be securely fixed with meter enclosure from inside. Suitable neoprene gasket shall be provided so that there shall not be any ingress of moisture through this window into the enclosure.
No viewing window is required for transparent polycarbonate meter box.
5.2 Construction of louver: No louver is required for transparent polycarbonate meter box.
5.3 One push button is to be provided on the front side of the top cover of meter box for taking meter reading during power off condition without opening of meter box cover.

5.4 The box shall be designed in such a way that NIC card shall be kept protected in side the box while shall not hinder data communication.
5.5 Provision for fitting of external antenna shall also be considered during preparation of design of the box.

6. **Guarantee:** As per NIT

7. **Replacement of defective Meter Box:** As per NIT

8. **Testing:**

8.1 Type Test: The bidder must furnish type test report including material verification of the offered/sample meter box from any NABL/Govt. approved laboratory as available with them along with technical bid without which the offer will not be considered. Type test report should not be more than 5 (five) years old.
8.2 Type testing at any recognized NABL accredited laboratory/CIPET in respect of one meter box as per the specified size, selected from any one of the offered lot during supply is to be conducted by the supplier at their own cost after placement of order for verification of material and quality of the box. If the type test results are not found satisfactory, the offered lot of meter along with the meter box will be rejected.
8.3 Acceptance Test: The acceptance test as stipulated in Annexure-VI shall be carried out at the time of inspection of the offered material.
Notes: 1) Where facilities do not exist at supplier's works for carrying out one or more of the Acceptance Tests as per Annexure-VI, such tests may be carried out at any of the approved laboratories such as CIPET/IIT/National Test House/Govt. approved laboratory etc. in presence of WBSEDCL's representative.
8.4 The sampling plan for carrying out the acceptance tests shall be as per IS.

9. **Submission of Drawing:** Three (3) copies of drawing complete in all respect shall have to be submitted to the Ordering Authority.

10. **Inspection:** The inspection will be carried out as per inspection & testing clause of General Conditions of Contract (GCC).

11. Guaranteed Technical Particulars: The bidder shall furnish all the necessary information as per Annexure-VII - Guaranteed Technical Particulars. If the bidder desire to furnish any other information in addition to the details as asked for, the same may be furnished.

ANNEXURE-IV

LIST OF TESTS TO BE CARRIED OUT ON SINGLE PHASE METER BOX

Sl. No.	Name of Indian standard/equivalent international standard	Test requirement	Test particulars		
			Type test	Routine Test	Acceptance Test
1.	IS : 14772	Marking	T		A
2.	As per Drawing	Dimensions	T	R	A
3.	IS / ASTM	Protection against electric shock	T	R	A
4.	IS / ASTM	Construction	T	R	A
5.	IS / ASTM	Resistance to ageing, to humid conditions, to ingress of solid object and to harmful ingress of water	T		
6.	IS / ASTM	Mechanical strength	T		
7.	IS / ASTM	Resistance to heat	T		
8.	IS / ASTM	Resistance to rusting	T		
9.	IS / ASTM	Resistance to tracking	T		
10.	IS / ASTM	Test for resistance to heat & fire (Glow wire test at 6500 C)	T		
11.	IS / ASTM	Heat deflection temp. @1.8 MPa-1000 C (Minm. for Engg. Plastic)/1400 C (Minim. For Polycarbonate	T	R	
12.	IS / ASTM	Self Extinguishing property of spirit burner test.	T	R	A
13.	IS / ASTM	Melting point-1800 C (Minimum for Engg. Plastic)/2100 C (Minimum for Polycarbonate)	T		
14.	IS / ASTM	Verification of di-electric properties, insulation test with 500V DC megger	T		
15.	CIPET/IR Spectrometry	Material identification	T		
16.	IS / ASTM	Physical water absorption (Max. 0.35%)	T		

Note : Applicable degree of protection shall be IP42 or better. Legend : T- Type Test, R- Routine Test, A- Acceptance Test

ANNEXURE-V
GUARANTEED TECHNICAL PARTICULARS OF PILFER PROOF METER BOX FOR SINGLE PHASE SMART METER

Sl. No.	Description		Detailed requirement	Offered by the bidder
1.	Material used for moulded meter box		Engineering Plastic (Acrylonitrile Butadiene Styrene)/Polycarbonate	
2.	Grade of Material		Fire Retardant, Self Extinguishing	
3.	Properties of material for meter box			
(a)	Heat Deflection Temperature (Min. 1400 C @ 1.8 MPa) (Ref. Std. IS/ASTM)		1000 C (Minimum for Engg. Plastic) / 1400 C (Minimum for Polycarbonate)	
(b)	Exposure to flame (Ref. Std..IS/ASTM)		Self-extinguishing	
(c)	Melting Point (Ref. Std. IS/ASTM)		1800 C (Minimum for Engg. Plastic) / 2100 C (Minimum for Polycarbonate)	
(d)	Resistance to heat & fire		Glow wire test at 6500 C	
(e)	Mechanical Property			
i)	Tensile Strength (MPa)		To be specified by the bidder	
ii)	Flexural Strength (MPa)		- Do -	
iii)	Modulus of Elasticity (MPa)		- Do -	
4.	Constructional features of the box			
(a)	Clear inside dimensions of Meter Box		Refer Drawing	
	i)	Height	To be specified by the bidder	
	ii)	Width	- Do -	
	iii)	Depth	- Do -	
	iv)	Rust & Vermin proofing	Neoprene Rubber Gasket NRG	
(b)	Minimum clearance from meter on all 4 sides		Clearance from all sides of the meter should be 30+2 mm except the bottom side which should be 75+5 mm from the lower edge of terminal block.	
(c)	Minimum clearance from meter on front		15+2 mm	
(d)	Minimum clearance from back of meter		10 + 2 mm	
(e)	Viewing Window :			
	i)	Material of transparent cover	Glass/Polycarbonate with Rubber Gasket	
	ii)	Size of opening (Min.)	90mm x 75 mm	

	iii)	Thickness of moulded sheet	2.0 mm (Minimum)	
	iv)	Fixing method	Fixed from inside with rubber gasket	
(f)	Earthing arrangement		May or may not be required.	
(g)	Sealing Arrangement		Holes for wire seal (One No.)	
(h)	Colour of Meter Box (base & cover)		Crystal clear	
(i)	Box mounting arrangement			
	i)	No. of holes for fixing of meter box	4 Nos. Holes	
	ii)	Dimension of holes	6 mm	
	iii)	Dimension of box fixing screw	4X25 mm self threaded	
	iv)	Total no. of fixing screws to be provided	4 nos.	
(j)	Hinges		Concealed hinges	
(k)	Incoming & outgoing cable holes		2 Nos. 12 mm. dia. Holes at bottom totally covered with Neoprene Rubber Gasket (NRG)	
(m)	Whether the cover is overlapping type having collars on all four sides		Yes	
(n)	Whether the cover/base provided with semicircular/circular neoprene rubber gasket of 2.5 mm dia (Minm.) to completely fit in the grove of the base		Yes	
(o)	Whether the meter box having push button to access to the meter for taking reading during power off condition without opening of meter box cover		To be provided	
(p)	Weight of complete box in Kg with +/- tolerance		To be specified by the bidder	
5.	Type test report as per Technical Specification		To be submitted by the bidder	
6.	Degree of protection		IP 42 or better	
7.	Any other information			

TS.2. Technical Specification of 3 Phase 4 wire Whole Current Smart Meters and Meter Box

TS.2.1. Scope: This specification covers the following for Three Phase Four Wire, 10-60A and 20-100A, Static Watt hour smart meters of accuracy class 1.0 with modular pluggable communication modules and integrated load control switches along with Meter Box suitable to house three-phase smart meter.

TS.2.1.1. Design, manufacture, testing at manufacturer works before dispatch, packing, delivery and submission of all documentation.

TS.2.1.2. The meter shall have bidirectional communication capability through any of the communication technologies defined in IS 16444 and shall communicate with DCU/Gateway Access Point/ HES as per the requirement of the utility.

TS.2.1.3. Smart meter with provision of TOD (Time of Day) tariff, also capable of recording and displaying energy (kWh & kVAh) and demand (kW & kVA) for three phase four wire A.C. loads.

TS.2.1.4. Meter shall support on demand read, remote firmware upgrading, different types of event detection.

TS.2.1.5. The meter shall have different import and export registers so that it can be used as net meter also with renewable generation resources.

TS.2.1.6. The meter shall have capability to function in both post-paid and pre-paid mode and any mode can be enabled remotely .

TS.2.1.7. All accessories / hardware required for installation, commissioning and operation for the meter shall have to be provided.

TS.2.1.8. It is mandatory that in case of all manufacturers, the offered meter shall be ISI marked and bidder shall have to furnish valid BIS certification along with the offer.

TS.2.2. Applicable Codes & standards: The meters covered in this specification shall conform to the latest editions and amendments of the following Indian/CEA/IEC standards and shall conform to the regulations of local statutory authorities, unless specified separately elsewhere in this specification.

Sl. No.	Standard	Description
18.	Indian Electricity Act	IE Act 2003
19.	CEA Metering Regulations: 2006	Installation and operation of meters with latest amendments.

20.	CBIP Report No.325 read with latest amendments	Standardization of AC Static Electrical Energy Meters
21.	RERC Regulation	On installation and operation of meters dated 29.05.2007.
22.	IS 16444 (Part 1) with latest amendments	AC Static Watt hour Smart Meters, Direct Connected Class 1 and 2
23.	IS- 13779: 1999	AC Static Watt-hour Meters, Class 1 and 2 – Specification
24.	IS:15884: 2010	Alternating current direct connected static prepayment meters for active energy (Class 1 and 2) - Specification
25.	IS-11448:	Application guide for AC Electricity meters
26.	IS 15959 Part 1 & Part 2 with latest amendments	Data Exchange for Electricity Meter Reading, Tariff and Load Control-Companion Standards
27.	IS15707:2006	Testing Evaluation Installation and Maintenance of AC Electricity Meters.
28.	IS : 9000	Basic Environmental testing Procedures for Electronic & Electrical items.
29.	IS:12346(1988)	Specification for testing equipment for AC Electrical Energy meter
30.	IEEE 1901-2010	Standard for Broadband Over Power Line Networks: Medium Access Control and Physical Layer Specifications.
31.	IEEE 1901.2-2013	Standard for Low-Frequency Narrow band power Line Communications for Smart Grid Applications
32.	IEC 62052–11	Electricity metering equipment (AC) – General requirements & test conditions Part II metering equipment
33.	IEC 62053-21	Electricity Metering equipment (AC)- particular Requirements – Part – 21 Static meters for active Energy (class 1 & 2)
34.	IEC- 61053-52	Electricity metering equipment (AC) - Particular requirements: Symbols
35.	IEC 62053-61	Electricity metering equipment (A.C.) - Particular requirements: Power consumption and voltage requirements
36.	IEC 62056-21	Electricity metering - Data exchange for meter reading, tariff and load control: Direct local data exchange.
37.	IEC 62056-5-3	Electricity metering data exchange- The DLMS/COSEM Suit: DLMS/ COSEM application layer.
38.	IEC 60068	Environmental Testing

In case of any conflict or discrepancy the order of precedence shall be as follows:

shall be

a. IS
b. IEC

c. CBIP technical report-325 (with latest amendments, if any).

In case of any difference between the provisions of these standards and the provisions of this specification, the provisions contained in this specification shall prevail.

NOTE: All requisite tests shall be carried out on the meter which are required to check its conformance to the above-mentioned standards.

TS.2.3. Climatic conditions for installation: The meters to be supplied against this specification shall be capable of performing and maintaining required accuracy under extreme hot, cold, tropical and dusty climate and solar radiation typically existing in state of West Bengal (India). The meter shall be required to operate satisfactorily and continuously under the following tropical climatic conditions.

S. No.	Parameter	Value
12.	Maximum ambient air temperature	55°C
13.	Maximum ambient air temperature in shade	45°C
14.	Maximum temperature attainable by the meter	60°C (when exposed to sun.)
15.	Minimum ambient temperature	-10°C
16.	Average daily ambient air temperature	40°C
17.	Maximum relative humidity	95 %
18.	Minimum Relative Humidity	10 %
19.	Number of months of tropical monsoon condition	5 months
20.	Maximum altitude above mean sea level	3000 meters
21.	Average annual rainfall	100 mm to 1500 mm
22.	Maximum wind pressure	200 kg/sq. m
23.	Permitted noise level	45 db

Note: The weather of West Bengal is semi-arid type. Temperatures remain comparatively on the higher end all around the year. Heavy lightning also occurs during the month of June to September.

TS.2.4. Supply/Installation System Data:

S. No.	Parameter	Value
1.	Type of Installation	Outdoor
2.	System	AC, 3 Phase - 4 Wire
3.	Rated Frequency	50 Hz +5%
4.	System Neutral	Solidly Earthed

TS.2.5. General Technical Requirement:

S.	Parameter	Requirement

No.		
1.	Meter Type	3 Phase, 4 Wire Static Whole Current Watt Hour Smart Meter, comprising of measuring elements, display, memory, load switch with pluggable bi-directional communication module all to be housed in pilfer proof meter box.
2.	Connection	Direct (Whole Current)
3.	Reference and Operating Voltage	Reference Voltage (V_{ref}) : 240 V (Ph-N) Operating Voltage: Meter shall be operational with required accuracy from 60%V_{ref} to 120%V_{ref}.. However, meter shall be capable to withstand the maximum system voltage of 433 V (Ph-Ph) for a period of atleast 1 hour
4.	Rated Current	Base Current (I_b) : 10 /20 A Maximum Current (I_{max}) : 60 /100 A
5.	Starting current & Running at no load	Starting Current: The meter shall start registering energy at 0.2 % of basic current at unity power factor and first pulse must be appeared within 10 minutes (i.e. time between two consecutive pulses). Running at no load: When 60%Vref and 120%Vref are applied and no current flows in the current circuit, the test output of the meter must not produce more than one pulse.
6.	Operating Frequency	50Hz ± 5%
7.	Reference Conditions for testing the performance of the meter	V_{ref} : 240 V ± 1 % Frequency: 50hz ± 0.3% Temperature: $27^{O}C \pm 2^{O}C$
8.	Accuracy Class	1.0 (shall comply accuracy requirements under IS 13779)
9.	Meter constant	Imp/ unit (Bidder to specify)
10.	Power Factor Range	Zero lag to Unity to Zero lead
11.	Meter category	Meter shall comply with D2 category of IS 15959 (Part 2)
12.	Power Consumption	Power consumption of the smart meter with integrated communication modules and load control switch shall be as per IS 16444 (Part 1)
	in voltage circuit	Meter shall comply with clause 6.10.1.1 of IS:16444 (Part 1)
	in current circuit	Meter shall comply with clause 6.10.1.2 of IS:16444 (Part 1)
13.	Mechanical requirements	As per clause 6.5 of IS 16444(Part 1)
14.	Calibration	Meter shall be calibrated through software at factory and modification in calibration shall not be possible at site by any means or external influence. However, configuration of parameters allowed for field reconfiguration shall be possible through wired or Over the Air (OTA) communication.
15.	Insulation and	Meter shall comply with IS 16444 (Part 1)

	Impulse test	
16.	Minimum Insulation resistance	Minimum Insulation resistance at test voltage 500 ± 50V dc c) Between frame & current, voltage circuits as well as auxiliary circuits connected together: 5 MΩ d) Between each current (or voltage) circuit & each and every other circuit.: 50 MΩ
17.	Influence of supply voltage	Meter shall comply with clause 4.4.2 of IS 15884
18.	Short time over current	Meter shall comply with clause 4.4.3 of IS 15884
19.	Immunity to phase and earth fault	Meter shall comply with clause 9.6 of IS 13779
20.	Influence of Self Heating	Meter shall comply with clause 4.4.4 of IS 15884
21.	Influence of heating	Meter shall comply with clause 4.4.5 of IS 15884
22.	Environmental Condition	Meter shall be suitable for environmental conditions as mentioned below
23.	Temperature Range	Operation range: $-10^{O}C$ to $60^{O}C$
24.	Relative Humidity	0 to 96%
25.	Resistance against heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per IS 13779.
26.	Resistance against Climatic influence.	Meter shall comply with clause 12.6 of IS 13779.
27.	kVAh Calculation	Meter shall be programmed for "Lag only configuration" i.e. lead to be treated as unity PF for kVAh calculation.
28.	Initial start-up of meter	Meter shall be fully functional within 5 seconds after reference voltage is applied to its terminals.
29.	Display	Backlit LCD, minimum 6+1 digits.
30.	Communication Capability	Meter shall have the ability to communicate with Head End System (HES) with any one of the communication technologies mentioned in IS 16444 (Part 1) , i.e, (RF/PLC/ Cellular) in a secure manner. The selection of communication technology shall be as per the site conditions and as per design requirement to meet the performance as per agreed Service Level Agreements (SLAs). In case of Plug-in type communication module, the meter shall log communication module removal /non responsive event with snapshot
31.	Software	The bidder shall supply software for wired (CMRI/HHU/Mobile app and Laptop/PC) and remote (preferably web based; for AMI) connectivity. The bidder shall also provide required training on usage of software free of cost.
32.	Communication	Shall have to comply with clause 9.3 of IS 16444 (Part 1)

	Layer Protocol	
33.	Alternative data retrieval	In case of meter damage, data stored in meter memory (NVM) shall be retrieved using a jig. Bidder need to provide such jigs free of cost (1 jig on each 10,000 meters). Jig shall be designed such that NVM can be plugged easily on it for data retrieval..
34.	Testing as part of Technical Evaluation	Sample meter with all accessories including communication module & load switch and software shall be tested at WBSEDCL's Testing Laboratory as part of technical evaluation of the offered smart meter. Requisite infrastructure needed for simulating the environment beyond the meter testing facilities, i.e, for load switching capabilities, data exchange and communication capabilities are to be provided by the bidder during this testing.
35.	Test and Test Conditions	Test and Test Conditions shall be guided by clause 10 of IS 16444(Part 1). Note: i. The smart meters shall be subjected to specified test for meteorology, for load switching capability, for data exchange and for smart meter communicability. ii. The tests shall include Type Tests, Routine Tests and Acceptance Tests.
36.	Data Retention	AS per CEA Regulations.

TS.2.6. Constructional Requirement:

Sl. no	Parameter	Requirement
1.	**General**	a) The meter shall be compact in design. The entire construction 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. b) All insulating material used in the construction of meters shall be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion during operating life by providing suitable protective coating. c) Meters shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following shall have to be ensured: i. Personal safety against electric shock ii. Personal safety against effects of excessive temperature iii. Protection against spread of fire

		a) Protection against penetration of solid objects, dust & water
2.	**Meter Body**	a) The meter shall be housed in a safe, high grade, unbreakable, fire resistant, UV stabilized insulating material of good dielectric and mechanical strength, The casing shall be of projection mounting type made up of virgin polycarbonate material. b) The meter cover shall be transparent with viewing window for easy reading of displayed parameters and observation of operation indicators. c) The meter base may not be transparent, but it shall not be black in colour. d) The meter casing shall not change in shape, colour, size, and dimensions when subjected to UV test as per ASTMD 53 for 200 hrs. e) It shall withstand 650 ℃ glow wire test and heat deflection test as per ISO 75. f) For testing of changing colour72 hrs on UV test is applicable. g) Meter body shall be sealed in such a way that opening of meter base and cover is not possible without breaking the seals. h) Thickness of meter body (Base and Terminal cover) shall be 2mm minimum
3.	Other Constructional Features	a) The meter shall be supplied with a transparent extended terminal block cover (ETBC). b) The terminal block shall be made of high grade non-hygroscopic, fire retardant, fire resistant material having good dielectric and mechanical strength with brass inserts for connecting terminals. c) The bidder shall submit relevant documents regarding the procurement of polycarbonate material. The polycarbonate material of only the following manufacturers shall be used: vii. G.E. Plastics/SABIC LEXAN 943A, or equivalent like 123R for Top cover & Terminal cover/ LEXAN 503R or equivalent like 143R for base & Terminal Block. viii. BAYER Grade corresponding to above ix. DOW Chemicals- - DO – x. MITSUBISHI- - DO – xi. TEJIN- - DO – xii. DUPONT- - DO –

		d) The ETBC shall not be easily detachable from the base and be secured to the base using a hinge or with any other suitable arrangement without hinge. e) ETBC shall be closed at the bottom to prevent access for wires to terminal holes. f) The terminal cover shall have provision for cable entry from the bottom. g) The terminal cover shall have sufficient space for incoming and outgoing cable such that these can pass without stressing and damaging the terminal cover. h) Diagram of external connections shall be embossed clearly on inside portion of terminal cover. i) Meter terminals shall be marked and this shall appear in the diagram. j) Clearances shall be as per IS 16444 (Part 1). k) All electrically live screws shall be of tinned or nickel plated brass material. l) All the fixing holes shall be such designed that once the meter is mounted, the screw heads shall not be accessible. m) The meter should be fitted with SHUNT for measuring current in the phase element. The Neutral element may have either C.T. or SHUNT or HALL EFFECT SENSOR with proper isolation. The shunts, used in current circuit must be of high quality having high thermal stability and temperature co-efficient. The shunts shall be E-Beam / Spot welded. In case of Hall Effect Sensor, meter shall record as per requirement of technical specification in normal and tamper conditions. n) Top cover and base shall be fixed in such a manner that it shall be break to open type, i.e, ultrasonically or chemically welded. In case any attempt is made to separate the meter cover from the base by using any tools / implements / device, there shall have to be visible evidence of tampering or attempt to open. o) Meter shall have a permanent indication in its display as well as logging of tamper in case of removal of top cover, even in power off condition and it shall not disappear even if cover is re-fitted. It shall have to be treated as a non roll over event.
4.	**Fixing Arrangement**	a. The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there shall be no risk of loosening or undue heating. b. Meter shall have 2 (two) screws in each terminal for effective

		clamping of cables. c. The screws shall not have pointed ends at the end of the thread. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life of the meter should be such that the risk of corrosion resulting from contact with any other metal part is minimized. d. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material. e. All terminals and connecting screws and washers should preferably be of tinned / nickel plated brass material. f. The terminals and all connecting screws shall be capable of withstanding a current of 150% of Imax atleast for two hours, continuously. g. The meter shall be capable of providing phase to neutral protection up to 433 V for 1(one) hour.
5.	**Sealing Arrangement**	a) The sealing screws used for the meter cover shall be fixed upside down so that these are tightened from the rear and for screw less design also for fixing the base and cover provision for sealing must be there. b) A run through screw (stud) has to be provided from bottom side & sealing is to be done on the top side of the meter. c) Two independent sealing screws are to be provided at each sides of the meter casing. d) The sealing screws shall be Tinned Brass or Nickel Plated Steel/Brass. In addition to the sealing screws provided to the meter cover, the sealing screws of the terminal cover shall also be Tinned Brass or Nickel plated steel. e) Meters must be supplied with two no. of manufactures' seals fixed between meter base and cover at both sides. If lock /click fit integrated seals are used in sample meters, acceptability of said seal will be decided after through checking.
6.	**Ingress Protection**	IP 51 or better Meter shall comply requirement of clause 6.9 and 12.5 of IS 13779
7.	**Output device**	a) Meter shall have flashing LED visible from the front to represent energy (active and reactive) recording. Resolution shall be such that satisfactory accuracy test can be conducted at the lowest load in less than 5 minutes and starting current test in less than 10 minutes. b) Meter shall have provision on LCD for indicating communication status. c) Meter shall have indicator on LCD for displaying the status of load

		switch.
8.	**Real Time Clock (RTC)**	a) The meter shall have internal real time crystal clock to set date and time. b) The Real Time Clock (RTC) shall have long life, at least 10 years. c) RTC shall have separate battery backup. d) Meter shall have capability of time synchronization through optical port/ remote communication with proper authentication.
9.	**Battery**	Meter shall have Lithium / Lithium ion battery with guaranteed shelf life of 10 years and capacity life of 15 years. In case of battery removal or total discharge same shall not affect the working & memory of the meter even in case of single wire power condition.
10.	**Memory**	Non-volatile memory (NVM) independent of battery backup, shall retain data up to 10 years without any auxiliary power.
11.	**Meter reading in Power Off condition**	It shall be possible to read the meter during power off condition. It shall also be possible to read the meter through NIC or with CMRI / Laptop in this condition. If battery is used for the same, it shall have to be a separate battery and not the one used for RTC, i.e., the RTC battery and the battery used for display during power off condition shall not be the same.
12.	**Self-Diagnostic feature**	The meter shall be capable of performing complete self diagnostic check to monitor integrity of data in memory location all the time. The meter shall have indication for unsatisfactory / non-functioning / malfunctioning of the following: a) RTC b) All display segments c) Battery d) Non-volatile Memory (NVM) e) Synchronization of time of meter & HES clock from MDAS instantly for less than 3 minutes and through HES for more than 3 minutes with alarm at HES.
13.	**Load Control Switch** Three numbers load switches (01 in each phase).	Smart meter shall be equipped with integrated load control switches to control flow of electricity to the load with connect/disconnect commands as per functional need of the system. Load switch shall be in compliance to IS 15884 and IS 16444. Meter shall be remotely settable to support double pole relay for connection/disconnection.

<table>
<tr><td></td><td></td><td>There shall have three number of load switches, i.e, one for each phase.

The phase and neutral relay shall connect/disconnect on the following conditions:
a) Over current
b) Load control limit
c) Pre-programmed Tamper conditions (like, Meter Cover Open detection, Neutral Disturbance, Magnetic Interference etc.).
d) Disconnect signal from Utility Control Centre such as balance unavailable in case pre-paid facility is availed by consumer
Load Control limits shall be remotely programmable.
The reconnection mechanism shall also be remotely programmable.

The brief technical particulars of this load switch are furnished below:
<table>
<tr><td>Sl No.</td><td>DESCRIPTION</td><td>Requirement</td></tr>
<tr><td>1</td><td>Operating Voltage range</td><td>Vref (-40% to +20%) (Ph-N)</td></tr>
<tr><td>2</td><td>Operating Current range</td><td>IS 16444</td></tr>
<tr><td>3</td><td>Maximum switching power</td><td>22 kVA per phase/ per IS 15884 Annex G</td></tr>
<tr><td>4</td><td>No. of poles</td><td>Double pole in a single relay</td></tr>
<tr><td>5</td><td>Operation of switches</td><td>Simultaneous</td></tr>
<tr><td>6</td><td>Utilization Categories</td><td>UC3</td></tr>
<tr><td>7</td><td>Min. number of operation</td><td>3001 (close, open each)</td></tr>
</table>
</td></tr>
<tr><td>14.</td><td>Performance requirement for load switching</td><td>Utilization category of the load switch shall comply with IS 15884.</td></tr>
<tr><td>15.</td><td>Communication module of meter for AMI</td><td>a) Smart meter shall have provision for plugging-in communication module (NIC card) as per clause 1.2(b) of IS 16444(Part 1).
b) Meter shall have provision for supporting both the variants of communication module.
c) The module shall be able to connect to NAN or WAN (as per the plugged RF or Cellular module) for two-way communication and any of these two will be used at a time.
d) Meter shall log communication module removal as an event.</td></tr>
<tr><td>16.</td><td>Meter Sealing Arrangement</td><td>a) Reliable sealing arrangement shall be provided to make the meter tamper evident and to avoid fiddling or tampering by unauthorized</td></tr>
</table>

		persons. b) Sealing should be in accordance with IS and CEA metering regulations with latest amendments. c) Approval shall be taken from purchaser for location of seals. d) Adequate sealing provision shall be provided in case of exposed optical port. e) In case of plug in communication module, sealing arrangement shall be provided for the same also.
17.	**Manufacturer's / WBSEDCL Seals**	a) All meters shall be sealed by the manufacturer at its works with 2 (two) no. of polycarbonate seals with manufacturer's logo and sequential numbers.
18.	**Name Plate and marking**	Meter shall have clearly visible, indelible and distinctly marked name plate in accordance with clause 11 of IS 16444 (Part 1).
19.	**Connection Diagram**	The connection diagram of the meter shall be clearly shown on terminal cover.

TS.2.7. Functional Requirement:

S.No.	Parameter	Requirement

S.No.	Parameter	Requirement
1.	Meter category	D2 as per IS 15959 (Part 2).
2.	Data Security	Advanced Security outlined in clause 7.1.2 of IS 15959 (Part 1)
3.	Encryption for data communication	As per clause 7.1 of IS 15959 (Part 2)
4.	Encryption/ Authentication for data transport	As per clause 7.2 of IS 15959 (Part 2)
5.	Key requirement and handling	As per clause 7.3 of IS 15959 (Part 2)
6.	IP communication profile support	As per clause 8 of IS 15959 (Part 2). Note: Meter shall support TCP-UDP/ IP communication profile for smart meter to HES.
7.	Self- Registration	Last mile mesh network must support auto-registration and self-healing. Meter once powered up should be self-detected and its basic name plate details should be transferred to HES.
8.	List of Parameters for Category D2	As per Clause 17 of IS 15959 (Part 2)
9.	Instantaneous Data	As listed in Table A14 of IS 15959 (Part 2).
10.	Billing Profile Data	Billing profile parameters are as listed in Table A17 of IS 15959 (Part 2) Notes: d) At the end of each billing cycle, meter shall generate and store in memory parameters as per provisions provided in clause no. 14 of IS 15959 (Part 2). e) Support for selective access shall be provided for billing parameters as per clause no 11.3 of IS 15959 (part 1). f) The current cycle billing parameters shall be readable as the values of the latest billing period, on demand. This shall be in addition to the last 6 billing period data which shall be available in the profile buffer as the last 6 entries in the buffer.
11.	MD reset	24:00 Hrs. of last day of each month.
12.	Billing period counter	Cumulative billing period counter since installation and available billing periods shall be provided as per clause 11.2 of IS 15959 (Part 1).
13.	Selective access of billing data	By entry.
14.	Billing period reset mechanism	As per IS 15959 (Part 1)
15.	MD Registration	Block window with 30 min integration period as per requirement. Block window with 15 min (programmable) integration period as per requirement.
16.	Load Data survey/ Interval Data	As per IS15959 (Part 2) Load Survey data shall be measured and recorded at the end of each interval

S.No.	Parameter	Requirement
		for last 60 days.

S.No.	Parameter	Requirement
17.	Daily Load Profile	As detailed in Table A16 of IS 15959 (Part 2) The parameters listed in this table shall be logged at midnight (00:00 hrs) every day and data shall be preserved for last 60 days.
18.	Name Plate Details	As detailed in Table A26 of IS 15959 (Part 2)
19.	Programmable parameters	As detailed in Table A27 of IS 15959 (Part 2) Note: The parameters can be programmed remotely by HES and locally by authorized devices (CMRI, laptop) through serial communication port via proper access rights. Every transaction shall be logged in non-volatile memory of the meter with date and time stamp.
20.	TOD metering	As per clause 9 of IS 15959 (Part 1) The meter shall have facilities to record active energy, apparent energy and MD in at least 8 time zones. The time zones shall be user programmable remotely through HES and locally by authenticated MRI/Laptop/RMR command. Necessary software for the same is to be provided by the bidder. At present TOD timings will be programmable as follows: TOD 1: 06:00 Hrs. to 17:00 Hrs. TOD 2: 17:00 Hrs. to 23:00 Hrs. TOD 3: 23:00 Hrs. to 06:00 Hrs.
21.	Push Services	As per clause no. 6 of IS 15959 (Part 2) Note: There shall be a provision for the smart meter to automatically notify data, events, and messages to a destination client system in an unsolicited manner (without a request from a client).
22.	Periodic push (SM to HES)	As per clause no. 6.1.1 of IS 15959 (Part 2) Note: d. In this service the selected objects list is to be notified periodically by the smart meter to HES. e. Meter shall be able to push the following objects including some instantaneous parameters to HES at predefined intervals: xiii. Device ID xiv. Push setup ID xv. Real Time clock- Date and time xvi. Phase wise Voltage xvii. Phase wise Current xviii. Current Neutral xix. Signed phase wise Power Factor xx. Signed Power Factor Net xxi. Apparent power KVA

S.No.	Parameter	Requirement
		xxii. Active power Kw xxiii. Cumulative Active Energy, kWh (Import) xxiv. Cumulative Apparent Energy kVAh (Import) xxv. Cumulative Active Energy kWh (Export) xxvi. Cumulative Apparent Energy kVAh (Export) a) Other attributes as per IS 15959 (Part2) i.e. Send Destination, Communication Window, Randomization Time Interval, number of retries and repeat delay shall be decided in the event of manufacturing.

S.No.	Parameter	Requirement
23.	Event push (SM to HES)	As per clause no. 6.1.5 of IS 15959 (Part 2) Note: In this service the smart meter is to report to HES status change of any of the identified events.
24.	Firmware upgrade	As per clause 9 of IS 15959 (Part 2) Note: iv. Smart meter shall support remote firmware upgrade feature v. Firmware upgrade shall be limited to the communication firmware only. vi. Firmware upgrade shall use the Image transfer classes and mechanisms specified in IEC62056-6-2 and IEC62056-5-3.
25.	Disconnection mechanism	As per clause 11.1 of IS 16444 (Part 1) Note: v. List of events for disconnection to be pre-programmed shall be provided by utility. vi. Load Control limits shall be programmable locally and remotely. vii. Meter shall use the disconnection control object as defined in clause 10 of IS 15959 (Part 2). viii. Relay for connect/disconnect shall comply all relevant requirements of IS 15884 **Disconnection Logic must be programmable at the time of installation
26.	Reconnection mechanism	As per Clause 11.2 of IS 16444 (Part 1) Note: iii. Reconnection shall be done from HES except for over current and load control limit. In case of failure of communication / HES, reconnection shall be possible through Handheld Device (CMRI/mobile app) locally via proper security. iv. Reconnection in case of prepayment meter shall be as per prepayment profile and balance/credit availability in the meter. **Re-connection Logic must be programmable at the time of installation
27.	Load switch event logging	As per clause 11.5 of IS 16444 (Part 1) Note: Meter shall log with date time and other relevant parameters, all connections and disconnections as events.
28.	Status of load switch	As per clause 11.4 of IS 16444 (Part 1)

S.No.	Parameter	Requirement
		Note: Indication of status of load switch (i.e, connected/ disconnected) shall be available on display as well as at HES. Connection and disconnection should be logged as events.
29.	First breath and last gasp	As per clause 11.7 of IS 16444 (Part 1) Smart Meter shall detect "First breath"(power on) and "Last gasp"(power off) condition and communicate to HES.
30.	On demand readings	On request from HES
31.	Schedule for meter readings	Programmable through HES

TS.2.8. Anti-tamper and Fraud Detection Requirement: The meter shall offer a link less design i.e. there shall be no isolation link provided between the current and voltage circuits and hence there would not be any possibility of tampering with the same. Tamper/ Event recoding shall follow IS 15959 (Part-2) and would log the event and send alarm at Head End System. The meter shall be capable of recording the following tamper events in memory.

1.	Current Related	As listed in table A19 of IS 15959 (Part-2)
2.	Power related	As listed in table A0 of IS 15959 (Part-2)
3.	Power On/ Off	Meter shall log Power Off event occurrence if the phase voltage is absent beyond a threshold period.
4.	Low Voltage Event Logging	Meter shall log Low Voltage Event in case the voltage reaches below a threshold value & stays beyond a threshold period.
5.	Protection against HV spark	In case a spark of up to 35 kV is applied externally to the meter including its communication port with its cover in place, using a spark gun / ignition coil, meter shall either remain immune & continue to record energy with allowable accuracy or log the event.
6.	Others	As listed in table A8 of IS 15959 (Part-2)
7.	Neutral disturbance	Meter shall log all events when AC/DC Pulsating Voltage is injected in neutral circuit especially when it can affect the recording of energy.
8.	External Magnetic Interference	e) The meter shall either remain immune to tamper through application of external magnetic field (AC electromagnet or DC magnet) as per value specified in CBIP 325 or if the metering gets affected then meter shall record energy with I_{max} rated voltage and unity P.F. as per CBIP 325 and same shall also be logged as event with date & time. f) In case of abnormal permanent magnetic field, either meter shall remain immune or if the metering gets affected then meter shall record energy with I_{max}, rated voltage and unity P.F and it shall also be logged as event with date & time. g) The meter shall be provided with built in logic/ indication and sensor to detect event as tamper beyond meter's magnetic immunity level and also display such occurrences. The meter

		accuracy ~~or~~ shall not be affected by permanent magnetic field up to meter's magnetic immunity level. h) At the time of restoration of magnetic tamper, the event shall be logged with actual parameters.
9.	Non rollover events	As listed in table A9 of IS 15959 (Part-2) For these events, only date and time shall be captured.
10.	Top cover open	Meter shall detect opening of top cover and this event shall be logged as non rollover event. This even shall not have any associated restoration.
11.	Connection Related Tamper Conditions	The meter shall not get affected by any remote control device specified under CBIP 325 & shall continue recording energy.
12.	Current Reversal	In case of current reversal in any phase meter shall record forward energy within acceptable limit of error specified for accuracy class 1.0 Note: Not applicable for Import-Export Mode
13.	Event Logging	a. Minimum 200 no. of events with date and time stamp preferably along with snapshots of V, I, PF and kWh shall be retained in memory. b. The logging will be on FIFO basis. c. Occurrence and restoration are considered as separate event d. For each occurrence event captured, the cumulative tamper count shall be incremented. e. Selective access shall be provided as per clause 11.3 of IS 15959 (Part 1).
14.	Parameter Snapshot	Parameters as per table A25 of IS 15959 (Part 2) are to be captured during occurrence and restoration of logged events.
15.	Tamper Indication	Appropriate Indications/Icons for all tampers shall appear on the meter display either continuously or in auto display mode.
16.	Tamper Logics	As per Annexure-II
17.	High Frequency Jammer	Meter shall have to be immune on this test

TS.2.9. Meter Display: The measured value(s) shall be displayed on a Liquid Crystal display (LCD) register. The display shall have backlit capability for easy reading from meters. When the LCD is placed at a constant temperature of 65°C for a period of 30 minutes in operating condition and 80°C for 30 minutes under de-energized / storage condition, it shall not get deformed.

TS.2.10. Software & Communication:

1.	Communication Ports	Communication port required in meter are as follows.
	Optical	Meter shall have one optical port. It shall be compatible for data transfer over RS 232 standard

2.	Plug-in Communication Module (NIC)	The smart meter shall 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 meter and act as interface between the meter and HES.. The plug-In module shall be field swappable/ replaceable.
3.	Integration	The bidder must ensure bi-directional data communication between the meter and HES for both RF mesh or cellular communication technology.
4.	Software and support	d) The bidder shall supply following software and provide required training & manuals to use the same free of cost : III. Software for local communication, i.e, for HHU/CMRI/Mobile App and Laptop/PC. This software can be Android or Windows OS based. IV. Software for firmware upgrading from remote and mass deployment. e) Bidder shall ensure integration of software with any of WBSEDCL system during the life of meter free of cost. WBSEDCL will provide all the required support for integration activity. f) The bidder shall have to ensure DLMS compliance of the meter for both local & remote communication through its Optical port and NIC card.
5.	Software for local communication	The manufacturer has to provide software capable of downloading all the data stored in meter memory through CMRI/HHU/Mobile app/Laptop/PC. The manufacturer shall also provide software for android or windows based HHUs along with software for traditional CMRI/HHU devices. The bidder has to ensure that all required reading and diagnostic tools are available with them to ensure SLA as mentioned in Tender. Specification and costing of these tools shall be shared with WBSEDCL in case WBSEDCL wants to maintain their own devices.
6.	Training	Manufacture shall impart training to WBSEDCL personnel for usage of software
7.	Port protection	All ports shall be optically isolated from the power circuit.
8.	Operation	Optical port and NIC Card shall work independently. Failure of one (including display) shall not affect the working of the other.
9.	Communication protocol	As per IS 15959 (Part 2). Other protocols shall not be acceptable.
10.	Data transfer rate	Communication ports shall have to support data transfer rate of 9600

		bps(minimum).

TS.2.11. Marking of Meter: The marking on the meter shall be in accordance with relevant clauses of IS 16444 and IS 13779. Colour of the Marking Plate will be Light Grey. The basic marking on the meter nameplate shall be as follows (all other markings as per IS 15959A2_R1 clause E - 10.1 shall also be there):

(a) Manufacturer's name & trade mark
(b) Place of manufacture
(c) Type Designation
(d) No. of phases & wires
(e) Meter serial number
(f) Month & year of manufacture
(g) Reference voltage
(h) Rated current
(i) Operating frequency
(j) Principal unit(s) of measurement
(k) Meter constant (imp/kwh)
(l) Class index of meter
(m) "Property of WBSEDCL"
(n) Purchase Order No. & Date
(o) Bar coded meter serial number along with month & year of manufacture
(p) BIS marking
(q) Firmware Version
(r) Communication technology for WAN or NAN (with carrier frequency)
(s) Symbol of load switch

TS.2.12. Guaranteed Technical Particulars: The bidder shall furnish all the necessary information as desired in the Schedule of Guaranteed Technical Particulars and data appended with this Specification. If the bidder desires to furnish any other information in addition to the details as asked for, the same may be furnished against the last item of this Annexure–I.

TS.2.13. Technical Deviations: Any deviation in Technical Specification as specified in the Specification shall be specifically and clearly indicated in a Deviation Format.

TS.2.14. Testing & Test Facilities At Manufacturer's Place:

TS.2.14.1. The manufacturer shall have to provide or arrange facilities for conducting all the tests specified in IS 16444 (Part 1) for pluggable type smart meters. The meter shall be subjected to tests for metrology, for load switching capability, for data exchange protocol and for smart meter communicability. The test for metrology shall include the "Type Tests, Routine Tests and Acceptance Tests" identified in IS 13779.

TS.2.14.2. The bidder shall indicate the details of the equipment/instrument/tools available at the manufacturer's premises for conducting the requisite tests as per relevant Standards. The bidder shall indicate the sources of all equipment/ instruments.

TS.2.14.3. The standard meters used for conducting tests, along with all other required equipment/instruments shall be calibrated periodically at any NABL Accredited Test Laboratory and test certificates shall be made available at manufacturer's works for verification of purchaser's representative.

TS.2.15. Sample Meter Testing At WBSEDCL's Testing Laboratory:

TS.2.15.1. Sample meter with all related accessories including communication module & load switch and software shall be tested at WBSEDCL's Testing Laboratory as part of technical evaluation of the NIT.

TS.2.15.2. The bidder will have to submit sample meters along with pilfer proof meter box and all the accessories including requisite software in sealed casing / carton along with relevant documents as per provision laid down in NIT.

TS.2.15.3. Requisite infrastructure needed for simulating the environment beyond the meter testing facilities, i.e, for testing of load switch functioning, local & remote bi-directional data exchange and communication capabilities are to be provided by the bidder during this testing.

TS.2.16. Inspection:

TS.2.16.1. The purchaser may carry out the inspection at the works of the meter manufacturer at any stage of manufacture. The manufacturer shall grant free access to the purchaser's representative at a reasonable time when the work is in progress. Inspection and acceptance of any meter manufactured as per this specification shall not relieve the supplier of his obligation of furnishing the meters in accordance with the specification and shall not prevent subsequent rejection if any meter is found to be defective.

TS.2.16.2. All acceptance tests and inspection shall be made at the place of manufacturer unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase.

TS.2.16.3. The Bidder shall provide all reasonable facilities without charge to the inspector, to satisfy him that the meter under reference is being furnished in accordance with this specification.

TS.2.16.4. The supplier shall keep the purchaser informed in advance, about the manufacturing programme for each lot so that arrangement can be made for inspection.

TS.2.16.5. The purchaser reserves the right to insist for witnessing the acceptance / routine testing of the bought out items. The supplier shall give at least 15 days' advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests.

TS.2.16.6. The purchaser reserves the right for type testing of any meter & meter casing etc. from any of the offered lots, received at any destination stores.

TS.2.17. Quality Assurance Plan: The design life of the meter shall be minimum 20 years and to prove the design life the firm shall have at least the following quality Assurance Plan:

The design life of the meter shall be minimum 20 years and to prove the design life the firm shall have at least the following quality Assurance Plan:

(a) The factory shall be completely dust proof.
(b) The testing rooms shall be temperature and humidity controlled as per relevant standards.
(c) The testing and calibrating equipments shall be automatic and all test equipment shall have their valid calibration certificates from NABL accredited laboratory.
(d) Power supplies used in testing equipment shall be distortion free with sinusoidal wave-forms and maintaining constant voltage, current and frequency as per the relevant standards.

During the manufacturing of the meters the following checks shall be carried out:

i) Meter frame dimensions tolerances shall be minimum.

ii) The assembly of parts shall be done with the help of jigs and fixtures so that human errors are eliminated.

iii) The meters shall be batch tested on automatic, computerized test bench and the results shall be printed directly without any human errors.

The Bidder shall invariably furnish the following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of material offered.

- ✓ Statement giving list of important raw materials
- ✓ Names of sub-suppliers for the raw materials
- ✓ List of standards according to which the raw materials are tested
- ✓ List of tests normally carried out on raw materials
- ✓ Information and copies of test certificates in respect of bought out accessories
- ✓ List of manufacturing facilities available
- ✓ Level of automation achieved
- ✓ List of areas where manual processing exists
- ✓ List of areas in manufacturing process, where stage inspections are normally carried out of quality control and details of such tests and inspections
- ✓ List of testing equipment available with the bidder/manufacturer for final testing of equipment specified
- ✓ Test-plant limitations, if any, vis-à-vis type, special acceptance and routine tests specified in the relevant standards and this specification. These limitations shall be very clearly brought out in schedule of deviations.

The manufacturer laboratory must be well equipped for testing of the meters. They must have computerized standard power source and standard equipment calibrated not later than a year (or as per standard practice). The details of testing facilities available for conducting

a) The routine tests.
b) Acceptance tests shall be furnished with the bid.

TS.2.18. Guarantee: As per NIT

TS.2.19. Replacement Of Defective Meters: As per NIT

Annexure – I

Guaranteed Technical Particulars:

Name of bidder…….

1. GUARANTEED TECHNICAL PARTICULARS FOR THREE PHASE - FOUR WIRE SMART ELECTRONIC ENERGY METER OF ACCURACY CLASS 1.0

S. No.	Particulars	Remark by Bidder
1.	**Makers Name & Company**	
	a) Meter Serial No.	
	b) Manufacturer Name	
	c) Firmware Version for meter	
	d) Firmware Version for communication module	
	e) Year of manufacturer	
	f) Software for smart meter remote configuration	
	g) Web Based Software for Meter Data	
2.	**Model**	
3.	**Type of Meter**	
4.	**System voltage with variations**	
5.	**Standard to which the meter conforms**	
6.	**Current**	
	a) Basic current (i_b)	
	b) Minimum starting current	
	c) Current overloading capacity	
	d) Short time over current	
	e) Maximum current I_{max} continuously with accuracy	
7.	**Frequency with variations**	
8.	**Humidity**	
9.	**Temperature**	
10.	**Altitude**	
11.	**Class of index**	
12.	**Accuracy**	
	a) Current range	
	b) Voltage range	
	c) Frequency range	
	d) Temperature range	
	e) PF range	

S. No.	Particulars	Remark by Bidder
13.	**Demand & integration Period**	
14.	**Specific Dynamic Range**	
15.	**Specified Working Range**	
16.	**Pulse output**	
17.	**Register (Electronic)**	
18.	**Internal Meter Multiplying Factor**	
19.	**Terminal Connection**	
20.	**Meter earthing**	
21.	**Power loss in each current circuit at basic current in VA & watt**	
22.	**Power loss in each voltage circuit at reference in VA & watt**	
23.	**Display device**	
	a) Type of display i.e. LCD	
	b) Character size of display digits	
	c) No. of display digits for data	
	d) No. of display digits for parameter identification	
	e) Life of display unit (guaranteed)	
	f) Method adopted for display overflow	
	g) Indication of healthiness of potential & current	
	h) Provision of Latching Relay connection /disconnection status	
	i) Earth Load Indication (if condition occurred)	
	j) Meter cover open Tamper Event	
24.	**Maximum Demand**	
	a) Parameters available	
	b) Integration period	
25.	**Provision for MD reset**	
	a) Communication driven reset	
	b) Auto reset at 24:00 hrs at the end of each billing cycle	
	c) Type of MD computation	
26.	**Display parameters in auto scrolling mode**	
	LCD Test	
	Credit Balance in INR	
	Relay status	
	Meter Sr. No.	
	Date	
	Time	
	Cumulative kWh	
	Current month MD	
	Instantaneous Voltage	

S. No.	Particulars	Remark by Bidder
	Instantaneous Current	
	Instantaneous Load KW	
	Tamper count	
27.	**Load Survey Parameters for last 60 days**	
	Real Time Clock – Date & Time	
	Current(I)	
	Voltage (V)	
	Block Energy – kWh-(Import)	
	Block Energy –kVAh-(Lag)	
	Block Energy –kVAh-(Lead)	
	Block Energy –kVAh-(Import)	
	Block Energy – kWh-(Export)	
	Block Energy –kVAh-(Export)	
28.	**Programmable Parameters**	
	a) Real Time Clock - Date and Time	
	b) Demand Integration Period	
	c) Profile Capture Period	
	d) Single – action Schedule for Billing Dates	
	e) Activity Calendar for Time Zones etc.,	
	f) Time Zones script table	
29.	**MD integration**	
	a) Integration period of MD (Minutes)	
	b) Principle of operation	
30.	**Overall dimensions, weight & drawing**	
31.	**Reference standards**	
32.	**No. of digits displayed**	
33.	**Parameters read out by MRI / HHU**	
	a. Meter serial number, Model, Make	
	b. All parameters as specified in the bid document	
	c. Load Survey data.	
	d. Tamper events details of at least 200 records (in and out) with date and time **, (occurrence & restoration are considered separate event)**	
	e. Self-diagnostic details (Real time calendar, low battery)	
34.	**Communication interface available**	
	a) For calibration	
	b) For data transfer	
35.	**Non-volatile memory retention time in absence of power**	
36.	**Provision for connectivity (RS 232)**	
37.	**Max error due to variation in**	

S. No.	Particulars	Remark by Bidder
	a) Voltage Variation - 15% to + 10%	
	b) Voltage Variation - 40% to + 20%	
	c) Current 2% to 600% of rated basic current	
	d) Frequency - +/- 5%	
	e) Temperature - + 70c	
	f) PF (0.0 lag -UPF-0.0 lead)	
38.	**Anti-Tamper Features**	
39.	**Power Supply back up**	
	a) For sorting recorded values	
	b) For taking reading	
	c) For downloading data	
40.	**Measuring principle employed for**	
	a) KWH, KVAH	
	b) Maximum demand parameters	
	c) Power Factor	
41.	**Guarantee period offered for**	
42.	**Microprocessor**	
	a) Address in bits	
	b) Sampling rate	
43.	**Tamper and fraud proof provision for**	
	a) Meters	
	b) Software	
44.	**Sealing arrangement provided**	
	a) Meter body	
	b) Meter Terminal block	
	c) Communication Port	
45.	**Degree of protection against dust, moisture etc.,**	
46.	**Details of battery indication**	
	a) Guaranteed life of battery	
	b) Low battery indication	
	c) Internal battery	
47.	**Provision of real time clock**	
48.	**Self-diagnostic features**	
49.	a) Software Requirement	
	b) Meters ID, Time, Report dates as "HEADER" at the beginning of each type of data	
	c) Meter configuration consisting of the following : Meter data i.e., Serial No., Software version, Hardware version, Basic current, voltage, accuracy class & Pulse output	
	d) Software for Smart prepaid Metering, Billing, collection, Tariff, vending, POS, Database @ central server	
	e) Security for vending features.	

S. No.	Particulars	Remark by Bidder
	f) Abnormal events occurrence data	
	g) Tamper data events, Voltage related , Current related, Power related, Transaction related, others, Non rollover events & control events	
	h) All display parameters values shall come in printout	
	i) Historical data of all cumulative parameters for previous 6 months @ reset	
50.	Facilities for conducting acceptance test and routine test in factory with additional acceptance & other acceptance tests.	

ANNEXURE II

Sl. No.	Tamper	Occurrence Threshold	Occurrence Time	Restoration Threshold	Restoration Time	Mode
1	PowerRelated Tamper: Power Failure	i) All Phase Voltages ~~≤50~~ 30% of Vref. ii) I3x>5% of Ib	After 5 minutes	f) Any Phase Voltage >~~50~~ 40% of Vref ii) I3x ignored	Immediate	Import
~~2~~	~~Invalid Voltage~~	~~i)V3x>60% of Vref &<115% of Vref ii)Angle difference of any two Phases≤10°~~	~~After 5 minutes~~	~~i)V3x>60% of Vref &<115% of Vref ii)Angle difference of any two Phases>10°~~	~~After 5 minutes~~	~~Import & Export~~
3	Missing Potential (Logging Phase Wise)	i) Vx<30%of Vref & ii)Current>10% of Ib iii)Other Phase Voltages>40% & <115% of Vref	After 5 minutes	i) Vx>60% Vref ii) Current >10% of Ib iii) Other phase Voltage>40% & <115% of Vref	After 5 minutes	Import & Export
4	High Voltage	i) Any Phase Voltage>115% of Vref ii) Current ignored	After 5 min	i) All Phase Voltage<115% of Vref ii) Current ignored	After 5 min	Import & Export
5	CT open	i) Iresidual >20% of Ib & ii)Phase Current<2% of Ib iii)All Phase Voltages>70% of Vref & <115% of Vref	After 5 min	i) Iresidual <20% of Ib & ii)Phase Current>2% of Ib iii)All Phase Voltages>70% of Vref & <115% of Vref iv) Avg. Ph current > 10% Ib	After 5 min	Import
6	Over Current	i)Any Phase Current > 150 % of Imax ii)All Phase Voltages>70% of Vref & <115% of Vref	After 5 min	i)All Phase Current < 150 % of Imax ii)All Phase Voltages>70% of Vref & <115% of Vref	After 5 min	Import & Export
7	Current Unbalance	i)All Phase Voltages > 60% of Vref ii) Imax – Imin > 30% of maximum of 3 Phase current iii) Iresidual < 20% of Ibasic iv) 120% of Imax > Iaverage > 10% of Ibasic	After 5 min	i)All Phase Voltages > 60% of Vref ii) Imax – Imin < 27% of maximum of 3 Phase current iii) Iresidual < 20% of Ibasic iv) 120% of Imax > Iaverage > 10% of Ibasic	After 5 min	Import

8	Low PF	i) All Phase Currents>10% of Ib ii) Average PF<0.3 iii) All Phase Voltages>70% and <115% of Vref	After 5 min	i) All Phase Currents>10% of Ib ii) Average PF>0.3 iii) All Phase Voltages>70% and <115% of Vref	After 5 min	Import & Export
9	Neutral Disturbance	In case any spurious signal Injected to the neutral of Meter, offered meter will be either immune or gets affected it will log the neutral disturbance event with date and time. Meter will register energy at reference voltage , actual current and UPF.	Within 20-40s			Import & Export
10	Magnet	Whenever the Meter functionality gets affected on account of presence of any magnetic field, Meter shall log it as an Event and start recording at Imax if does not remain immune. In Tamper Snap Shot Imax must be shown (either occurance or restoration), with Date and Time stamp.	20 sec (apprx)		20 sec (apprx)	Import & Export
11	Cover Open	On Removal of Meter Cover the Meter will lock Cover Open Event with Date and Time Stamp, It must be reflected in Auto Display mode	Immediate	No restoration shall be allowed without due authorization	Immediate	Import & Export

When Reset Button is pressed within an integration Period, Rising Demand will not reset to Zero. The Demand will be registered for the entire Integration Period and will be logged as Current Max. Demand at the end of the Integration Period.

Annexure-III

TECHNICAL SPECIFICATION FOR PILFER PROOF METER BOX SUITABLE FOR THREE PHASE WHOLE CURRENT ENERGY METER

1.0 SCOPE:

This specification covers manufacture and supply of Pilfer Proof Meter Box (PPMB) suitable to house Three Phase Static Smart Energy Meter along detachable communication module and all other accessories.

The Meter Box shall be wall mounted type with ability to protect meter with its assembly against harsh weather. The box shall be anti-corrosive, dust proof, shock, vermin & water proof, pilfer proof, fire proof and UV stabilized. The enclosures shall not deform or melt when exposed to fire.

2.0 TECHNICAL REQUIREMENT:

The Meter Box i.e base and cover shall be made of hot press/injection moulded, unbreakable, high grade fire retardant Engineering Plastic (Acrylonitrile Butadiene Styrene)/Polycarbonate, with minimum thickness of 2.0 mm having good dielectric and mechanical strength. The material must be such that the Meter Box shall not change in colour, shape. size, dimensions when subjected to Ageing Test.

The Meter Box shall have top tapered surface and round corners to prevent any water logging on the top of meter cover. The overall dimensions of the enclosure shall be suitable for housing the single phase smart meter along with all its attachments/accessories as offered by the bidder and there shall be a clearance of 30 + 2 mm from top & both sides of the meter. Bottom side clearance shall be 75 + 5 mm from the lower edge of terminal block of the meter. Clearance from front side and back side of the meter shall be 15 + 2 mm and 10 + 2 mm respectively.

The Meter Box shall be capable of withstanding the mechanical, electrical and thermal stresses well as the effects of humidity which are likely to be encountered in service. At the same time the box shall ensure desired degree of safety. The material used shall be adequately stabilized against detrimental effect of light and weather. The surface appearance of the moulded parts must be smooth, non-porous and homogeneous, free of ripples, defects and marks. No fillers of fibres shall be visible at any place.

The box shall comply in all respect with the requirement of latest amendments of IS /ASTM. Applicable degree of protection shall be IP 42 or better.

All accessories like nuts, bolts, washers etc. shall be galvanized.

3.0 CONSTRUCTION:

3.1 The enclosure shall be single piece moulded with hot process compression moulding or injection moulding.
3.2 Dimension: To be specified by the bidder.
3.3 Hinge: A minimum of 2 nos. brass/stainless steel hinges in left side of the door and 1 no. brass/stainless steel hinge/stainless steel U type latch with locking arrangement in right side of the door shall be provided inside the enclosure. The hinges of the door shall be concealed and they shall be fixed to the flanges provided on the body and cover of the enclosure in such a manner that the door opens by a minimum of 120 degrees.
3.4 Suitable grove with locking arrangement shall be provided for opening of the enclosure door.

3.5 Fixing arrangement: The meter box shall have sufficient number of mounting brackets made out of same material as of meter box with provision for hole of suitable diameter for mounting the box on the wall or on wooden board with suitable screws.
3.6 Any other suitable arrangement for fixing the box may be accepted after verification.
3.7 Sealing arrangement: The Box shall have provision for sealing of the base with the cover to make it fully tamper proof.
3.8 Incoming and outgoing cable arrangement: Required number of holes at bottom with suitable diameter shall be provided in the box for cable/wire entry. The holes must be totally covered with neoprene rubber gasket (NRG). NRG will be punched for entry of incoming and outgoing cable/wire.
3.9 Base and Cover details: Thickness of the meter box shall not be less than 2.0 mm on all sides including door. The meter box shall have 4 mm thickness of the tongue and groove area. The meter box cover shall be made overlapping type having collars on all four (4) sides and shall be provided with Neoprene rubber gasket of minimum 2.5 mm dia to completely fit in the grooves of the base. The base of the meter box must have a groove to hold the gasket and the overlap of the top cover with base shall be sufficient. The tongue of the base shall ensure proper sealing arrangement against ingress of rainwater and dust inside the box.
3.10 The Enclosures shall generally comply with the provision of IS 14772 or IEC 695. The enclosures shall be suitable for outdoor application. The enclosure shall be with good workmanship.
3.11 Soft neoprene/nitride rubber gaskets shall be provided all round wherever required for protection against entry of dust and water. The gasket shall conform to Type-III as per IS-11149. The enclosure shall comply with IP-42 or better degree of protection.
3.12 The Enclosures shall be of crystal clear (transparent) polycarbonate.
3.13 Marking/Embossing: The following information shall be clearly & indelibly embossed/laser printed on the cover and base of the Meter Box. No printed paper sticker will be accepted. The top & bottom corner of Meter Box Sl. No. shall be same for the particular Meter Box.

e) Property of WBSEDCL / For Use in WBSEDCL
f) Name/Brand name of Manufacturer
g) Meter Box Sl. No. (Embossed / laser printing on both the base and covers of Meter Box)
h) Sign of Danger

3.14 Submission of Sample: The bidder shall submit a sample Meter Box as per specification along with the sample meter as per provision laid down in NIT.
3.15 Type testing including material identification (IR Spectrometry test) of one meter box manufactured as per specification is to be conducted at any NABL accredited laboratory/CIPET by the supplier at their own cost after placement of order.
3.16 For type testing the meter box will be selected from the first offered lot of meter with meter box. If the type test results are not found satisfactory, the offered lot of meter along with meter box will be rejected.

4.0 **Quality Control:**

4.1 Type test reports from CIPET/NABL accredited laboratory as per Standard IS/ASTM shall be submitted. The type test reports shall not be more than 5 (five) years old. Acceptance tests as per IS/ASTM are to be carried out by the supplier in presence of WBSEDCL's representative.

4.2 Material of meter enclosure shall be tested for Heat Deflection Temperature, Exposure to Flame (Self-extinguishing) and Resistance to Heat & Fire (Glow wire) as per specification and Ref. Standard IS/ASTM.

5.0 General Construction Requirement:

5.1 Viewing Window: A viewing window as per drawing made up of scratch and break resistant, UV resistant, transparent Polycarbonate material shall be provided on the door for reading the meter without inconvenience. The minimum thickness of the viewing window shall be 2.0 mm (flashing with top). The viewing window shall be provided with fixed rain hood. The window shall be securely fixed with meter enclosure from inside. Suitable neoprene gasket shall be provided so that there shall not be any ingress of moisture through this window into the enclosure.

No viewing window is required for transparent polycarbonate meter box.

5.2 Construction of louver: No louver is required for transparent polycarbonate meter box.

5.3 One push button is to be provided on the front side of the top cover of meter box for taking meter reading during power off condition without opening of meter box cover.

5.4 The box shall be designed in such a way that NIC card shall be kept protected in side the box while shall not hinder data communication.

5.5 Provision for fitting of external antenna shall also be considered during preparation of design of the box.

6.0 Guarantee: As per NIT

a. **Replacement of defective Meter Box:** As per NIT

8.0 Testing:

8.1 Type Test: The bidder must furnish type test report including material verification of the offered/sample meter box from any NABL/Govt. approved laboratory as available with them along with technical bid without which the offer will not be considered. Type test report should not be more than 5 (five) years old.

8.2 Type testing at any recognized NABL accredited laboratory/CIPET in respect of one meter box as per the specified size, selected from any one of the offered lot during supply is to be conducted by the supplier at their own cost after placement of order for verification of material and quality of the box. If the type test results are not found satisfactory, the offered lot of meter along with the meter box will be rejected.

8.3 Acceptance Test: The acceptance test as stipulated in Annexure-VI shall be carried out at the time of inspection of the offered material.

Notes: 1) Where facilities do not exist at supplier's works for carrying out one or more of the Acceptance Tests as per Annexure-VI, such tests may be carried out at any of the approved laboratories such as CIPET/IIT/National Test House/Govt. approved laboratory etc. in presence of WBSEDCL's representative.

8.4 The sampling plan for carrying out the acceptance tests shall be as per IS.

9.0 Submission of Drawing: Three (3) copies of drawing complete in all respect shall have to be submitted to the Ordering Authority.

10.0 Inspection: The inspection will be carried out as per inspection & testing clause of General Conditions of Contract (GCC).

11.0 Guaranteed Technical Particulars: The bidder shall furnish all the necessary information as per Annexure-VII - Guaranteed Technical Particulars. If the bidder desire to furnish any other information in addition to the details as asked for, the same may be furnished.

Annexure-IV

LIST OF TESTS TO BE CARRIED OUT ON THREE PHASE METER BOX

Sl. No.	Name of Indian standard/equivalentinternational standard	Test requirement	Test particulars		
			Type test	Routine Test	AcceptanceTest
1.	IS : 14772	Marking	T		A
2.	As per Drawing	Dimensions	T	R	A
3.	IS / ASTM	Protection against electric shock	T	R	A
4.	IS / ASTM	Construction	T	R	A
5.	IS / ASTM	Resistance to ageing, to humid conditions, to ingress of solid object and to harmful ingress of water	T		
6.	IS / ASTM	Mechanical strength	T		
7.	IS / ASTM	Resistance to heat	T		
8.	IS / ASTM	Resistance to rusting	T		
9.	IS / ASTM	Resistance to tracking	T		
10.	IS / ASTM	Test for resistance to heat & fire (Glow wire test at 650^0 C)	T		
11.	IS / ASTM	Heat deflection temp. @1.8 MPa-100^0 C (Minm. for Engg. Plastic)/140^0 C (Minim. forPolycarbonate	T	R	
12.	IS / ASTM	Self Extinguishing property of spirit burner test.	T	R	A
13.	IS / ASTM	Melting point-180^0 C (Minimum for Engg. Plastic)/210^0 C (Minimum for Polycarbonate)	T		

14.	IS / ASTM	Verification of di-electricproperties, insulation testwith 500V DC magger	T		
15.	CIPET/IR Spectrometry	Material identification	T		
16.	IS / ASTM	Physical water absorption (Max. 0.35%)	T		

Note : Applicable degree of protection shall be IP42 or better. Legend : T- Type Test, R- Routine Test, A- Acceptance Test

ANNEXURE-V

GUARANTEED TECHNICAL PARTICULARS OF PILFER PROOF METER BOXFOR SINGLE PHASE METER

Sl. No.	Description	Detailed requirement	Offered bythe bidder
1.	Material used for moulded meterbox	Engineering Plastic (Acrylonitrile Butadiene Styrene)/Polycarbonate	
2.	Grade of Material	Fire Retardant, Self Extinguishing	
3.	Properties of material for meterbox		
(a)	Heat Deflection Temperature(Min. 140^0 C @ 1.8 MPa) (Ref. Std. IS/ASTM)	100^0 C (Minimum for Engg. Plastic) / 140^0 C (Minimum for Polycarbonate)	
(b)	Exposure to flame (Ref. Std..IS/ASTM)	Self-extinguishing	
(c)	Melting Point (Ref. Std. IS/ASTM)	180^0 C (Minimum for Engg. Plastic) / 210^0 C (Minimum for Polycarbonate)	
(d)	Resistance to heat & fire	Glow wire test at 650^0 C	
(e)	Mechanical Property		
i)	Tensile Strength (MPa)	To be specified by the bidder	
ii)	Flexural Strength (MPa)	- Do -	
iii)	Modulus of Elasticity (MPa)	- Do -	
4.	Constructional features of the box		
(a)	Clear inside dimensions of MeterBox	Refer Drawing	
	i) Height	To be specified by the bidder	
	ii) Width	- Do -	
	iii) Depth	- Do -	
	iv) Rust & Vermin proofing	Neoprene Rubber Gasket NRG	
(b)	Minimum clearance from meteron all 4 sides	Clearance from all sides of the meter should be 30±2 mm except the bottom side which should be 75±5 mm from the lower edge of terminal block.	

(c)	Minimum clearance from meteron front		15±2 mm	
(d)	Minimum clearance from back ofmeter		10 ± 2 mm	
(e)	Viewing Window :			
	i)	Material of transparentcover	Glass/Polycarbonate with RubberGasket	
	ii)	Size of opening (Min.)	90mm x 75 mm	
	iii)	Thickness of mouldedsheet	2.0 mm (Minimum)	
	iv)	Fixing method	Fixed from inside with rubber gasket	
(f)	Earthing arrangement		May or may not be required.	
(g)	Sealing Arrangement		Holes for wire seal (One No.)	
(h)	Colour of Meter Box (base &cover)		Crystal clear	
(i)	Box mounting arrangement			
	i)	No. of holes for fixing ofmeter box	4 Nos. Holes	
	ii)	Dimension of holes	6 mm	
	iii)	Dimension of box fixingscrew	4X25 mm self threaded	
	iv)	Total no. of fixing screwsto be provided	4 nos.	
(j)	Hinges		Concealed hinges	
(k)	Incoming & outgoing cable holes		2 Nos. 12 mm. dia. Holes at bottom totally covered with Neoprene RubberGasket (NRG)	
(m)	Whether the cover is overlapping type having collars on all foursides		Yes	
(n)	Whether the cover/base provided with semicircular/circular neoprene rubber gasket of 2.5 mm dia (Minm.) to completely fit in the grove of the base		Yes	
(o)	Whether the meter box having push button to access to the meter for taking reading during power off condition without opening of meter box cover		To be provided	
(p)	Weight of complete box in Kgwith +/- tolerance		To be specified by the bidder	
5.	Type test report as per Technical Specification		To be submitted by the bidder	
6.	Degree of protection		IP 42 or better	
7.	Any other information			

TS.3. Specifications of Cellular based Network Interface Card (NIC): The communication architecture shall be in accordance to the variant - 2, C3 as defined under IS 16444: 2015. Each Smart Meter shall be provided with Plug-in WAN module for communication with HES.

TS.3.1. Functional Specifications:

TS.3.1.1. The plug-in type communication WAN module shall be based on Cellular 4G with fallback to 3G/2G capabilities as per Indian telecom Standards.

TS.3.1.2. For DLMS enabled smart meters (IS16444), the WAN module shall access the full range of DLMS capabilities supported by the smart meter. The data received by the WAN module shall be transmitted securely to the HES.

TS.3.1.3. The Cellular WAN module shall have features /facilities for

TS.3.1.3.1. This Cellular 4G WAN module shall support TCP Server & TCP client features and shall be able to exchange data on serial port transparently;

TS.3.1.3.2. The WAN module shall support store and forward functionality and shall initiate the connection to forward the meter data.

TS.3.1.3.3. The 4G Cellular WAN module shall support both IPv4 /IPv6 schema as per availability from network service provider

TS.3.1.3.4. The Cellular WAN shall automatically register to HES at power up.

TS.3.1.3.5. Time synchronization with HES and Network Time Protocol (NTP) to sub second accuracy and support time distribution to the meter.

TS.3.1.3.6. The module shall be able to send diagnostics logs/ data periodically to HES.

TS.3.1.3.7. Remote Configuration and Program Over the Air.

TS.3.1.3.8. WAN module shall operate 24*7 and shall recover from any deadlock situation immediately on its own.

TS.3.1.4. Should Support Configurable scheduled and on-demand meter data reading feature

TS.3.1.5. The Cellular WAN Module shall have persistent cellular network connectivity and shall be able connect to cellular network automatically. It shall be connected to cellular network all the time.

TS.3.1.6. Each WAN module shall be provisioned with a private, static IP address not visible or routable from the public internet.

TS.3.1.7. If fixed IP and operator VPN is not available /possible and Dynamic IP is being used, then the cellular WAN module shall support SSL/ VPN and the data shall be encrypted before send / received on Cellular last mile network.

TS.3.1.8. It shall facilitate On-demand / schedule (15 /30 minutes, Daily, Monthly) reading, connect/disconnect, time sync/set. The Schedule shall be configurable from HES.

TS.3.1.9. The module shall have enough non-volatile memory to store meter data and firmware for upgrade. The WAN module shall be able to read, store and forward meter data to Head End System (HES) at scheduled interval.

TS.3.1.10. It shall support Meter configuration and over the air firmware upgrade from the head-end system.

TS.3.1.11. It shall support Push Services, alarms services of the smart meter as defined in IS16444 and IS15959 part 2 and 3.

TS.3.1.12. It shall facilitate delivery of first breath and last gasp and other event alarms as defined in IS16444 and IS15959 part 2&3.

TS.3.2. Standards: For Cellular based WAN communication modules shall be compliant to below:

TS.3.2.1. 4G cellular network 3GPP standards

TS.3.2.2. Shall support UMTS/HSPA+ and GSM/EDGE, GPRS fallback and integrate dual IPv4 and IPv6 stacks.

TS.3.2.3. Shall enables TCP/IP connectivity to every end-point device (Smart Meter)

TS.3.2.4. It shall support 3/ 1.8V SIM interface and shall accepts standard SIM card/ Micro

TS.3.2.5. For network protocol it shall comply to the standard mentioned in IS16444 clause 9.3

(a) IETF RFC 2464 Transmission of IPv6 Packets over Ethernet Networks
(b) IETF RFC 1661 - The Point-to-Point Protocol (PPP)
(c) IETF RFC 5072 - IPv6 over Point-to-Point Protocol (PPP) over point-to-point link and associated RFC 5121

TS.3.3. Electrical, Constructional and Operational Requirement for WAN Module:

TS.3.3.1. The WAN module shall be designed with suitable dimension to fit in meter and operate in the same environment as of meter and interface through compatible connector with the host smart meter.

TS.3.3.2. It shall work with PCB antenna which shall be placed inside the Plug-in module enclosure. Antenna placement shall not interfere with smart meter functionality in any manner.

TS.3.3.3. The Internal SIM card holder shall be provided within the WAN module such as it can be accessible easily.

TS.3.3.4. It shall be fitted with LED for visual indication for Power ON, Traffic status.

TS.3.3.5. WAN module must be capable of operating on the power drawn from the smart meter as defined in BIS standard of Smart meter IS16444.

TS.3.3.6. The power consumption of WAN module shall optimal to meet the requirement of clause 6.10.1.1 of IS 16444 for both Idle mode and communication mode

TS.3.3.7. WAN module must not exceed maximum power requirement of 7W in any case and it shall be in line with the smart meter standard as per IS16444. There must be proper protection and isolation between smart meter and WAN Module power supply.

TS.3.3.8. The Power supply / backup requirement (if any) for WAN Module for Last Gasp, it shall be drawn from Smart Meter.

TS.3.3.9. The SIM shall be preconfigured for activation before meter installation and the communication module shall be properly sealed after SIM insertion before installation

TS.3.3.10. Environmental Operating conditions shall be similar to Smart meters

Operating Temperature: -10 deg. C to + 60 deg. C
Storage Temperature: -10 deg. C to + 70 deg. C
Humidity: up to 95% RH (Non-Condensing)

TS.3.3.11. The Bidder shall be managing timely suspension, termination, activation and reactivation of SIMs and the process shall comply with the prevailing regulations of DoT / TRAI**.**

TS.4. Specifications of Head End System (HES): Head End System, is the critical interface to the field devices, which shall support Meter Data Acquisition, two-way communication, poll meters for data collection, send remote firmware upgrades/programmable parameter inputs to meters, send Load Curtailment signals, Connect/ Disconnect and send of pricing and other signals as generated from the MDMS/Other applications to the meter. This will maintain a both way communication with MDM also.

TS.4.1. System Requirements: 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 2.5 Lakh + 25% numbers of meters installed
b) 15 mins interval meter reads
c) 50 users requesting data from meters
d) Other events and statuses coming from meters.

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.

TS.4.2. Functional Requirements:

TS.4.2.1. Head-end System (HES) must be deployed to maintain Two-way communication with meter and manage data from a multitude of field devices and applications;

TS.4.2.2. Suitable Network Management System (NMS) must be deployed to manage communication network and its associated devices and to monitor the performance of network. This module must provide real time information about the network and its associated devices.

TS.4.2.3. Data from network must report to main data centre but in circumstances where it is not possible then data shall report to Data Recovery Centre (DR).

TS.4.2.4. Node must have auto-discovery and auto-registration features so that Module along with its connecting devices shall register themselves in head-end application upon

its deployment and establishment of communication. Necessary mechanism for the same to described by the bidder.

TS.4.2.5. 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).

TS.4.2.6. System must provide daily, weekly and monthly performance reports, tracking equipment failures, communications failures and security breach.

TS.4.2.7. System must facilitate OTA (Over the Air) firmware upgrade of network terminals and application devices.

TS.4.2.8. 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).

TS.4.2.9. Ability to redirect messages including configuration commands from the MDM in order to reach the desired meter.

TS.4.2.10. Maintain time sync with DCU / meter. Manage time distribution to ensure that nodes / meters always have an accurate RTC using NTP servers.

TS.4.2.11. The time distribution mechanism shall take into account the network latencies

TS.4.2.12. Handling of Control signals / event messages on priority

TS.4.2.13. System must not be impacted by obsolescence.

TS.4.2.14. Bidder must provide the methodology and approach for integration. Integration must include both hardware and protocol.

TS.4.2.15. Bidder shall provide technical specifications of elements including hardware and software.

TS.4.2.16. Head-end System (HES) shall provide interface with field devices.

TS.4.2.17. HES must provide web-based user interface for access.

TS.4.2.18. It must perform network management, device management, device data management and processing of the data before exchanging to other systems.

TS.4.2.19. HES bidder must extend technical support for integration with MDMS to Discom and the MDMS Bidder as and when required to ensure seamless integration of HES with MDMS System.

TS.4.2.20. Store raw data for defined duration (minimum 5 days). HES shall hold the data that is not transferred to the MDM.

TS.4.3. Application Profile:

TS.4.3.1. HES shall be able to capture and store data from different devices. It shall have AMI profile for smart meters.

TS.4.3.2. In AMI profile, HES shall support automatic meter reading viz. register data, interval data and event logs on different frequencies. System should have capability to read data on demand from individual or group of devices. Frequency of data collection is defined in Scope of Work.

TS.4.3.3. AMI profile shall support two-way communication with smart meters i.e. critical events, alarms, etc. shall be delivered to HES upon its occurrence.

TS.4.3.4. AMI profile shall support remote connect / disconnect, load control, time sync, parameters configuration et cetera. These features shall be triggered to individual device, group of devices and / or entire network from MDM system. It shall facilitate the configuration of meter parameters as applicable in the smart meters. Shall receive confirmation on successful execution of a command.

TS.4.3.5. AMI profile shall collect the missing data and reconcile the missing data with available data

TS.4.3.6. AMI profile shall facilitate over the air firmware upgrades of smart meters individually and in groups.

TS.4.3.7. AMI profile shall have support of different metering protocols defined in IS16444 and IS15959 part I & part II with its latest amendments. Bidder shall acquire these documents from BIS (Bureau of India Standards).

TS.4.4. Device Management:

TS.4.4.1. HES shall have device management functionality for managing, monitoring and control the field devices including network terminals if used.

TS.4.4.2. HES shall indicate status summary by device type, hardware & software versions, device IDs, service type etc.

TS.4.4.3. HES shall provide support for importing devices and associated information from third party systems like SAP, GIS, CRM,OMS etc through MDMS.

TS.4.4.4. HES should also support schedule and on-demand meter reads and pinging of meter energized states by authorized users and by other utility system.

TS.4.4.5. HES shall collect and display information that identifies the device.

TS.4.5. Reporting and Dashboard: HES will provide thin client web portal enabled dash board services for utility users. Dash board should be dynamic to user specific and intended display information should be configurable.

Report Service shall able to generate various reports, based on metering equipment data, collected measurement data, received alarms etc. Report shall be based on a report definition made by the system administrator. In the definition the user to specify the data for the report, defines mathematical operations on the data as

multiplying by a constant, summing two measurements etc. Additional statistic functions can be performed on the data, for example finding a maximum, minimum, average etc. Each report can be viewed and downloaded in standard reporting format (excel, pdf, csv etc.) and shall be distributed via ftp, email or file dump.

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.

TS.4.5.1. 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

TS.4.5.2. 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.

TS.4.6. Notifications: HES must support notification module for dispatching notifications based on exceptions to concern user/s via application pop-up, email, SMS. These notifications should be based on the data received from the field devices.

TS.4.7. Security Module:

TS.4.7.1. Security module must manage security keys and certificates. System shall be able to report any security breach or unauthorized communication devices logged in.

TS.4.7.2. Security module must have audit trail functionality for managing and storing all the records of activities performed by authorized/unauthorized users.

TS.4.7.3. Secure network protocols and technologies such as DTLS/TLS/VPN or IPSEC shall be appropriately used to meet the security requirements as per IS16444.

TS.4.7.4. Security credentials like PKI (Public Key Infrastructure) shall be considered to achieve both authentication and encryption of the end-to-end data path between the HES and each meter.

TS.4.7.5. Should support meter key management as per IS16444 for data exchange between meter and HES.

TS.4.7.6. Bidder must comply with stringent norms of cyber security.

TS.4.8. Integration: HES shall preferably interface with MDM on standard interfaces and the data exchange models and interfaces shall comply with CIM / XML / IEC 61968 or any other open standard. The solution shall be Service Oriented Architecture (SOA) enabled. The

HES shall support web based multiple data base support software and also support standard integration for third party MDMS**.**

TS.4.9. User Interface: User interface for utility shall have ability for at least the following functionality: GUI to provide role-based access based on user identity and user role.

Shall have following types of users:

TS.4.9.1.1. Administrator
TS.4.9.1.2. Operator
TS.4.9.1.3. Field staff
TS.4.9.1.4. Viewer/Guest

TS.4.9.2. Configure the look, feel, and functionality of the HES in accordance with business needs, business processes, and business conventions. (e.g. GUI, content, look and feel of screens, validation rules, exception handling, etc.).

TS.4.9.3. Ability for utility through user interface to set up alarm and event notifications that can be directed to a combination of configurable email addresses, cellular text messages or phone numbers.

TS.4.10. Asset Management:

TS.4.10.1. Maintains 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.

TS.4.10.2. 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.

TS.4.10.3. Ability to report and log any damage / deterioration in the meter attributable to consumer /utility.

TS.4.11. AMI Installation Support:

TS.4.11.1. The HES shall support device lifecycle management from device registration, installation, provisioning, operations and maintenance to decommissioning etc. The HES generates exceptions for smart meter or OTT modules not delivering the correct meter data after installation.

TS.4.11.2. The HES provides a reconciliation report that identifies the meters that have been installed but not communicating for a designated period. HES generates reports on the number of meters installed in comparison to the number of meters successfully communicating.

TS.4.12. Meter Data:

TS.4.12.1. The HES accept input, process, store, and analyse Meter data from NIC and meter data collected through handheld meter reading instruments/ CMRI.

TS.4.12.2. It accepts input, process, store, and analyse non-billing meter data such as voltage and power quality data (like under/over voltage etc.).

TS.4.12.3. Correctly track & resolve energy usage across meter changes with no loss of individual meter data.

TS.4.12.4. Execute on-demand read processes.

TS.4.12.5. Handle special metering configurations like net metering/multiple meters at same premises.

TS.4.12.6. It should have the ability to manage a minimum 15-minute interval data.

TS.4.13. Configuration: HES shall facilitate configuration of following minimum AMI parameters:

TS.4.13.1. Load profile capture period
TS.4.13.2. Demand integration period
TS.4.13.3. Setting of parameters for time of day (TOD/TOU) billing
TS.4.13.4. Prepaid function
TS.4.13.5. Net metering
TS.4.13.6. Billing date
TS.4.13.7. Clock setting/time synchronizations
TS.4.13.8. Load curtailment limit
TS.4.13.9. Event setting for connect/disconnect
TS.4.13.10. Number of auto reconnection attempt
TS.4.13.11. Time interval between auto reconnection attempt
TS.4.13.12. Lock out period for relay
TS.4.13.13. Remote firmware upgrade
TS.4.13.14. Password setting
TS.4.13.15. Push schedule
TS.4.13.16. Setting threshold limits for monitored parameters
TS.4.13.17. Provision for adding more programming features in future
(The bidder may suggest more parameters as per the requirement)

TS.4.14. Data Validation and Exception Handling:

TS.4.14.1. HES shall ensure data integrity checks, for example, checksum, time check, pulse, overflow, etc. on all metered data.

TS.4.14.2. The system shall detect and prevent logical data errors when the data is input either by user entry or from other systems.

TS.4.14.3. Any data error shall not affect system functions that are not directly associated with it.

TS.4.14.4. The system should generate an error code and description which can be used to help facilitate debugging end user problems. Error code must be referenced to the actual exception generated.

TS.4.15. Network Management System (NMS): 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 WAN modules in the field device/s**.**

TS.4.15.1. NMS shall be able to collect parameters viz. terminal status, device status, signal strength, Hardware/software version numbers, communication logs/events etc. It shall be able to constantly monitor the meter cellular WAN module for its connectivity and signal strength and quality.

TS.4.15.2. NMS function shall be able to perform ping & trace-route to an individual and a group of Nodes.

TS.4.15.3. 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 as well as trigger a hardware reset of the node.

TS.4.15.4. NMS function should be able to collect and store monitoring profiles from End Points (WAN modules) and network devices for performance evaluation, and troubleshooting purposes. Historical logs of monitored profiles shall be available analysis through standard reporting tool.

TS.4.15.5. After GIS integration with MDMS, topology, location (lat/long) and status of all network nodes shall be visible on GIS map.

TS.5. Meter Installation Mobile App: Android based mobile app shall be provided for field operational stuffs for carry out meter installation/ re-installation/ replacement type job. The mobile app will be used for entering the required data, capturing the inputs, collection of basic meter related information and will sync with MDMS for consumer and GIS related information. The app should have the minimum following features:

TS.5.1. The App shall have Login authentication via its central database

TS.5.2. For new service connection or Meter replacement, Mobile apps should be able to capture various Consumer/Meter information viz name, Address, sanction load, meter serial no., old meter details, Connected DTR, Feeder etc.

TS.5.3. The Latitude Longitude coordinates of the meter shall be automatically updated based on the GPS location.

TS.5.4. The module shall facilitate the field executive in accurately mapping DTR or feeder details as per the actual site data. Provision shall be provided to update, edit/relocate or modify any asset captured.

TS.5.5. Mobile device should facilitate bidirectional communication with the central server using standard mobile network (GPRS/EDGE/2G/3G/4G/LTE etc.). It is preferred that app should be connected to HES application over same secure cellular communication used for meters and should update the data directly or through interfaces into MDM.

TS.5.6. Agency shall be able to Load the meter details/ Consumer Master Information into the Smart Phone online via WIFI/GPRS. The data should not be stored in the local database.

TS.5.7. Once the details are captured, same should automatically sync with the central database.

TS.5.8. The App should allow auto and manual entry of meter updates

TS.5.9. The device software shall have options to capture the photo of the meter.

TS.5.10. Provision to Add/Modify/Delete the consumer meter/asset information like the meter make, status of meters, supply information etc.

TS.5.11. The app should be integrated with a thermal printer and shall have "Printer setup" option

TS.5.12. The app should be able to give on the spot print of the new connection to the consumer. It has an option to print multiple no. of copies in case required

TS.5.13. The app shall support Reprint option in case of an event where the print was not taken at the consumer premise initially.

TS.6. Cloud Service Provider (CSP) Requirement:

[It is the responsibility of the bidder: (1) to provide MPLS/VPN links from two different service providers, to/from HES application hosted over Cloud to WBSEDCL's MDM application for integration of HES and MDM and (2) to provide MPLS/VPN links from two different service providers, to/from HES application hosted over Cloud to WBSEDCL's data center for utility access to HES application]

Bidder may appoint Cloud Service Provider as a sub vendor. If techno commercially viable bidder may choose CSP provider where the utility's MDMS application is residing; that will enhance the availability of HES-MDMS integration and may obsolete the requirement of Link1 (MPLS link between HES to MDMS). But this clause is suggestive and solely depends on bidder's choice.

Secure cloud based web hosting with uninterrupted services on 24x365 days basis will have to be provided. The vendor must host the system in security standard **MeitY empanelled, STQC audited, ISO 27001 certified** minimum Tier-3 Data Centre within INDIA and WBSEDCL officials may visit this Data Centre for inspection. Data should not be transferred across the border at any time. There should be an agreement of non-disposal of data between WBSEDCL and vendor.

It shall be up to the SI/ Bidder, to identify the critical service agreements with the concerned cloud data centre provider in order that the SI/ Bidder can meet and sustain the SLA for the MDMS. This section mentions key requirements from the Cloud Service Provider (CSP) but bidder/ SI shall be responsible to provide the services of CSP:

TS.6.1. Cloud Data Center specification and compliance:

TS.6.1.1. The datacenter and DR of Cloud Service Provider (CSP) must be within judicial jurisdiction of Indian Republic.

TS.6.1.2. All the physical servers, storage and other IT hardware from where cloud resources are provisioned for this project must be within Indian datacenters only.

TS.6.1.3. The datacenters of CSP should be spread across different geo location and preferably in different seismic zones.

TS.6.1.4. The CSP datacenters should have adequate physical security in place.

TS.6.1.5. The cloud data center 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.

TS.6.1.6. WBSEDCL officials shall have right to visit this Data Centre for inspection at any time with or without prior intimation.

TS.6.1.7. CSPs are certified to be compliant to the following standards:

TS.6.1.7.1. ISO 27001 - Data Center and the cloud services should be certified for the latest version of the standards

TS.6.1.7.2. ISO/IEC 27017:2015-Code of practice for information security controls based on ISO/IEC 27002 for cloud services and Information technology

TS.6.1.7.3. ISO 27018 - Code of practice for protection of personally identifiable information (PII) in public clouds.

TS.6.1.7.4. ISO 20000-9-Guidance on the application of ISO/IEC 20000-1 to cloud services.

TS.6.2. Operational Services:

TS.6.2.1. Provide access of cloud virtual machines either by SSH in case of Linux and RDP in case of Windows servers.

TS.6.2.2. Enable WBSEDCL to get console access of cloud virtual machine by thin client and perform operations.

TS.6.2.3. Upgrade its hardware time to time to recent configuration to delivery expected performance for this Project.

TS.6.2.4. Investigate outages; perform appropriate corrective action to restore the hardware, operating system, and related tools.

TS.6.2.5. Manage cloud infrastructure as per standard ITIL framework in order to delivery right services to Project.

TS.6.2.6. 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.

TS.6.3. Cloud Network Requirement:

TS.6.3.1. Should ensure connectivity to and from cloud resources used for this project is allowed to/ from other cloud service providers on requirement.

TS.6.3.2. Must ensure that the Virtual Machine (VM) format is compatible with other cloud provider.

TS.6.3.3. CSP should give provision to import cloud VM template from other cloud providers.

TS.6.3.4. Should ensure connectivity to and from cloud resources used for this project is allowed to/ from other cloud service providers if required.

TS.6.3.5. Must ensure that cloud virtual machine of project is into separate network tenant and virtual LAN.

TS.6.3.6. Must ensure that cloud virtual machines are having private IP network assigned to cloud VM.

TS.6.3.7. Must ensure that all the cloud VMs are in same network segment (VLAN) even if they are spread across multi datacenters of CSP.

TS.6.3.8. Must ensure that cloud VM network is IPV6 compatible.

TS.6.3.9. 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.

TS.6.3.10. CSP should have provision of dedicated virtual links for data replication between their multiple datacenter in order to provide secure data replication for DR services.

TS.6.3.11. 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.

TS.6.3.12. Should ensure use of appropriate load balancers for network request distribution across multiple cloud VMs.

TS.6.3.13. In case of scalability like horizontal scalability, the CSP should ensure that additional require network is provisioned automatically of same network segment.

TS.6.3.14. 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.

TS.6.3.15. Must ensure that public IP address of cloud VMs remains same even if cloud VM network is being served from multiple CSP data centres.

TS.6.3.16. Must ensure that the public network provisioned for cloud VMs is redundant at every point.

TS.6.3.17. Must ensure that cloud VMs are accessible from Utility private network if private linksP2P/MPLS is used by Utility

TS.6.3.18. Must ensure that there is access to cloud VMs if Utility requires to access it using IPSEC/SSL or any other type of VPN.

TS.6.4. Cloud Storage Service Requirement:

TS.6.4.1. 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

TS.6.4.2. Should provide scalable, dynamic and redundant storage.

TS.6.4.3. Should offer provision from self-provisioning portal to add more storage as and when require by respective Utilities.

TS.6.4.4. 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.

TS.6.4.5. Should have block disk offering as well as file/object disk offering to address different kind of Project needs.

TS.6.5. Cloud Security Specification:

TS.6.5.1. The CSP/Service Provider shall comply or meet any security requirements applicable to CSPs/Service Providers published (or to be published) by MeitY or any standards body setup / recognized by Government of India from time to time and notified to the CSP/Service Providers by MeitY as a mandatory standard.

TS.6.5.2. The CSP/Service Provider shall meet all the security requirements indicated in the IT Act 2000 and amendments, the terms and conditions of the Provisional Empanelment of the Cloud Service Providers and shall comply to the audit criteria defined by Standardisation Testing and Quality Certification (STQC).

TS.6.5.3. CSP should have built-in user-level controls and administrator logs for transparency and audit control.

TS.6.5.4. CSP should deploy public facing services in a zone (DMZ) different from the application services. The Database nodes should be in a separate zone with higher security layer.

TS.6.5.5. CSP should ensure a well-designed access management process, ensuring security of physical and digital assets, data and network security, backup and recovery etc.

TS.6.5.6. Should have built-in user-level controls and administrator logs for transparency and audit control.

TS.6.5.7. Cloud platform should be protected by fully managed Intrusion detection system using signature, protocol, and anomaly-based inspection thus providing network intrusion detection monitoring.

TS.6.5.8. SI/ Bidder should intimate WBSEDCL immediately if any event of security incidents or intrusions, or requests from foreign government agencies for access to the data or

any possible attack / hacking of services, unauthorized access / attempt by internal or external persons happened.

TS.6.5.9. The CSP and SI undertakes to treat information passed on to them under this Agreement as classified. Such Information will not be communicated / published / advertised by the CSP or SI to any person/organization without the express permission of the Department.

TS.6.6. Managed Services: SI/ Bidder in line with CSP (CSP provides System Software as a Service) should provide at least the following managed services related to cloud monitoring:

TS.6.6.1. Network and Security Management:

(a) Monitoring & management of network link proposed as part of this Solution. Bandwidth utilization, latency, packet loss etc.

(b) Call logging and co-ordination with vendors for restoration of links, if need arises.

(c) 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.

(d) Ensuring that patches / workarounds for identified vulnerabilities are patched / blocked immediately

(e) Ensure a well-designed access management process, ensuring security of physical and digital assets, data and network security, backup and recovery etc.

(f) Adding/ Changing network address translation rules of existing security policies on the firewall

(g) Diagnosis and resolving problems related to firewall, IDS/IPS.

(h) 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.

TS.6.6.2. Server Administration and Management:

(a) 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

(b) Installation/ re-installation of the server operating systems and operating system utilities

(c) 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

(d) Regular backup of servers as per the backup & restoration

(e) Managing uptime of servers as per SLAs.

(f) Preparation/ update of the new and existing Standard Operating Procedure (SOP) documents on servers & applications deployment and hardening.

TS.6.6.3. Web Application Firewall (WAF) as Service: NGFW+ features

TS.6.6.3.1. Cloud platform should provide Web Application Filter for OWASP Top 10 protection

TS.6.6.3.2. CSP WAF should be able to support multiple website security.

TS.6.6.3.3. CSP WAF should be able to perform deep packet inspection on every request covering the 7th layers.

TS.6.6.3.4. CSP WAF should be able to block invalidated requests.

TS.6.6.3.5. CSP WAF should be able to block attacks before it is posted to website.

TS.6.6.3.6. CSP WAF should have manual control over IP/Subnet. i.e., Allow or Deny IP/Subnet from accessing website.

TS.6.6.3.7. The attackers should receive custom response once they are blocked.

TS.6.6.3.8. CSP must offer provision to customize response of vulnerable requests.

TS.6.6.3.9. CSP WAF should be able to monitor attack incidents and simultaneously control the attacker IP.

TS.6.6.3.10. CSP WAF should be able to Grey list or Backlist IP/Subnet.

TS.6.6.3.11. 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.

TS.6.6.3.12. 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.

TS.6.6.3.13. CSP WAF should be able to set a limit to maximum length of path to URL.

TS.6.6.3.14. CSP WAF should be able to limit maximum size of request to Kilobytes.

TS.6.6.3.15. CSP WAF should be able to limit maximum time in seconds for a client to send its HTTP request.

TS.6.6.3.16. CSP WAF should be able to BAN an IP for a customizable specified amount of time if the HTTP request is too large.

TS.6.6.3.17. CSP WAF should be able to limit maximum size of PUT request entity in MB

TS.6.6.3.18. The WAF should be able to close all the sessions of an IP if it is ban.

TS.6.6.3.19. 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.

TS.6.6.3.20. The Dashboard should show a graphical representation of:

(a) Top 5 Attacked Websites.
(b) Top 5 Attacking IP.
(c) Top 5 Attack types.
(d) Top 5 Attacked URLs.

TS.6.6.3.21. For analysis purpose the Dashboard should contain following information:

(a) Number of requests to web server.
(b) Number of attacks.
(c) Number of Attackers.
(d) Types of error messages and on. Of error messages sent to the users.
(e) Total Bytes sent during transaction.

TS.6.7. Disaster Recovery Management:

TS.6.8. CSP is responsible for Disaster Recovery Services so as to ensure continuity of operations in the event of failure of primary data center and meet the RPO and RTO requirements.

TS.6.9. 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 4 hours shall be met by infrastructure redundancy and failover.

TS.6.10. 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 30 mins 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.

TS.6.11. There shall be asynchronous replication of data between Primary DC and DRDC and the CSP will be responsible for sizing and providing the DC-DR replication link so as to meet the RTO and the RPO requirements.

TS.6.12. During normal operations, the Primary Data Center will serve the requests. The Disaster Recovery Site will not be performing any work but will remain on standby. During this period, the compute environment for the application in DR shall be available but with minimum possible compute resources required for a functional DR as per the solution offered. The application environment shall be installed and ready for use. DR Database Storage shall be replicated on an ongoing basis and shall be available in full as per designed RTO/RPO and replication strategy. The storage should be 100% of the capacity of the Primary Data Center site. In the event of a site failover or switchover, DR site will take over the active role, and all requests should be routed through that

site. The pre-requisite to route request to DR should be articulated properly and shared by CSP.

TS.6.13. Whenever there is failover from primary to secondary, compute environment for the application at DR site shall be equivalent to DC

TS.6.14. The installed application instance and the database shall be usable and the same SLAs as DC shall be provided.

TS.6.15. The bandwidth at the DR shall be scaled to the level of Data center when DR is activated.

TS.6.16. The CSP shall clearly define the procedure for announcing DR based on the proposed DR solution. The CSP shall also clearly specify the situations in which disaster shall be announced along with the implications of disaster and the time frame required for migrating to DR. The CSP shall plan all the activities to be carried out during the Disaster Drill and issue a notice to the Department at least two weeks before such drill.

TS.6.17. The CSP should offer dashboard to monitor RPO and RTO of each application and database.

TS.6.18. Any lag in data replication should be clearly visible in dashboard and alerts of same should be sent to respective authorities.

TS.6.19. Backup Services:

TS.6.19.1. Regular backup of servers as per the backup & restoration.

TS.6.19.2. Managing uptime of servers as per SLAs.

TS.6.19.3. CSP must provide backup of cloud resources. The backup tool should be accessible.

TS.6.19.4. 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.

TS.6.19.5. Ensuring prompt execution of on-demand backups & restoration of volumes, files and database applications whenever required.

TS.6.19.6. 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.

TS.6.19.7. 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.

TS.6.19.8. Periodic Restoration Testing of the Backup.

TS.6.19.9. Maintenance log of backup/ restoration.

TS.6.19.10. CSP should provide network information of cloud virtual resources.

TS.6.19.11. CSP must offer provision to monitor network uptime of each cloud virtual machine.

TS.6.20. Database Support Services:

TS.6.20.1. Installation, configuration, maintenance of the database (Cluster & Standalone).

TS.6.20.2. Regular health checkup of databases.

TS.6.20.3. Regular monitoring of CPU & Memory utilization of database server, Alert log monitoring & configuration of the alerts for errors.

TS.6.20.4. Space monitoring for database table space, Index fragmentation monitoring and rebuilding and performance tuning of Databases.

TS.6.20.5. Partition creation & management of database objects, Archiving of database objects on need basis.

TS.6.20.6. Patching, upgrade & backup activity and restoring the database backup as per defined interval.

TS.6.20.7. Schedule/review the various backup and alert jobs.

TS.6.20.8. Configuration, installation and maintenance of Automatic Storage Management (ASM), capacity planning/sizing estimation of the Database setup have to be taken care by the vendor.

TS.6.20.9. Setup, maintain and monitor the 'Database replication' / Physical standby and Asses IT infrastructure up-gradation on need basis pertaining to databases.

TS.6.21. Reporting: Further, the SI/ IA should insist on the following regular reporting by CSP during the contract:

TS.6.21.1. Availability of the cloud services being used

TS.6.21.2. Summary of alerts that are automatically triggered by changes in the health of those services.

TS.6.21.3. Summary of event-based alerts, providing proactive notifications of scheduled activities, such as any changes to the infrastructure powering the cloud resources

TS.6.21.4. 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

TS.6.21.5. Auto-scaling rules and limits

TS.6.21.6. 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

TS.6.21.7. Report of all the provisioned resources and view the configuration of each.

TS.6.21.8. Summary of notifications, triggered each time a configuration changes

TS.6.21.9. Incident Analysis in case of any un-authorized configuration changes.

TS.6.21.10. 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

TS.6.21.11. Summary of security assessment report that identifies the possible improvements (prioritized by the severity) to the security and compliance of applications deployed on cloud

TS.6.21.12. 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.

TS.6.21.13. Detailed report on network uptime, Bandwidth utilization, latency, packet loss and network health to be provided on Monthly basis.

TS.6.21.14. Report on storage status and unauthorized access attempted to be shared on quarterly basis.

TS.6.22. Security: 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-

TS.6.22.1. Strong encryption capabilities for data in transit or at rest

TS.6.22.2. Firewalls – instance and subnet levels

TS.6.22.3. Identity and Access Management (IAM): Control users' access to cloud services. Create and manage users and groups, and grant or deny access

TS.6.22.4. 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

TS.6.22.5. Managed DDoS Protection: Managed Distributed Denial of Service (DDoS) protection service that safeguards web applications running on cloud.

TS.6.22.6. Web Application Firewall: Helps protect your web applications from common web exploits that could affect application availability, compromise security, or consume excessive resources.

TS.6.22.7. Key Management Service (KMS): Managed service that makes it easy for you to create and control the encryption keys used to encrypt your data

TS.6.22.8. Certificate Manager: Easily provision, manage, and deploy Secure Sockets Layer/Transport Layer Security (SSL/TLS) certificates.

TS.6.22.9. Cloud HSM: Meet regulatory compliance requirements for data security by using dedicated Hardware Security Module (HSM) appliances within the Cloud.

TS.6.22.10. Inspector: Automated security assessment service that helps improve the security and compliance of applications deployed on cloud

TS.6.22.11. 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 SI/IA 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 and which shall be renewed and valid for entire project period.

TS.6.23. Transitioning/Exit:

TS.6.23.1. The CSP shall not delete any data at the end of the agreement (for a maximum of 45 days beyond the expiry of the Agreement) without the express approval from WBSEDCL. Any cost for retaining the data beyond 45 days shall be paid to the CSP based on the cost indicated in the commercial quote and that will be paid by the bidder on failure of exit management.

TS.6.23.2. At the end of the agreement, the bidder shall ensure that all the storage blocks or multiple copies of data if any, are unallocated or zeroed out by the CSPs so that data cannot be recovered.

TS.6.23.3. Bidder should clearly define policies to handle data in transit and at rest and shall be responsible for carrying out the exit management / transition.

TS.6.23.4. The Bidder is responsible for both Transitions of the Services as well as Migration of the VMs, Data, Content and other assets to the new environment.

TS.6.23.5. The bidder shall ensure that all the documentation required by the Department for smooth transition (in addition to the documentation provided by the Cloud Service Provider) are kept up to date and all such documentation is handed over to WBSEDCL during regular intervals as well as during the exit management process.

General Conditions of Contract [GCC]

GCC.1. General Terms:

GCC.1.1. The entire work shall be executed on OPEX MODEL. After successful completion of the project i.e 7 years from the placement of LOA, the whole system including Consumer smart meter, pilfer proof box, communication system, HES, and customized software will be handed over to WBSEDCL without any cost. The vendor also hands over all the operations, relevant documents i.e design documents, source code, integration details, component's specifications and circuit diagrams etc to WBSEDCL as per exit management plan.

GCC.1.2. Consumer Smart Meters will be supplied on lease rental basis and WBSEDCL have all rights to inspect, seize, test at own and any other third party laboratory at any time. For any adverse or irregularity or malpractice i.r.o smart meters or service connections, WBSEDCL have all the rights to lodge F.I.R or to take necessary legal action as per WBERC regulations.

GCC.1.3. The quantities of job mentioned are indicative in nature and may vary -10% to +25% (during first 5 years of the project) as per business requirement. There is no firm commitment from WBSEDCL and it reserves its right to reduce or increase the quantities indicated during the contract period time to time. The successful tenderer shall not be permitted to revise the rates quoted for such increase or decrease in the quantity. WBSEDCL shall not be liable to pay damages/compensation for such increase/decrease. WBSEDCL reserves the right to increase/decrease the work order quantity at the time of confirmation of order.

GCC.1.4. The components of all the equipments delivered must be of latest technology.

GCC.1.5. During initial installation the smart meters and boxes should be new and un used.

GCC.1.6. After successful commissioning of the smart meters, the vendor will not be allowed to dismantle and de-install the device from any premises without prior permission from WBSEDCL. Otherwise penal action will be taken against vendor including forfeit of security deposit, termination of contract. The vendor shall be responsible for time to time up gradation of hardware and software to maintain the full functionality of system without any extra cost. During entire contract period, the vendor has to deliver and install on site updates, patches etc. of the Software if any, free of cost.

GCC.1.7. The bidder has to furnish all the information as required regarding their offer.

GCC.1.8. The WBSEDCL reserves the right to reject the hardware/software, even after delivery, if any deviation from tendered specifications is found in the supplied materials at any point of time.

GCC.1.9. Bidders shall also submit proposals of work methods and schedule, in sufficient detail to demonstrate the adequacy of the bidders' proposal to meet the technical specifications and the completion time.

GCC.1.10. For non-timely completion of the project, WBSEDCL reserves the right to divide/split/modify/cancel the entire job during placement of order without showing any reason whatsoever.

GCC.1.11. The bidder shall have the sole responsibility of complete system integration and ensure that all required arrangement/procurement should be confirmed from his own or respective service providers. However, WBSEDCL have no responsibility at any point of time to contract, interact or pay directly to these entities.

GCC.1.12. The bidder shall satisfy WBSEDCL with his ability to complete the works positively within the stipulated time.

GCC.1.13. The Company reserves the right, to reject any or all the tenders, at its discretion, without assigning any reason whatsoever.

GCC.2. Steps to be taken to avoid any damages of WBSEDCL installation: Contractor shall see that no damages are caused to Electrical Cables, wires, station installations, communication lines, electric devices. If any damage is caused to or suffer or and in general to WBSEDCL Equipments or any property or by the consequences of the acts of unlawful omission of the contractor, its employees and workmen or other person connected with it, necessary repairs of replacements shall be effected by WBSEDCL at the risk and cost of the contractor. The expenses shall be recovered from the money due and payable to the contractor or by other appropriate processes.

GCC.3. Intellectual Property: Each Party represents warrants and agrees to the other Party that it shall:

GCC.3.1.1. Not use nor represent (in any manner whatsoever) the other Party's Intellectual Property as their own;

GCC.3.1.2. Treat the other Party's Intellectual Property as Proprietary Information, and use and disclose it only as set forth herein; and

GCC.3.1.3. Not do anything which, in the opinion of either Party, may bring the interests of such Party or any of its Affiliates into disrepute or damage the interests of such Party or any of its Affiliates in any way; and

GCC.3.1.4. Formulate ways in which a record is maintained giving details of a Party's Intellectual Property made available to the other party.

GCC.4. Confidentiality: All data generated during the operation period shall be the property of WBSEDCL. Any data received from WBSEDCL initially or during the contract period or data generated during the period, in no way will be shared with any third party except written prior permission from WBSEDCL. Otherwise strict legal action as per law may be taken by WBSEDCL against the vendor including other third parties who will acquire the data in unauthorized way.

GCC.5. Disclosure: In the event that any occurrence or circumstance comes to the attention of either Party that renders any of its aforesaid representations or warranties untrue or incorrect, such Party shall immediately notify the other Party of the same.

GCC.6. <u>CONTRACT AGREEMENT:</u> The contractor / Vendor (successful bidder) shall have to be entered into a Contract Agreement 30 (thirty) days from the issue of the Letter of Award (LOA) with West Bengal State Electricity Distribution Company Limited (WBSEDCL) for the proper fulfillment of the contract as per Pro forma (ANNEXURE-XIII). All Documents/ Correspondences relevant to this tender evolved during the tendering process and firming up of the Contract and during execution of the work will form part of the agreement. The successful bidder shall have to submit a copy of the whole tender document duly signed and stamped by the authorized representative of the successful bidder.

GCC.7. Contract Period: Contract will be for 10 (Ten) years from the date of issuance of LoA**.**

GCC.8. Contract Value: The contract value of the project will be the total: { (value of charges per reading data per month for 1-ph meters) x 120 x (total no. of meters 1-ph as per LoA) **+** (value of charges per reading data per month for 3-ph meters) x 120 x (total no. of meters 3-ph as per LoA)} excluding taxes and duties.

GCC.9. Performance Guarantee: As contract security, the vendor has to furnish a performance Guarantee in the form of Bank Guarantee on non-judicial stamp paper of Rs.100/- by any Schedule Bank in India, as per format enclosed ANNEXURE-XIV. The PBG shall be submitted to the CE, IT&C Cell, 3rd Floor, 'D' Block, Vidyut Bhawan, WBSEDCL. For any failure towards satisfactory performance on the part of the Bidder(s), the Bank Guarantee will be liable to encashment and forfeiture.

As Performance BG, 0.5 % of Contract Value to be submitted within 45 days from the date of issue of LOA. Validity of PBG will be 7 years from the date of LOA and claim period will be further 6 months.

GCC.10. <u>Liability for Accident:</u> If any accident occurred during the time of the execution of the work by your employee, all cost to be borne by bidder itself.

GCC.11. <u>INDEMNITY BOND:</u> The contractor / Vendor (successful bidder) shall have to produce Indemnity Bond as per Pro forma (ANNEXURE-XV) within 30 (thirty) days from the issue of LOA to the Controlling Officer of the work.

GCC.12. Completion Time:

GCC.12.1. Completion time for execution of the project in turn-key basis shall be within 18 months as mentioned in times schedule at clause IB.24. from the date of issuance of LOA. The vendor shall complete the entire job including installation, commissioning, integration, initial database creation, user training, test run and shall hand over the system for use within scheduled completion time as stipulated in this clause.

GCC.12.2. If due to any unavoidable circumstances the bidder is unable to commission Smart Meter SYSTEM and devices for some locations and if this number is less than 5% of initial ordered quantity then the vendor may apply to ordering authority for issuance of completion certificate. The reason for non-commissioning of 5% must be submitted with necessary supporting document.

GCC.12.3. The contract shall be considered completed on end of the contract period after full handing over of data, documents or material and clearing all dues towards the vendor as specified in this document. On successful completion of the entire project the controlling

officer would issue the Completion Certificate for the entire scope of installation and commissioning under the LoA.

GCC.13. Risk Purchase / Performance: Adherence to time schedules mentioned in the foregoing clauses shall be deemed as the essence of contract and if the vendor fails to deliver within the periods prescribed for such work in the rate contract order, WBSEDCL shall be entitled to execute the job through the best and nearest substitute available elsewhere on the account and at the risk of the contracting vendor or to cancel the contract and the contracting vendor shall be liable to compensate for any loss or damage which WBSEDCL may sustain by reason of such failure on the part of the Contracting Vendor.

GCC.14. Warranty:

GCC.14.1. The IA 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.

GCC.14.2. The IA further warrants that the Goods shall be free from defects arising from any act or omission of the IA or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

GCC.14.3. The warranty of the complete system shall remain valid till expiry of the Contract Period.

GCC.14.4. The IA 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. IA 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.

GCC.14.5. The maintenance of the system supplied & installed by the IA shall be comprehensive. The IA shall be responsible for providing all the spares as mentioned in scope of work of this Contract. The spares shall be maintained by the IA at no extra cost to Utility.

GCC.15. Force Majeure: "Force Majeure" shall mean any event beyond the reasonable control of the Employer or of the Vendor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:
(a) war, hostilities or warlike operations (whether war be declared or not), invasion, act of foreign enemy and civil war,
(b) rebellion, revolution, insurrection, mutiny, usurpation of government, conspiracy, riot and civil commotion,
(c) earthquake, landslide, volcanic activity, flood or cyclone, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster,
Neither party shall be considered to be in default or in breach of his obligations under the Contract to the extent that performance of such obligation is prevented by any circumstances of Force majeure, which arises after date of Notification of Award.

If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the

occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.

The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed.

Though the Vendor shall at all times use its reasonable efforts to minimize any delay in the performance of its obligations under the Contract, in case of such event the Vendor shall submit to WBSEDCL a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Vendor shall agree upon the period of such extension.

GCC.16. Exit Management Plan: 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, SI/ Implementation Agency shall provide necessary handholding and transition support to the Utility or its agency for maintaining the system post the Contract with the vendor. This includes (but not limited to):

GCC.16.1. Conducting detailed walkthrough and demonstrations for the System Solution;
GCC.16.2. Addressing the queries/clarifications of the designated staff / new agency with respect to the working / performance levels of the infrastructure.
GCC.16.3. Any pending Cloud Administration and Management Manual; Business Process Guides; Program Flow Descriptions; Integration Sequence; Interfacing Details; Troubleshooting Guides etc.
GCC.16.4. Frequently Asked Question (FAQ) Guides.
GCC.16.5. Conducting training sessions.
GCC.16.6. Knowledge Transfer.
GCC.16.7. Any other activity, over and above these, as may be deemed necessary to meet the service levels and requirements specified in the bid document.

Vendor will facilitate / allow the Utility or its nominated agency access to information reasonably required to define the current mode of operation associated with the provision of the services to enable the Utility to assess the existing services being delivered.
The vendor 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. Vendor shall get this process approved by Utility. The Plan shall include, but not be limited to, the following:

- 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.

- Plans for provision of contingent support to Utility or its nominated Agency for a reasonable period after transfer.
- The Exit Management Plan including all updates shall be presented by the IA to and approved by the Utility or its nominated agencies.
- During the Exit Management Period, the SI/ IA shall use its best efforts to deliver the services.

In case WBSEDCL observes the lack of willingness to manage transit/ sharing of information or lack of support from AIA end , WBSEDCL shall have absolute discretion to levy severe penalties and deduct the amount from performance bank guarantee.

GCC.17. Exit clause after end of contract: Till the end of contract IA should complete all system handover process to utility or it's nominated agency with all access, documents, handholding trainings etc. and Exit Management plan will be followed as per clause GCC.16. Also, The IA shall not delete any data from CSP for a maximum of 45 days beyond the expiry of the Agreement without the written approval from WBSEDCL. Any cost for retaining the data beyond 45 days shall be paid to the CSP based on mutually agreed rate.

GCC.18. Cancellation/Termination of Order: WBSEDCL shall have the right to repudiate the contract if the work is not completed within schedule completion time as per "Time Schedule" and "Completion Time" Clause. WBSEDCL will be at its discretion to take possession of the smart meters installed at consumer premises along with all other equipments and should have the right to invoke and appropriate the entire amount of PBG without citing any cause thereof. The following causes may also lead to cancellation of LOA.

GCC.18.1. Non acceptance of LOA as per "Acceptance" clause.
GCC.18.2. Non submission of Performance BG within time.
GCC.18.3. If the vendor is found to have Conflict of Interest.
GCC.18.4. If failed to implement the project.
GCC.18.5. If monthly review of performance of the system not upto the performance level.
GCC.18.6. If the services rendered by the vendor are failed to meet the bare minimum requirements of WBSEDCL for three consecutive quarters after commencement of work, then Discom will have liberty to terminate the contract.

In each above cases 15 days termination notice shall be issued prior to termination of LOA and exit management plan will be followed.

GCC.19. Premature Termination: If the vendor exits from the contract transferring the entire liability or part thereof prior to natural termination of the contract period, WBSEDCL should have the right to invoke and appropriate the entire amount of PBG without citing any cause thereof. Also, WBSEDCL will be at its discretion to take possession of the smart meters installed at consumer premises along with all other equipments. In the event of Termination prior to Work Completion the exit management plan as per GCC.15 will be followed for continuation of system operations.

GCC.20. Termination for Convenience: WBSEDCL, by sending Notice to the Contractor, may terminate the Contract, in whole or in part, at any time for its convenience. The Notice of termination shall specify that termination is for WBSEDCL's convenience, the extent to which performance of the Contractor under the Contract is terminated, and the date upon which such termination becomes effective. In such cases, the Goods that are complete and ready for

shipment within twenty-eight (28) days after the Contractor's receipt of the Notice of 1 termination shall be accepted by WBSEDCL at the Contract terms and prices/ mutually agreed rate. For the remaining Goods, WBSEDCL may elect:

GCC.20.1. To have any portion completed and delivered at the Contract terms and prices; and/or

GCC.20.2. to cancel the remainder and pay to the Contractor an agreed amount for partially completed Goods and Related Services and for materials and parts previously procured by the Contractor.

GCC.21. Arbitration & Legal Jurisdiction:

GCC.21.1. During execution of this contract, if any dispute arises thereby, shall be settled amicably between the contractual parties.

GCC.21.2. In case disputes or differences between parties not resolved amicably, between parties either party may refer such matter to arbitration in accordance with the provisions of the Arbitration and Conciliation Act - 1996 or any statutory modification thereof. The venue of Arbitration shall be Kolkata only.

GCC.21.3. The necessary legal affairs and / or court case shall be exclusively within the jurisdiction of Calcutta High Court or any subordinate court having competent jurisdiction at Kolkata only.

GCC.22. Conflict of Interest:

GCC.22.1. The Bidder shall not have a Conflict of Interest that may affect the Tendering Process. Any Bidder found to have a Conflict of Interest as per the following reasons, shall be disqualified. In the event of disqualification, the Bid Security of the bidder shall be forfeited for the time, cost & effort of the Authority including consideration of such Bidder's Proposal, without prejudice to any other right or remedy that may be available to the Authority hereunder or otherwise.

GCC.22.2. Any bidder found to have a conflict of interest if his near relative is posted as an employee/ officer in any capacity in WBSEDCL, who is associated with the Tender inviting Authority or vice versa.

GCC.22.3. Any bidder found to have a conflict of interest if any employee of the bidding firm/company has or develops a financial or other interest with any employee / officer of WBSEDCL associated with the Tender inviting Authority during the execution of the Contract or vice versa.

GCC.22.4. Any bidder has a relationship with another bidder/bidders directly or through common third parties that puts them in a position to have access to each other's information about or to influence the tendering processes of either or each of the other bidder.

GCC.23. Liquidated damage: The timely commissioning and configuration of entire system as per scope of LOA and start of delivery service throughout the total project is the basic consideration and essence of the contract and WBSEDCL reserves the right to repudiate the contract if the vendor fails to do the work within stipulated period. However, the ordering authority may at his discretion waive this condition with imposition of liquidated damage in case of delay due to WBSEDCL dependency.

GCC.23.1. Calculation of LD: During the contract period deviation of any condition attracts the penalty as LD. In case, there is a delay in installation & commissioning of meter Lot as per time schedule, Liquidated Damages shall be charged at a rate of 0.5% of the contract value of that unfinished portion for delay per week and recovered from the vendor subject to maximum of 10% of the that contract value.

GCC.23.2. If the vendor continuously being deviated from its planed schedule after numbers of official reminder, then the LOA is liable to be cancelled and placed on an alternate tenderer at the risk and cost of the original tenderer, unless such failure is due to Force Majeure as defined or due to WBSEDCL defaults.

GCC.24. Payment:

GCC.24.1. The payment shall be made to the IA in Indian Rupees (INR) only.

GCC.24.2. The payment to the IA shall commence only after: Delivery, site installation, integration and operationalization of first lot of Smart Meters each with related hardware, software and equipment and successful Operational Go-Live of the system as defined in this Contract.

GCC.24.3. Terms of Payment:

GCC.24.3.1. No advance payment will be made against this order in any circumstances for turn-key implementation of entire project

GCC.24.3.2. Monthly Payment of Consumer billing data = (Cost per billable reading per month – Deduction as per SLA per month and applicable LD)

GCC.24.3.3. The Monthly Payment as per above formula is final and beside nothing will be Payable.

GCC.24.3.4. Payment for Replaced meter as per clause SW.17.1 will be paid at actuals on submission of original invoice.

GCC.24.4. Submission of bills for payment:

GCC.24.4.1. All the bills in triplicate with relevant papers, documents are to be submitted for payment addressing to the Office of the chief Engineer, IT&C Cell, 3rd Floor, 'D' Block, Vidyut Bhavan, Kolkata – 700091. Bill submission date will be considered after successful acceptance of bill along with all supporting documents. After successful acceptance generally, payment will be processed within due date i.e. 30 working days

GCC.24.4.2. Only successful billing data available through AMI as per clause SW.22., will be considered for monthly billing purpose. 1st Monthly reading Bill of newly installed consumer smart meter can only be submitted after availability of reading data through AMI.

GCC.24.4.3. Triplicate monthly bill with SLA deductions supported with relevant documents, calculation sheet of performance certificate of AMI SYSTEM, compiled in one

Excel format and the following certificates and reports are to be submitted to the Controlling Officer of the project. Only one consolidated bill on monthly basis per month can be placed for payment.

GCC.24.4.4. In case of first claim, of Monthly Payment bill for any Device then "Commissioning Certificates" (ANNEXURE-XVII), signed by the concerned site officer and supervising officer is to be submitted as per clause SW.32.

GCC.24.4.5. For claim of Monthly Payment bill, System generated "Performance Certificate" (ANNEXURE-XVIII) as per SLA is required to be submitted on monthly basis as per clause SW.32

GCC.24.5. Payment Security: A stand by LC (Letter of Credit) of two months monthly bill amount will be provided against OPEX part of the project. Details terms and conditions of the stand by LC included at ANNEXURE-XIX.

GCC.25. Price Schedule:

Sl.	Particulars	Unit	Qty	Per – Meter Per Month Cost	Applicable Tax	Total Cost for 120 months (Excluding Tax)
	Bidder should consider total project cost in OPEX and rate against meter per month wise unit price.					
1	Service Charge for 1-ph Consumer Meter per Month on OPEX	Nos	52,189			
2	Service Charge for 3-ph Consumer Meter per Month on OPEX	Nos	1,94,544			

1. Total contract period will be considered 10 years from date of LoA. Meter should be delivered and installation lot wise as per time schedule specified.
2. Component wise price to be provided.
3. 1st bill on any smart meter can only be claimed after system Go-live of final acceptance of the system and availability of meter data through remote reading to HES.
4. NO SLA is applicable upto implementation period of 1.5 years.
5. Installation of meter before schedule timeline is allowed.
6. Delayed meter installation schedule will attract LD as well as the meter service period will be reduced as the end of contract date is fixed.

GCC.26. Price:

GCC.26.1. Incomplete or partial quotation will not be accepted and shall be liable to be rejected.

GCC.26.2. Price should be quoted in the Price Bid Sheet as per format given in **BoQ**. No deviation in any form in the Price Bid Sheet(s) is acceptable. The quoted price shall remain firm throughout the period of the contract and no adjustment shall be made to the contract price in respect of rise or fall in cost of Installation & Commissioning Charge.

GCC.27. WBSEDCL personnel for liaison:

GCC.27.1. Controlling Officer: Chief Engineer, IT & C Cell. - He would issue the successful completion certificate for the entire scope of work under the LoA.

GCC.27.2. Nodal Officer: Addl. Chief Engineer, IT & C Cell - He would overall supervise & monitor all the activities.

GCC.27.3. Supervising Officer: S.E / D.E , IT&C Cell – He would monitor detailed execution of the project.

GCC.27.4. Paying Authority: For Supply, Delivery, Installation, Commissioning and availability of billable reading: Manager (F&A), Establishment-Corporate, Vidyut Bhawan, WBSEDCL.

GCC.28. Enclosure:

Item	Description
SLA	Service Level Agreements and Key Performance Indicators
Price Schedule	Item Rate BoQ
FORM-I	Declaration of Mandatory Condition
FORM-II	Checklist of Mandatory Condition
FORM-III	List of Consortium Members/ Sub-Contractor(s)
ANNEXURE-I	Format of Consortium Agreement to be entered amongst all Members of a bidding Consortium
ANNEXURE-II	Format of Power of Attorney by Consortium Member in favour of Lead Consortium Member
ANNEXURE-III	Format of Power of Attorney by Lead Consortium Member authorizing an Individual Designated Representative for the Consortium
ANNEXURE-IV	Format of Letter of Consent by Consortium Member reviewing each element of the Bid
ANNEXURE-V	Bid Proposal

Item	Description
ANNEXURE-VI	Proforma of Bank Guarantee for Bid Guarantee
ANNEXURE-VII	Data Requirement Sheet
ANNEXURE-VIII	Techno Commercial Deviation Sheet
ANNEXURE-IX	Proposed Key Resource Format
ANNEXURE-X	Pre bid query Format
ANNEXURE-XI	Proforma of Declaration of Black Listing
ANNEXURE-XII	Proforma of Declaration Regarding abandonment or Rescission of Work
ANNEXURE-XIII	Format of Contract Agreement
ANNEXURE-XIV	Format for Bank Guarantee for contract Performance
ANNEXURE-XV	Format of INDEMNITY BOND
ANNEXURE-XVI	Format of Installation Certificate
ANNEXURE-XVII	Format of Commissioning Confirmation
ANNEXURE-XVIII	Format of the Performance Certificate
ANNEXURE-XIX	Terms and Conditions of Letter of Credit

Service Level Agreements (SLA)

Sl No	SLA Parameters	SLA Deductions
1	**During installation and commissioning period** Upto 18 months from the date of issuance of LoA.	**No Deduction**
1.1	1st Bill can be submitted after availability of billing data through AMI.	**No Deductions**
After installation and commissioning period (Beyond 18 months (T1) from the date of issuance of LoA).		
2. Billing Data Availability (As per SW.21.1)		
2.1.1	Vendor will have to ensure **100%** billing data either through AMI or through CMRI uploading.	**Deduction of 1% of the monthly invoice will be done for every 1% non availability of billing data.** (e.g: for 98% of total billing data availability 2% deduction of bill amount will be done)
2.1.2	Upto **95%** availability of AMI billing data and upto **5%** CMRI data.	No Deductions
2.2.1	Then after every reduction in AMI billing data by 1% upto **75%** of data availability.	**Deduction of 2% of the monthly invoice will be done.** (e.g: for 80% AMI billing data availability 30% deduction of bill amount will be done)
2.2.2	Less than **75%** availability of AMI billing data	**No amount will be paid.**
3. Scheduled Data Reading of Other Profiles		
3.1.1	Instantaneous Data From 95% of meters within 8 hours	No deduction
3.1.2	Then after reduction of every 0.5%	Deduction of 0.2% of the monthly invoice- Maximum upto 2% penalty
3.2.1	Load profile Data From 95% of meters within 12 hours	No deduction
3.2.2	Then after reduction of every 0.5%	Deduction of 0.5% of the monthly invoice- Maximum upto 3% penalty
3.3.1	Midnight Data From 95% of meters within 24 hours after midnight	No deduction
3.3.2	Then after reduction of every 0.5%	Deduction of 0.2% of the monthly invoice- Maximum upto 1% penalty
4. On-Demand Remote reads of meters (data strength: Collection of 7 days of interval energy or similar)		
4.1	From 90% of the meters in 30 minutes	No deduction
4.2	Then after reduction of every 0.5%	Deduction of 0.2% of the monthly invoice- Maximum upto 2% penalty
5. Remote Connect/ Disconnect with acknowledgement/ response for selected meters		
5.1	Action performed 99.9% of meters within 6 hours	No deduction
5.2	Then after reduction of every 0.5%	Deduction of 0.5% of the monthly invoice- Maximum upto 3% penalty
6. Remote Firmware upgrade with acknowledgement/ response for selected meters		

6.1	Action performed 99.9% of meters within 24 hours	No deduction
6.2	Then after reduction of every 0.5%	Deduction of 0.5% of the monthly invoice- Maximum upto 3% penalty
7. Availability of AMI System per month		
7.1	Availability >= 95.0%	No deduction
7.2	Then after reduction of every 0.5%	Deduction of 0.5% of the monthly invoice- Maximum upto 6% penalty

Conditions:

1. The deduction shall be computed as IA's Monthly Invoice X penalty % as computed in above table.

2. Assuming on ith day or event, action was done on Yi% of total meters and within stipulated time, data was received from Zi% of Yi% meters. So, the average SLA over the month shall be computed as: Σ(Yi*Zi)/ Σ(Yi)

3. For system availability, the availability is computed as: (THM-(S1*1+S2*.8+ S3*.6))/THM where THM is scheduled operating hours for the month; All planned downtime (for maintenance) would be deducted from the total operation time for the month to give the scheduled operation time. All planned downtime should be pre-approved from competent authority of WBSEDCL.

S1/S2/S3 is the total non-available hours in Severity Level-1/Level-2/ Level-3 (Given Below)

4. Exclusions: Power Outages, Meter bypass by consumers, Local Temporary/ Permanent disconnection by Utilities, Meter burnt shall be excluded from above SLA calculations.

5. For seamless integration between MDMS and HES system coordination from both vendors are required; though service orders, commands and data flow between two systems will be monitored by integrating tool as well as both system end and the reports, logs etc. from both system will ensure fault of any sub-system fault. If fault is found from this bidders scope then suitable SLA will be applied on him.

6.IA shall submit system generated reports for cases mentioned above based on data available in HES/MDM. For the balance cases, joint visit of IA and Utility officials shall be carried out and field inspection report shall be submitted by AI to Utility for suitable action.

7. For the purpose of joint visit, IA shall put a request to Utility who should allocate manpower for joint visit within 3 working days. In case of non-allocation/ non-availability of manpower from Utility, the report submitted by IA shall be final and actionable by Utility.

7. The penalties would be computed on the basis of performance of IA for a calendar month.

8. IA shall be responsible for collection of billing data and disconnection / reconnection for all Smart Meters which could not be remotely accessed.

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.

d. Change Request (CR) are related to functional modification, change in business process, reporting, viewing etc.

The IA shall implement an appropriate online SLA Application 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 WBSEDCL towards desired resolution. The incidents are categorized as mentioned in below table.

Category	Definition
Severity 1 – Urgent	Complete system failure, severe system instability, loss or failure of any major subsystem component such as to cause significant number of end users are impacted. Partial outage of HES functions unavailability of Utility user interface Any functional loss or subsystem failure due to interruption in communication link fail Stoppage of data backup at DC/DR as per requirement Cyber Security issues leading to unauthorized access to systems/applications
Severity 2 – Serious	Outage at Network Operation cum Monitoring Centre Failure of any Integration service. Any application performance issue that occurring slow system response and not meeting with individual KPIs, Unavailability of man power as per contract Non-availability of required inventory of spares specified as per requirement Data unavailability in MDMS from data collection source i.e HES Interruption of data exchange with utility enterprise systems Not adherence to RTO, RPO Applications not following the volumetric parameters: Partial outage of AMI functions i. Outage of VEE ii. Billing Determinants iii. Reports Breach of data privacy
Severity 3 – Minor	Non-availability of reports as per requirement 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/IA before being registered for resolution] Moderate loss of performance resulting in multiple users (including public users) or certain group of users of any logical sub set. Malfunctioning of any functional module or minor bug in function Any exception related to business function Change in report data etc.
Severity 4- Change Request (CR)	Any change request related to functional modification, change in business process, reporting, viewing etc. Change request will be resolved within mutually agreed timeline and penalty measure according to criticality of the cr

Response & Resolution Time: The target times within which the IA 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 IA subject to the maximum time defined in the following table. In case, IA doesn't respond within initial response time, the support shall be deemed acknowledged by the IA.

b. The Action Resolution Time is the period from the acknowledgement of support request to the IA 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 (Working Hours)	Initial Response Time (Non-Working Hours)	Maximum Action Resolution Time	Action
1	15 minutes	30 minutes	2 hours	An urgent or emergency situation requiring continuous attention from necessary support staff until system operation is restored – may be by Work around.
2	15 minutes	20 Hours	24 Hours	Attempt to find a solution acceptable to WBSEDCL (dependent on reproducibility), as quickly as practical.
3	2 hours	1 day	10 days	Evaluation and action plan. Resolution time is dependent on reproducibility, ability to gather data, and WBSEDCL's prioritization. Resolution may be by workaround.
4	24 hours	48 Hours	Mutually agreed time	Change request will be resolved within mutually agreed timeline between IA and utility depends on the criticality.

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.

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 IA to correct the issue
   b) Applicable Severity level
   c) Time of reporting to the IA 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 IA'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:

Availability per Month = (THM-(S1*1+S2*.8+ S3*.6))/THM

SLA change process: The parties may amend this SLA by mutual agreement. Changes can be proposed by either party. The Bidder representative may initiate an SLA review at least half yearly which is subject to approval from WBSEDCL. The Bidder representative will maintain and distribute current copies of the SLA document as directed by WBSEDCL. Additional copies of the current SLA will be available at all times to authorized parties.

Price Schedule

A. BoQ

Validate Print Help

Item Rate BoQ

Tender Inviting Authority: Chief Engineer, IT&C Cell, WBSEDCL BoQ

Name of Work: Smart Meter with Communication System and Cloud Based Head End System for AMI Solution in OPEX Model.

Tender No: IT&C/33.10(iv)/ 3468 Dated : 19/02/2021

Bidder Name :	

PRICE SCHEDULE

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevent columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBE	TEXT	NUMBER	TEXT	NUMBER	NUMBER	TEXT	NUMBER	TEXT
Sl. No.	Item Description	Quantity	Units	Unit rate for per meter per month (INR)	GST (%)	HSN / SAC Code	TOTAL AMOUNT for 120 months (Excluding GST)	TOTAL AMOUNT In Words
1	Smart Metering System, Data Fetching for 1-ph Consumer on OPEX	52137	Nos				0.00	INR Zero Only
2	Smart Metering System, Data Fetching for 3-ph Consumer on OPEX	194167	Lot				0.00	INR Zero Only
Total in Figures							0.00	INR Zero Only
Quoted Rate in Words		INR Zero Only						

B. Detailed Component wise price:

1	Smart Meters	Unit	Quantity	Price as on Bid submission date (In INR)
a	Three Phase (3 Ø) Whole Current Smart Meter without Communication Module (Rating 5-30A)	Nos.	1,94,544	
b	Single Phase Smart Meter without Communication Module (5-30A /20-100A))	Nos.	52,189	
2	**Meter Box**			
a	Polycarbonate meter box for Three Phase WC Meters with Installation Accessories	Nos.	1,94,544	
b	Polycarbonate meter box for Single Phase WC Meters with Installation Accessories	Nos.	52,189	
3	**Communication Module**			
a	Modular Cellular (4G - LTE with fall back on 2G) Communication Module for smart meters	Nos.	2,46,733	
4	**Application Software Licenses**			
a	Head End System (HES) Perpetual License	Nos	2,46,733	
b	Meter Installation Mobile App	LS	1	
5	Annual CSP charge for 2.5 lakh end points	LS	1	
6	Annual MPLS link charge	LS	1	

FORM- I - DECLARATION OF MANADATORY CRITIRIA/ PRE-QUALIFICATION CRITERIA

	Qualifying Requirement (QR) of Bidder			
Sl.	**Description**	**Qualification Criteria**	**Evaluation/ Document Required**	**Submitted Yes/ NO**
(G) General Pre-qualification Criteria of Bidder				
1	Bidders Identity	The bidder shall be a private/public Company registered under Companies Act 1956 / 2013 proprietary firm / partnership firm. [The bidder / Each Member of Consortium/ Sub-Contractor need to satisfy this condition]	Certificate of Incorporation and Registration.	
2	Quality Certification	The Bidder should be an ISO 9001:2008 certified. OR Bidder should have CMMI Level 3 (minimum) certification. [In case of consortium both, the lead bidder and consortium partners need to satisfy this condition]	A valid ISO/CMMi certificate on or before the date of publication of the tender.	
3	Experience	The Bidder must have successfully executed & implemented AMR/AMI projects (meeting any of the below criteria) in an Indian/ Global Power Distribution Utility/ Distribution Franchisee in the last 7 years (i.e. FY 2014-15 to till the previous date of publication of this tender). b) Successfully executed AMR/AMI project covering implementation of minimum 50,000 nos. of Meters with required hardware, software and other associated accessories in a single/ multiple contract and project/ projects should have been operational for at least 01 year in last 07 years.	List of clients and individual Client's PO / WO / LOI / LOA / Contract/Certification on client letterhead and Performance certificate and contact details of clients as proof provided for the last 7 years needs to be submitted.	
4	Financial Strength	d) The bidder should have average annual turnover of Rs. 250 Crores during last three financial years ending on 31- Mar-2020 (i.e. for the F.Y. 2017-18, 2018-19 & 2019-20). [In case of consortium bids, Minimum 50% to be met by Lead Bidder and balance to be met by other consortium members]	Income Tax return, All enclosures forming the part of Income Tax return (as applicable) and Audited Balance Sheet and certificate from Chartered Accountant stating turnover from each relevant line of business	

		e) The bidder should have a minimum working capital or its sanctioned limit of Rs.250 Crores during financial year ending on 31-Mar-2020. [In case of consortium bids, Minimum 50% to be met by Lead Bidder and balance to be met by other consortium members]	Audit report for company registered under Company's Act & Tax Audit report for others to be submitted as a proof of net worth. In case of sanctioned limit, Bank sanctioned letter of the limit / Company secretary signed certification is required.	
		f) Net Worth for the each of the last three Financial Years should be positive. Consider Financial year ending on 31- Mar-2020 (i.e. for the F.Y. 2017-18, 2018-19 & 2019-20). [In case of consortium, all need to satisfy this condition]	FORM- II (B) with attachments. (duly audited and approved by Authorized Audit Firm / CA)	
5	Workforce Capability	The Bidder should have at least 15 personnel on its rolls with a minimum AMR/AMI implementation experience. The details of experience, roles & responsibilities of the personnel should be as per SW.25.	Signed resume of employees need to be submitted as per enclosed format in ANNEXURE-IX.	
6	OEM Implementation Partner Status	The bidder should be an authorized implementation partner of OEM products proposed in the bid and should possess all the necessary authorizations of the OEM in order to supply, customize, implement and support their OEM solutions.	Authorization letter from OEM for next 7 years back to back support of as per the format attached for Manufacturer's authorization form (MAF)	
7	Authentication	Bidder must submit a certificate on company letterhead, stating that the bidder hasn't been blacklisted by any institution/ organization/ society/ company of the Central / State Government ministry/department, or its public sector organizations during the last five years, with company stamp and signed by authorized signatory. [In case of consortium all need to satisfy this condition]	Self Certificate on company letterhead with company stamp and signed by authorized signatory as per ANNEXURE- XI and ANNEXURE-XII.	
8	Office Location	Bidder shall have a registered office and operations in India for at least one year prior to submission of the bid. [In case of consortium, each member of consortium also shall have registered office in India]	Certificate of Incorporation/Registration Documents should be submitted as proof of the same	
(H) Qualification Requirement for SI (To be satisfied by the System Integrator only)				
1	Quality Assurance	8. The SI should be an ISO 41001:2018 certified. 9. SI should have CMMI Level 3 certification. 10. SI should have ISO 27001:2013 or latest certifications.	valid ISO and CMMI certificate on or before the date of publication of the tender.	

2	Large Projects Implementation Experience	The SI should have implemented the Billing & CRM system for power distribution Utility in Global / India for Minimum 10 Lacs Consumers in last 10 years and system till the date of publication of this tender.	Purchase orders/ Work award/ work order from End Customer/ Certificate from the client on successful implementation and operation of the project. (Power Utility) with detailed scope of work.	
3	Integration capability between HES/MDAS with utility systems	System Integrator must have successfully executed AMI projects (Consists of Smart Meters, DCU/Gateway/Router/ GPRS Access Point and HES) with cumulative installation base of Minimum 1.5 lakh end points in the last 5 years till the date of publication of this tender.	Purchase orders/ Work award/ work order from End Customer/ Certificate from the client on successful implementation and operation of the project (Power Utility) with detailed scope of work	
(I) Qualification Requirement for DL (To be satisfied by the Power Distribution Licensee only)				
1	Authentication	Distribution licensee in India for last 5 consecutive years immediately preceding the Bid due date	Self-attested copy of the license document as per the act	
2	Quality Certification	Bidder should have ISO 9001:2015 certificate	Copy of valid certificate	
3	Work Experience	Distribution Licensee (on its own or through its majorly owned subsidiary) must have successfully executed & implemented AMI Projects for minimum 50,000 metering points for its own consumers and such projects should be in operation for at least one year as on Bid Date.	Evidence of such deployment along with PO/ WO/ LoA / Contract / Appropriate Certification	
(J) **Qualification Requirement for MM/ Proposed MM (To be satisfied by the Meter Manufacture only)**				
1	Technical Experience	The MM should be in the business of manufacturing Static Energy Meters and should have state of the art facility in India. Should be in Metering Business for at least 10 years as on date of Bid Submission.	Factory License Certificate/ MoA mentioning nature of Business. Purchase orders / Framework agreements for this duration or other documents that prove to this aspect.	
2	Smart meter Experience	The MM must have successfully Supplied / Implemented, 1,00,000 Smart Meters in AMI projects in Indian/ Global Power Distribution Utility in the last 10 years as Main Bidder, Consortium member/Sub-contractor (as on date of Bid Submission date)	Individual Client's PO/ WO/ LOA/Contract/ Certification on client letterhead.	
3	Capacity	MM/ Proposed MM should have experience of manufacturing and supply of Static electricity meters/ Smart electricity meters. Minimum 5 Lacs Single Phase Meters or 1 Lac Single Phase Smart Meters per annum. Minimum 1 Lac Three phase Whole Current Meters or 50,000 Three Phase Smart Meter per annum.	Proof of Work order & performance certificate/ work order completion certificate to be submitted.	

4	ISI certification	Smart Meters offered should meet the relevant standards applicable in India ' IS:16444 with latest amendment' and should have BIS Certification.	Copy of Certificate for the Smart Meter offered should be furnished.	
5	Quality	MM should have valid ISO9001 & 14001 for the manufacturing facility as on the bid submission date.	ISO certificate	
6	Testing facility	The bidder should have in-house NABL accredited Laboratory Inside his factory premises.	A valid registration certificate mentioning issue / renewal / expiry date	
(K)	**Qualification Requirement for Proposed Head End System**			
1.	Experience	The proposed HES must have following deployment capabilities in Indian/ Global Utilities: • Successfully Commissioned cumulative 5 Lacs end points in AMI project. • Single Large AMI deployment experience of at least 30,000 Smart meters, with RF or GPRS. • At least 3 different meter brands operating on single network and Head End System. • Successful integration of HES with Cots MDMS product. All projects should be in operations as on bid submission date.	Purchase order/Completion/ Go-live certification from client. Client certification with name, contact number and email with all required information (WBSEDCL may contact the client for verification purpose only)	
(L)	**Qualification Requirement for Proposed Cloud Service Provider**			
1	Certification	Proposed CSP should be Tier-3 MeitY empanelled Data Centre within INDIA.	Valid Letter of Award of Empanelment from MEITY.	
2	DC DR Criteria	Proposed CSP must be operating at least two (2) Data Centre / Disaster Recovery Centre Facilities in India at time of submission of the bid. CSP should be able to provide both DC & DR services together without any limitations as per MeitY guidelines.	Self-certificate from the CSP mentioning the location details signed by authorised signatory of the CSP for this bid.	
3	Experience	The cloud service provider must have at-least two (2) work orders from Central Government / State Government / PSU / Semi-Government of India	Self-certificate from the CSP	

FORM- II (A)

Checklist of Mandatory Conditions

West Bengal State Electricity Distribution Company Limited				
Tender Notice No. WBSEDCL/IT & C /33.10 (iv) / 3468 Dt. 19.02.2021				
Details of information to be provided in support of Mandatory condition (copy of Supporting document to be submitted with the bid)				
Sl. No.	Item Details	Details		
1	Contact Person with Telephone No., Mobile No., E-mail ID and FAX No. of the Bidder			
2	Communication details of Service Centre at Kolkata			
3	PF Registration No.			
4	Permanent Account No. (PAN)			
5	Sales Tax Registration No.			
6	GST registration No.			
7	Service Tax Registration No.			
8	SSC Code of GST			
9	GST Registration No.			
10	Company Registration No.			
11	Annual Turn Over for each of last three financial years	2017-18 (in ` crore)	2018-19(in ` crore)	2019-20(in ` crore)

12	Orders received and executed by the bidder	Organization where worked with Contact Telephone No. and FAX No.	Order No. and Date with Value of the Order	Completion / ongoing Certificate with date (indicating order reference no.)
				Signature of the Bidder with Seal

FORM- II (B)

Historical Financial Performance

Bidder's Legal Name: _____ Date: _____

JV Member Legal Name: _____

Page _____ of _____ pages

To be completed by the Bidder and, if JV, by each member

Financial information	**Historic information for previous 3 years**				
	Year 1	**Year 2**	**Year 3**	**Avg.**	**Avg. Ratio**
Information from Balance Sheet					
Total Assets (TA)					
Total Liabilities (TL)					
Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					

Attached are copies of financial statements (balance sheets, including all related notes, and income statements) for the years required above complying with the following conditions:

(a) Must reflect the financial situation of the Bidder or member to a JV, and not sister or parent companies

(b) Historic financial statements must be audited by a certified accountant

(c) Historic financial statements must be complete, including all notes to the financial statements

(d) Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted)

FORM-III: 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)		
HES Provider (if any)		
Cloud Service Provider (if any)		
[Other] (if any)		

ANNEXURE-I: 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. …… dated ……as per its Clause IB.3.4.

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

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

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

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

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

for the purpose of submitting the Bid in response to the Tender and in the event of selection as Selected Bidder to comply with the requirements as specified in the tender document and ensure execution of the Tender Document as may be required to be entered into with WBSEDCL.

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

WHEREAS Bid document stipulates that the Bidders qualifying on the strength of a Bidding Consortium shall submit a legally enforceable Consortium Agreement in a format specified in the document, 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 tender document, as specified herein.

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

NOW THEREFORE, THIS INDENTURE WITNESSTH AS UNDER:

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

1. In consideration of the selection of the Consortium as the Bidding Consortium by WBSEDCL, we the Members of the Consortium and Parties to the Consortium Agreement do hereby unequivocally agree that M/s..... *[Insert name of the Lead Member]*, shall act as the Lead Member as defined in the RFP for self and agent for and on behalf of M/s. ....., M/s. ....., M/s. ....., and M/s. ..... *[the names of all the other Members of the Consortium to be filled in here]*.

2. The Lead Consortium Member is hereby authorized by the Members of Consortium and Parties to the Consortium Agreement to bind the Consortium and receive instructions for and on behalf of all Members. The Roles and Responsibilities of all other members shall be as per the **Annexure** to this Agreement.

3. The Lead Consortium Member shall be liable and responsible for ensuring the individual and collective commitment of each of the Members of the Consortium in discharging all their respective Roles and Responsibilities. Each Consortium Member further undertakes to be individually liable for the performance of its part of the Roles and Responsibilities without in any way limiting the scope of collective liability envisaged in this Agreement in order to meet the requirements and obligations of the Tender.

4. In case of any breach of any of the commitment as specified under this Agreement by any of the Consortium Members, then all Members of the Consortium and Parties shall be liable to meet the obligations as defined under this Tender.

5. Except as specified in the Agreement, it is agreed that sharing of responsibilities as aforesaid and obligations thereto shall not in any way be a limitation of responsibility of the Lead Member under these presents.

6. This Consortium Agreement shall be construed and interpreted in accordance with the Laws of India and Courts at KOLKATA shall have the exclusive jurisdiction in all matters relating thereto and arising there under.

7. It is hereby agreed that the Lead Consortium Member shall furnish the Bid Security, as stipulated in the Tender, on behalf of the Bidding Consortium.

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

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

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

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

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

13. It is hereby expressly agreed between the Parties to this Consortium Agreement that neither Party shall assign or delegate or subcontract its rights, duties or obligations under this

Agreement to any person or entity except with prior written consent of [WBSEDCL].

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

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

1. Common Seal of ..... has been affixed in my/ our presence pursuant to Board Resolution dated	For M/s. ..... (Party 1) *[Signature of Authorized Representative]* ..... *[Name of the Authorized Representative]* *[Designation of the Authorized Representative]*
1.1. Witness 1 [Signature of Witness 1] ..... Name: Designation:	1.2. Witness 2 [Signature of Witness 1] ..... Name: Designation:
2. Common Seal of ..... has been affixed in my/ our presence pursuant to Board Resolution dated	For M/s. ..... (Party 2) *[Signature of Authorized Representative]* ..... *[Name of the Authorized Representative]* *[Designation of the Authorized Representative]*
2.1. Witness 1 [Signature of Witness 1] ..... Name: Designation:	2.2. Witness 2 [Signature of Witness 1] ..... Name: Designation
3. Common Seal of ..... has been affixed in my/ our presence pursuant to Board Resolution dated	For M/s. ..... (Party 3) *[Signature of Authorized Representative]* ..... *[Name of the Authorized Representative]* *[Designation of the Authorized Representative]*
3.1. Witness 1 [Signature of Witness 1] ..... Name: Designation:	3.2. Witness 2 [Signature of Witness 1] ..... Name: Designation:

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

ANNEXURE-II: 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 WBSEDCL has issued for Tender No. ……..(the "RFP") dated …….. for inviting Bids in respect of Appointment of AMI Implementing Agency for Implementation of AMI Project (the "Project") on the terms contained in the RFP;

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

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

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

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

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

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

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

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

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

Accepted
…… (Signature of Attorney)
[Insert Name, designation and address of the Attorney]
Attested
……..
(Signature of the executant)
(Name, designation and address of the executant)
…….
Signature and stamp of Notary of the place of execution

Common seal of ……. has been affixed in my/our presence pursuant to Board of Director's Resolution dated……
WITNESS:
1. ……. (Signature)
Name …….
Designation.....……..
2. ……. (Signature)
Name …….
Designation.....……..

Notes

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

b. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.

c. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

ANNEXURE-III: Format of Power of Attorney by Lead Consortium Member authorizing an Individual Designated Representative for the Consortium

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

Know all men by these presents, we ……*[Insert name and address of the registered office of the Lead Consortium Member of the Bidding Consortium]* do hereby constitute, appoint, nominate and authorize Mr./Ms. …… *[Insert name and residential address]*, who is presently employed with us and holding the position of ……. as our true and lawful attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to submission of our Bid in response to Tender No. [Tender Details] for Appointment of SI/ Implementation Agency for Implementation of MDMS Project (the "Project") issued by WBSEDCL, 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 WBSEDCL may require us to submit. The aforesaid attorney is further authorized for making representations to WBSEDCL, and providing information / responses to WBSEDCL, representing us in all matters before WBSEDCL, and generally dealing with WBSEDCL in all matters in connection with our Bid till the completion of the bidding process as per the terms of the RFP.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall be binding on us and shall always be deemed to have been done by us.
All the terms used herein but not defined shall have the meaning ascribed to such terms under the RFP.

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

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

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

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

Common seal of …… has been affixed in my/our presence pursuant to Board of Director's Resolution dated……
WITNESS:

1. ……. (Signature)
Name ……
Designation.....……..
2. ……. (Signature)
Name ……
Designation.....……..

Notes:

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

b. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.

c. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

ANNEXURE-IV: Format of Letter of Consent by Consortium Member reviewing each element of the Bid

[On the letter head of each Member of the Consortium including Lead Member]
[Reference No.]

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

To:
WBSEDCL
Vidyut Bhavan, Block-DJ, Sector -II
Bidhannagar, Kolkata-91

Sub: Bid for Smart Meter with Communication System and Cloud Based Head End System for AMI Solution in OPEX Model.
Ref: ……..[Tender Details]
Dear Sir/ Madam,

We, ……..…… [Insert name of the undersigned Consortium Member]Member of Consortium Lead by ……..…… [Insert name of the Lead Consortium Member] have read, examined and understood the RFP and RFP Documents for Appointment of Implementing Agency for Implementation of Smart Meter with Communication System and Cloud Based Head End System for AMI Solution in OPEX Model.

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

The details of contact person are furnished as under:

Name :
Designation :
Name of the Company :
Address :
Phone Nos. :
Fax Nos. :
E-mail address :

Dated the ……. day of ……. of 20……
Thanking you,
Yours faithfully,
……..
[Signature, Name, Designation of Authorized Signatory of Consortium Member and Company's Seal]

Business Address:
[Name and address of principal officer]

ANNEXURE-V : BID PROPOSAL

From

Bidder's Name and Address	:
Contact person	:
Designation	:
Telephone No.(Land Line & mobile)	:
Fax	:
Tender Reference	:

To
The Chief Engineer,
IT & C Cell,
West Bengal State Electricity Distribution Company Limited,
3rd Floor, Block'D', Vidyut Bhavan.,
Bidhannagar,
Kolkata- 700 09l.

Sub.: Invitation to Supply, Installation of Smart Meter with Communication System and Cloud Based Head End System for AMI Solution in OPEX Model.

Dear Sir,

1. We the undersigned Bidder/(s), having read and examined in details the specifications and other documents of the subject Tender, do hereby propose to execute the contract as per specification as set forth in your Bid-Document.
2. PRICES AND VALIDITY :
   2.1. The ex-works prices of all items/equipments and rate of erection, commissioning etc. stated in the bid are FIRM during the entire period of contract irrespective of date of completion and not subject to any price adjustment as per in line with the Bidding Documents. All prices and other terms and conditions of this proposal are valid for a period of 180 (one hundred eighty) days from the date of opening of the bids (Part-1). We further declare that prices stated in our proposal are in accordance with your bidding.
   2.2. All duties & taxes such, if any, applicable on transaction from us to you payable extra by you against production of documentary evidence to be submitted by us.

3. BID GUARANTEE :
   We have enclosed a Bid Guarantee in the form of Bank Guarantee from ……drawn in favour of WBSEDCL for an amount of Rs.....

4. DEVIATIONS :
   We declare that contract shall be executed strictly in accordance with the specifications and documents except for the deviations, all of which have been detailed out exhaustively in our deviation schedules, in volume irrespective of whatever has been stated to the contrary any where else in our proposal.

Further, we agree that additional conditions, deviations, if any, found in the proposal documents other than those stated in our Deviation Schedules, save that pertaining to any rebates offered, shall not be given effect to.

5. WORK SCHEDULE :

If this proposal is accepted by you, we agree to provide services and complete the entire work, in accordance with schedule indicated in the proposal, we fully understand that the work completion schedule stipulated in the proposal is the essence of the Contract, if awarded. The completion schedule of the various major key phases of the work will be as per time Schedule submitted by us and approved by WBSEDCL in order to maintain the completion time schedule of bid documents.

6. CONTRACT PERFORMANCE GUARANTEE :

We further agree that if our proposal is accepted, we shall provide a Contract Performance Guarantee of value, equivalent to ten percent (10%) of the Contract Price as stipulated in Bid document in the form of Bank Guarantee (Please specify the form of guarantee) in your favour and enter into a formal agreement with you within 15 (Fifteen) days from the date of placement of Letter of Award.

Dated.....this.....day of.....2021

Thanking you, we remain,

Yours faithfully,

Date _____

Place _____ (Signature) _____

(Printed Name) _____

(Designation) _____

(Common Seal) _____

Business Address:

Name & Address of Authorized Signatory:

ANNEXURE-VI: PROFORMA OF BANK GUARANTEE
FOR BID GUARANTEE (Earnest Money)

(To be stamped in accordance with Stamp Act)

Ref. No. : Date :

To
The West Bengal State Electricity Distribution Company Limited
Vidyut Bhawan
DJ Block, Sector - II
Salt Lake, Kolkata - 700 091

Dear Sirs,

In accordance with your Notice Inviting Tender (NIT) under your Specification No._____ M/s _____ having its Registered Head Office at _____ (hereinafter called the Bidder) wish to participate in the said Tender for _____.

As an irrevocable Bank Guarantee against Bid Guarantee for an amount of ____ is required to be submitted by the Bidder as a condition precedent for participation in the said Tender, which amount is liable to be forfeited on the happening of any contingencies mentioned in the Tender Documents.

We, the _____ Bank at _____ having our Head Office at _____ (Address of Bank) guarantee and undertake to pay immediately on demand by West Bengal State Electricity Distribution Company Limited the amount of _____ (in words and figures) without any reservation, protest, demur and recourse. Any such demand made by said Purchaser shall be conclusive and binding on us irrespective of any dispute of difference raised by the Bidder.

This Guarantee shall be irrevocable and shall remain valid up to **_____. If any further extension of this guarantee is required, the same shall be extended to such required period on receiving instructions from M/s _____ on whose behalf this Guarantee is issued.

All rights of West Bengal State Electricity Distribution Company Limited under this Guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities there under unless WBSEDCL enforce a claim under this Guarantee against the Bank within three months from the above mentioned expiry date of validity or, from that of the extended date.

In witness whereof the Bank, through its authorized Officer, has set its hand and stamp on this _____ day of _____ 2019 ___ at _____.

WITNESS:

_____ _____

(Signature) (Signature)

_____ _____

(Name) (Name)

_____ _____

(Official address) (Designation with Bank Stamp)

Attorney as per Power of Attorney No. _____

Date _____

** This date should be initially for one hundred eighty (180) days and may be extended from time to time.

ANNEXURE-VII: Data Requirement Sheet

(A) Single Phase Whole Current Smart Meter: Submit GTP as TS.1.

(B) Three Phase Whole Current Smart Meter: Submit GTP as TS.2.

(C) Communication Network and Equipments:

Sl. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
1.	**NIC Card**	• The plug-in type communication WAN module shall be in accordance to the variant - 2, C3 as defined under IS 16444. • The plug-in type communication WAN module shall be based on Cellular 4G fallback to 3G/2G • Shall support UMTS/HSPA+ and GSM/EDGE, GPRS fallback and integrate dual IPv4 and IPv6 stacks. • Shall enables TCP/IP connectivity to every end-point device (Smart Meter) • It shall support 3/ 1.8V SIM interface and shall accepts standard SIM card/ Micro • For network protocol it shall comply to the standard mentioned in IS16444 clause 9.3 • DLMS enabled smart meters (IS16444), the WAN module shall access the full range of DLMS capabilities supported by the smart meter • The 4G Cellular WAN module shall support both IPv4 /IPv6 schema as per availability from network service provider . • The Cellular WAN shall automatically register to HES at power up • It shall support IPv4 and IPv6 network addressing. • Each WAN module shall be provisioned with a private, static IP address not visible or	

Sl. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		routable from the public internet. • If fixed IP and operator VPN is not available /possible and Dynamic IP is being used, then the cellular WAN module shall support SSL/ VPN and the data shall be encrypted before send / received on Cellular last mile network. • It shall be fitted with LED for visual indication for Power ON, Traffic status. • WAN module must be capable of operating on the power drawn from the smart meter as defined in BIS standard of Smart meter IS16444. • The power consumption of WAN module shall optimal to meet the requirement of clause 6.10.1.1 of IS 16444 for both Idle mode and communication mode • WAN module must not exceed maximum power requirement of 7W in any case and it shall be in line with the smart meter standard as per IS16444. There must be proper protection and isolation between smart meter and WAN Module power supply • The module shall be able to send diagnostics logs/ data periodically to HES • .It shall support Push Services, alarms services of the smart meter as defined in IS16444 and IS15959 part 2 and 3 • It shall facilitate delivery of first breath and last gasp and other event alarms as defined in IS16444 and IS15959 part 2&3 • It shall support remote firmware upgradation. • It shall be secure enough to avoid all cyber threats like DDoS, spoofing, malwares etc. • Network should have proper cyber security system and that shall also be subjected to Annual Security Audit from CERT-In listed	

Sl. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		auditors. • The communication network shall ensure secure communication of data to HES. • The list of standards followed in all the devices/equipment used in communication network shall be furnished.	

(D)Head End System (HES):

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	General requirement,	• HES system should be inter-operable amongst different makes of meters (atleast 2 types from leading Meter OEM in INDIA).	
	Communication and security	• It will maintain Two way communication with meter and to communicate with MDM on other side. • The HES system should comply with the communication protocol as defined in IS standard 16444 and IS 15959 (for data exchange for electricity meter reading tariff and load control) including latest amendments. • The system shall include mechanisms for defining and controlling user access also encryption of data for secure communication. • Have meter key management facility and data exchange with smart meter with security key as dfined in IS16444	
	Functionality & Interface	• It will support self-discovery and self-registry functionality to detect and register meters within [ ] minutes of meter connection. • Acquisition of meter data on demand & at user selectable periodicity	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		• Audit trail and Event & Alarm Logging • Store raw data for defined duration (minimum 6 days) • Handling of Control signals / event messages on priority • Setting of Smart meter configurable parameters • Communication device status and history • Maintain time sync with meter. • Support OTA firmware upgradation, Disconn. and Reconn. functionalities • Support pre-paid and net metering functionalities of end nodes. • Provide web based interface to manage functionalities. • Intelligent enough to detect and report critical and non-critical events. • HES shall interface with MDM on standard interfaces and the data exchange models and interfaces shall comply with CIM / XML / IEC 61968 or any other open standard. The solution shall be Service Oriented Architecture (SOA) enabled. Able to integrate with standard Integration BUS/ middleware.	

(E) Cloud Infrastructure:

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
1	**CSP specification & Compliance**	• MeitY empanelled ISO 27001 certified minimum Tier-3 Data Centre within INDIA • The datacenter and DR of Cloud Service Provider (CSP) is within judicial jurisdiction of Indian Republic. • The datacenters of CSP should be spread across different geo location and preferably in different seismic zones • ISO/IEC 27017:2015-Code of practice for information security controls based on ISO/IEC 27002 for cloud services and Information technology. • ISO 27018 - Code of practice for protection of personally identifiable information (PII) in public clouds. • ISO 20000-9-Guidance on the application of ISO/IEC 20000-1 to cloud services.	
2	**Security**	• The CSP/Service Provider shall comply or meet any security requirements applicable to CSPs/Service Providers published (or to be published) by MeitY. • The CSP/Service Provider shall meet all the security requirements indicated in the IT Act 2000 and amendments, the terms and conditions of the Provisional Empanelment of the Cloud Service Providers and shall comply to the audit criteria defined by Standardisation Testing and Quality Certification (STQC), and the STQC certificate should be renewed and valid for entire project period. • CSP is having public facing services in a zone (DMZ) different from the application services. The Database nodes (RDBMS)	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		should be in a separate zone with higher security layer. • CSP should have built-in user-level controls and administrator logs for transparency and audit control. • Whether or not measures to circumvent denial of service attacks are available. • Whether or not measures to prevent infection by malware are available • Status of communication control to block malicious communication • Status of acquisition of a log for detection of malicious acts	
3	**Disaster Recovery Management**	• RPO should be less than 1/2 hours and RTO shall be less than 4 hours • Whenever there is failover from primary to secondary, compute environment for the application at DR site shall be equivalent to DC • The CSP should offer dashboard to monitor RPO and RTO of each application and database. • 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.	
4	**Operational**	• CSP should ensure that cloud VM network is IPV6 compatible. • CSP should ensure use of appropriate load balancers for network request distribution across multiple cloud VMs • CSP should ensure that any OS provisioned	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		as part of cloud virtual machine should be patched with latest security patch • . Detailed report on network uptime, Bandwidth utilization, latency, packet loss and network health to be provided on Monthly basis • Report on storage status and unauthorized access attempted to be shared	

(F) Other Scope of the project:

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
1	**Link and connectivity**	• Provisioning of Internet, Minimum 8 MBPS MPLS/VPN links from two different service providers between existing data centre at Kolkata in West Bengal and CSP. Link should be considered for both DC and DR of cloud.	
2	**Procurement of other Software**	• Procurement of Analytics, Virtualization Software (if required), Centralized network management software along with patch management, OS, any Repository Software and any third party Software or open source software.	
3	**Integration Layer**	• For ease of implementation, maintenance and scalability it is recommended to use a continuous Integration Bus/ Integration Middleware layer that have inbuild ready connectors that could then be used to undertake any future integration between applications. The integration middleware shall be based on Service Oriented Architecture (SOA) and shall use visual mapping points.	
4	**Cyber Security**	• Comply with Cyber Security System monitoring as per CERT guideline	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
5	**System Environments and Security Zone deployment**	• Comply with System Environment Requirements. • Comply with Security Zone Deployment	
6	**System Performance**	• To comply with System Performance Measures and as per disaster recovery plan submit detailed system offerings.	
7	**Testing Plan**	• Offering any automated test tool/ process for virtual HES test bench (produce dummy IS15959 meter data) for different unit/ load / integration testing.	
8	**Training and Handholding**	• Training and Handholding plan to make utility ready for system handover.	

ANNEXURE-VIII: TECHNO COMMERCIAL DEVIATION SHEET

1. If the proposal has got any deviation from the Technical specification, the bidder shall tabulate those deviations clause by clause.

Sl No	Clause No	Description	Deviation offered	Remarks:(+)ve /(-)ve

2. If the proposal has got any deviation from the commercial terms, the bidder shall tabulate those deviations here clause by clause.

Sl No	Clause No	Description	Deviation offered	Remarks:(+)ve /(-)ve

Signature of Authorised Signatory with office seal

Name and address of the bidder:

Note: When there is no deviation, this sheet is to be submitted with the offer duly signed with an endorsement indicating "No Deviation". Deviations not indicated here will not be taken into consideration.

ANNEXURE-IX: PROPOSED KEY RESOURCE FORMAT

(FORM PER-I)

Proposed personnel:

Bidder should provide the names of suitably qualified personnel to meet the specified requirements stated in clause SW.20. The data on their experience should be supplied using the form below for each candidate.

1	Title of position:	
	Name:	
2	Title of position:	
	Name:	
:	Title of position:	
:	Name:	
5	Title of position:	
	Name:	

(FORM PER-II)

Resume of Proposed Personnel:

Name of Bidder

Position		
Personnel Information	Name	Date of Birth
	Professional qualification	
Present Employment	Name of Employer	
	Address of Employer	
	Telephone	Contact(manager/ personnel officer)
	Fax	E-mail
	Job title	Years with present Employer

Summarize professional experience in reverse chronological order. Indicate particular technical and management experience relevant to the project.

From	To	Company/Project/Position/Relevant technical and management experience

ANNEXURE-X: PRE BID QUERY FORMAT

West Bengal State Electricity Distribution Company Limited
Tender Notice No. WBSEDCL/IT & C / 33.10 (iv)/ 1402 , dtd.20.02.2019

Pre-BID Query Format

Name of the Bidder :

Sl. No.	Clause No of the Tender Document	Page No of the Tender Document	Text Details	Query Details	Justification of the Query	Remarks
1						
2						
3						
: :						
N						

ANNEXURE-XI: PROFORMA OF DECLARATION OF BLACK LISTING/HOLIDAY LISTING

Reference: Tender Notice No. WBSEDCL/IT & C / 33.10 (iv)/3467, dtd.19.02.2021.

In the case of a Proprietary Concern:

I hereby declare that neither I in my personal name or in the name of my Proprietary concern M/s _____ which is submitting the bid for the work nor any other concern in which I am proprietor nor any partnership firm in which I am involved as a managing partner have been placed on black list or holiday list declared by WBSEDCL, WBSETCL or any central/ state power utility services, except as indicated below:

(Here give particulars of black listing or holiday listing, and in absence thereof state "NIL")

In the case of a Partnership Firm:

We hereby declare that neither we, M/s _____ submitting the bid for the work nor any partner involved in the management of the said firm either in his individual capacity or as proprietor or managing partner of any firm or concern have or has been placed on black list or holiday list declared by WBSEDCL, WBSETCL or any central/ state power utility services, except as indicated below:

(Here give particulars of black listing or holiday listing, and in absence thereof state "NIL")

In the case of a Company:

We hereby declare that we have not been placed on any black list or holiday list declared by WBSEDCL, WBSETCL or any central/ state power utility services, except as indicated below:

(Here give particulars of black listing or holiday listing, and in absence thereof state "NIL")

It is understood that if this declaration is found to be false in any particular WBSEDCL, WBSETCL or Administrative Ministry, shall have the right to reject the Bid and if the bid has resulted in a contract, the contract is liable to be terminated.

ANNEXURE-XII: PROFORMA OF DECLARATION REGARDING ABANDONMENT OR RESCISSION OF WORK

Reference: Tender Notice No. WBSEDCL/IT & C /33.10 (iv)/3467, dtd.19.02.2021.

In the case of a Proprietary Concern:

I hereby declare that neither I in my personal name or in the name of my Proprietary concern M/s _____ which is submitting the bid for the work nor any other concern in which I am proprietor nor any partnership firm in which I am involved as a managing partner neither have abandoned any work nor any of our contract have been rescinded during the last 5 (five) years, except as indicated below:

(Here give particulars of abandonment or rescission of work and in absence thereof state "NIL")

In the case of a Partnership Firm:

We hereby declare that neither we, M/s _____ submitting the bid for the work nor any partner involved in the management of the said firm either in his individual capacity or as proprietor or managing partner of any firm or concern neither have abandoned any work nor any of our contract have been rescinded during the last 5 (five) years except as indicated below:

(Here give particulars of abandonment or rescission of work and in absence thereof state "NIL")

In the case of a Company:

We hereby declare that we neither have abandoned any work nor any of our contract have been rescinded during the last 5 (five) years, except as indicated below:

(Here give particulars of abandonment or rescission of work, and in absence thereof state "NIL")

It is understood that if this declaration is found to be false, The WBSEDCL shall have the right to reject the Bid and if the bid has resulted in a contract, the contract is liable to be terminated.

ANNEXURE-XIII: PROFORMA OF "CONTRACT AGREEMENT"

(To be executed on non-Judicial stamp paper of Rs. 100/-)

This Agreement made this.....day of.....two thousand..... between West Bengal State Electricity Distribution Company Limited, having its head office at Vidyut Bhawan, Bidhannagar, Kolkata – 700 091 (hereinafter referred to as `Owner' or `WBSEDCL', which expression shall include its administrators, successors and assigns on one part) and **M/S ----------**(hereinafter referred to as the `Contractor' , which expression shall include its administrators, successors, executors and permitted assigns) on the other part.

WHEREAS WBSEDCL is desirous of implementation of AMI in different locations of WBSEDCL as per its LOA No. ----------

AND WHEREAS **M/S ----------** had awarded the Contract on terms and conditions, documents referred to therein, which have been acknowledged by **M/S ---------- ----------** resulting into a "Contract".

1) NOW THEREFORE THIS DEED WITNESSETH AS UNDER:-

1.0 **Article**

1.1 Award of Contract

WBSEDCL awarded the Contract to Contractor for the work of ---------- ----------on the terms and conditions contained in its Letter of Award No. ----------. and the documents referred to therein. The award has taken effect retrospectively from the date of issue of the Award. The terms and expressions used in this Agreement shall have the same meaning as are assigned to them in the `Contract Documents' referred to in the succeeding Article.

2.0 Documentation

The Contract shall be performed strictly as per the terms and conditions stipulated herein and in the following documents attached herewith (hereinafter referred to as "Contract Documents").

i. **Tender No.----------**
ii. **LOA No. ----------**

All the aforesaid Contract Documents shall form an integral part of this Agreement, in so far as the same or any part conform to the Bidding Documents and what has been specifically agreed to by the Owner in its Letter of Award. Any matter inconsistent therewith, contrary or repugnant thereto or any deviations taken by the Contractor in its `Proposal' but not agreed to specially by the Owner in its Letter of Award shall be deemed to have been withdrawn by the Contractor. For the sake of brevity, this agreement along with its aforesaid Contract Documents shall be referred to as the `Contract Agreement'.

3.0 Conditions & Covenants

3.1 The scope of Contract, Consideration, Terms of Payment, Taxes wherever applicable, Insurance, Liquidated Damage, Performance Guarantees and all other terms and conditions are contained in WBSEDCL's Letter of Award No. ---------- read in conjunction with other aforesaid Contract Documents. The Contract shall be duly performed by the Contract Documents, but which are needed for successful, efficient, safe and reliable operation of the system unless otherwise specifically excluded in the specifications under `exclusions' or `Letter of Award'.

3.2 The scope of work shall also include supply and other activities of all such items which are not specifically mentioned in the Contract Documents, but which are needed for successful, efficient, safe and reliable operation of the entire supplied and commissioned system unless otherwise specifically excluded in the specifications under `exclusions', or `Letter of Award'.

3.3. Time Schedule

Time is the essence of the Contract and schedules shall be strictly adhered to. "**M/S ----------**" shall perform the work in accordance with the agreed schedules.

3.4. Quality Plans

3.4.1 The Contractor agrees to provide the Owner with the necessary facilities for carrying out inspection, quality audit and quality surveillance of Contractors and its Sub-contractor's Quality Assurance Systems.

3.4.2 It is expressly agreed to by the Contractor that the quality tests and inspection by the Owner shall not in any way relieve the Contractor of its responsibilities for quality standards, performance guarantee and their other obligations under the Agreement.

3.5 The Contractor guarantees that the equipments used under the contract shall meet the ratings and performance parameters as stipulated in the technical specifications and in the event of any deficiencies found in the requisite performance figures, the Owner may at its option reject the equipment package or alternatively accept it on the terms and conditions and subject to levy of the liquidated damages in terms of contract documents. The amount of liquidated damages so leviable shall be in accordance with the contract documents.

3.6 It is further agreed by the Contractor that the contract performance guarantee shall in no way be construed to limit or restrict the owner's right to recover the damages/compensation due to short-fall in the equipment performance figures as stated in Para 3.5 above or under any other clause of the Agreement. The amount of damages/compensation shall be recoverable either by way of deduction from the contract price, contract performance guarantee and or otherwise.

3.7 The contract performance guarantee furnished by the Contractor is irrevocable and unconditional and the Owner shall have the powers to invoke it notwithstanding any

dispute or difference between the owner and the contractor pending before any court tribunal, arbitrator or any other authority.

3.8 This Agreement constitutes full and complete understanding between the parties and terms of the presents. It shall supersede and prior correspondence terms and conditions contained in the Agreement. Any modification of the Agreement shall be effected only by a written instrument signed by the authorized representative of both the parties.

4.0 SETTLEMENT OF DISPUTES

4.1 During execution of this contract, if any dispute arises thereby, shall be settled amicably between WBSEDCL and yourself to the extent possible.

4.2 The necessary legal affairs and / or court case shall be exclusively within the jurisdiction of Kolkata High Court only at Kolkata only.

4.3 Notice of Default : Notice of default given by either party to the other party under Agreement shall be in writing and shall be deemed to have been duly and properly served upon the parties hereto if delivered against acknowledgement or by fax or by registered mail with acknowledgements due addressed to the signatories at the addresses mentioned at Kolkata.

IN WITNESS WHEREOF, the parties through their duly authorized representatives have executed these presents (execution where of has been approved by the competent authorities of both the parties) on the day, month and year first above mentioned at Kolkata.

---------- **(Signature of Ordering Authority with Printed Name, Designation, Office Seal)**
---------- **(Signature of Contractor with Printed Name, Designation, Company's Seal)**

ANNEXURE-XIV: FORMAT OF BANK GUARANTEE FOR CONTRACT PERFORMANCE

(To be stamped in accordance with Stamp Act)

Bank Guarantee No._____
Ref No._____ Date : _____

To
The West Bengal State Electricity Distribution Company Limited,
Vidyut Bhavan, Salt Lake,
DJ Block, Sector-II,
Kolkata -700 09l (India).

Dear Sir,

In consideration of West Bengal State Electricity Distribution Company Limited (hereinafter referred to as WBSEDCL) which expression shall unless repugnant to the context or meaning thereof include its successors, administrators and assigns having awarded to M/s _____ with its Registered/Head Office at _____ (hereinafter referred to as the 'Contractor') which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns, a Contract by issue of Order No._____ dated_____ valued at_____ for_____ (Scope of Contract) and the Contractor having agreed to provide a Contract Performance Guarantee for the faithful performance of the entire Contract equipment to *-----%(percent) of the value of the entire system vide Order No. ..... date .....(reference of original order), against Contract to WBSEDCL.

We _____(Name and Address) having its Head Office at_____ hereinafter referred to as the `Bank') which expression shall, unless repugnant to the context or meaning thereof include its successors, administrators, executors and assigns do hereby guarantee and undertake to pay WBSEDCL, on demand any and all moneys payable by the Contract to the extent of _____as aforesaid at any time upto (day/month/year) without any demur, reservation, contest recourse or protest and or without any reference to the Contractor. Any such demand made by WBSEDCL on the Bank shall be conclusive and binding notwithstanding any difference between WBSEDCL and the Contractor or any dispute pending before any before any Court, Tribunal or any other Authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of WBSEDCL and further agrees that the guarantee herein contained shall continue to be enforceable till the WBSEDCL discharges this guarantee.

WBSEDCL shall have the fullest liberty without affecting in any way the liability of the Bank under this guarantee from time to time extend the time for performance of the Contract by the Contractor. WBSEDCL, shall have the fullest liberty, without affecting this guarantee to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor and to exercise the same at any time and any manner, and either to enforce or to forbear to enforce any covenants, contained or implied in the Contract between WBSEDCL and the Contractor or any other course of remedy or security available to WBSEDCL. The Bank shall not be released of its obligations under

this presents by any exercise by WBSEDCL of its liberty with reference to the matters aforesaid or any of them or by reason or any other acts of omission or commission on the part of WBSEDCL or any other indulgence shown by WBSEDCL or by any other matter or thing whatsoever which under the law would but for this provisions have the effect of relieving the Bank.

The Bank also agrees that WBSEDCL at its option shall be entitled to enforce this guarantee against the Bank as a Principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that WBSEDCL may have in relation to the contractor's liabilities.

Notwithstanding anything contained herein above our liability under this guarantee is restricted to_____ and shall remain in force up to and including_____ and shall be extended from time to time for such period, as may be desired by M/s._____ to whose behalf this guarantee has been given.

All rights of WBSEDCL under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities there under unless the WBSEDCL enforce a claim under this guarantee against the Bank within three months from the above mentioned date or from the extended date.

Dated this _____day of_____20 ___ at _____

Witness:

_____ (Signature)

_____ (Name)

_____ (Official address)

_____ (Signature)

_____ (Name)

_____ (Designation with Bank Stamp)

_____ Attorney as per Power of

Attorney No._____

Date_____

ANNEXURE-XV: PROFORMA OF INDEMNITY BOND

(To be executed on Non-Judicial Stamp Paper of Rs. 100/-)

BY THE PRESENT INDEMINITY BOND EXCUTED by me / us on this ……Day of……, 20…..I/We having Registered Office/ residing at …….. (hereinafter called "OBLIGOR/OBLIGORS" which expression shall mean and includes my/our Successors legal representatives, assigns) do hereby binds myself / ourselves and also our Company/ firm …….. after having the power to bind so with the promise and undertaking in favour of the West Bengal State Electricity Distribution Company Limited a government Company within the meaning of sec.617 of the Company's Act, 1956 having registered office at VidyutBhavan, Block-DJ ,Sector-II, Salt Lake City, Kolkata-700091 (hereinafter called as OBLIGEE, which expression shall mean and include it's legal representative, administrators assigns.

WHEREAS OBLIGOR/OBLIGORS has /have been awarded to execute the job/works under letter no……Dated……issued by the OBLIGEE after having observing necessary formalities the details of which is described in the schedule given hereunder as per letter mentioned herein-above and whereas the said job/works will be/likely to be done in places covered under Employees' State Insurance Act(ESI) and /or the Workmen Compensation Act(W.C. Act) and /or other laws relating to the Labour Management and Welfare.

AND WHEREAS according to the condition of the contract the OBLIGOR/OBLIGORS is/are under obligation to execute this Indemnity Bond before the commencement of actual execution and OBLIGOR/OBLIGORS is/are aware that unless this Indemnity Bond is executed in accordance with the condition of contract before the actual execution in accordance with law the OBLIGEE shall have the power to deem that actual work has been started within the meaning of the contract before the execution of this Indemnity Bond

NOW THIS INDENTURE WITNESS THAT I / We the OBLIGOR/OBLIGORS do hereby undertake.

1. THAT the OBLIGEE shall not be held responsible for any type of accident which may take place during the course of work undertaken by the OBLIGOR/OBLIGORS.
2. THAT the OBLIGOR/OBLIGORS will take/ adopt all safety norms in respect of each and every workmen labour personnel according to the rules or to the satisfaction of the OBLIGEE in all cases.
3. THAT the OBLIGOR/OBLIGORS undertakes to engage only those labour worker or any other personnel whether skilled or unskilled or any other person whether in technical management or non-managerial or any other capacity in the area covered under Employees' State Insurance Act, 1948 who has/have insurance coverage within the meaning of Employees State Insurance Act and further undertakes NOT to engage any person in the area covered under the Employees State Insurance Act, who does / do not has/have insurance coverage within the meaning of Employees State Insurance Act,1948.
4. THAT the OBLIGOR/OBLIGORS further undertakes/undertake to engage only those labour worker, or any other personnel, whether skilled or unskilled, whether in technical, managerial or non-managerial or any other capacity in the area NOT covered under Employees' State Insurance Act ,1948 who has life insurance for the sum assured equivalent to the amount of Compensation under the Employees' Compensation Act in case of accidental death or inquiry and such insurance has been effected by the OBLIGOR/OBLIGORS.
5. THAT the OBLIGOR/OBLIGORS undertakes / undertake to indemnify and keep harmless the OBLIGEE from all claims, action, proceedings and of risk, damage, danger to any person whether belonging to/or not belonging to OBLIGOR/OBLIGORS.
6. THAT the OBLIGOR/OBLIGORS shall keep harmless the OBLIGEE from all claims, compensation, damages, any proceedings in respect of any of its employee/workmen under the Workmen Compensation Act. Act or any other laws for the time being in force.

7. THAT, if during the course of execution of work as stated in the letter mentioned hereinabove issued by the OBLIGEE, it is found that the OBLIGOR/OBLIGORS has/have not complied with guidelines/formalities within the meaning of Employees' State Insurance Act or Workmen Compensation Act or any other laws relating to the Labour Welfare for the time being in force, and also has not observed the safety norms in accordance with the law to the satisfaction of the OBLIGEE, the OBLIGEE shall have the right to stop the execution of work/job and the period of such stoppage shall continue till adequate safety and other compliance mentioned hereinabove under the labour welfare legislation have been observed and such period of stoppage shall not be taken into account for the calculation of the total period of completion of work for which the OBLIGOR/OBLIGORS is responsible to complete the work/job and it will be deemed that discontinuance was due to default of OBLIGOR/OBLIGATOR.
8. THAT , if at any time due to exigency, the OBLIGEE i.e. the West Bengal State Electricity Distribution Company Limited as the Principal Employer, becomes liable to pay any such compensation mentioned hereinabove, whether on failure of the OBLIGOR/OBLIGORS or for any other reason , the OBLIGEE shall have the right to recover the said amount from any amount receivable by OBLIGOR/OBLIGORS or any bank guarantee deposited or anything payable whether in connection with this contract or other contract by the OBLIGEE to the OBLIGOR/OBLIGORS
9. THAT the OBLIGOR/OBLIGORS is/are aware and accept that for the persistent or repeated violation of any condition mentioned in this Indemnity Bond, the OBLIGEE shall have right to terminate the contract of work issued by the OBLIGEE to OBLIGOR/OBLIGORS.

SIGNED AND DELIVERED
BY THE OBLIGOR/OBLIGORS ……
……..
Signature

WITNESS

1 Name, Designation ……..
Signature ……..
2. Name, Designation …….
Signature ……

ANNEXURE-XVI: INSTALLATION & COMMISSIONING CONFIRMATION CERTIFICATE FORMAT

Installation Certificate Of Consumer Smart Meter (A)

Ref LoA No:
Date of Installation:
Name of Division:
Name of CCC:

Sl No	CCC Name	Consumer ID	Connection Phase	Meter No.	Seal NO.	Consumer Address	Attached DTR Painting Code	The Smart Meter is installed in the circuit and working properly	Signature of successful bidder's representative ,with designation and stamp	Signature of Site Officer , WBSEDCL, Designation with stamp

Signature of Supervising Officer
Designation with stamp

Signature of Site Officer
Designation with stamp

Commissioning Certificate of Consumer Meter (B)

Ref LoA No:
Date of Installation:
Name of Division:
Name of CCC:

Sl No	CCC Name	Consumer No / Installation No. / Con ID	Meter No.	NIC card NO.	Seal No.	The Smart Meter is installed at the Consumer premises with necessary SIM card	Necessary application software installed at PC of site office. Log on credential (User Id and Password) is handed over.	Signature of successful bidder's representative ,with designation and stamp	Signature of Site Officer , WBSEDCL, Designation with stamp

Signature of Supervising Officer
Designation with stamp

Signature of Site Officer
Designation with stamp

Commissioning Certificate (C)

Ref LoA No:

Date of Installation :

Name of ccc :

Name of the Office :			
Sl. No.	Work Item	Completed (Y/N)	Remarks
1	Satisfactory hands-on live training on system how to use and operate.		
2	The Meter Parameters are successfully monitored and events can be successfully performed from the application		

_____ _____ _____

Signature of Successful Bidder's Representative
With Designation and Stamp

Signature of Site Officer, WBSEDCL
Designation with stamp

ANNEXURE IX: FORMAT OF THE PERFORMANCE CERTIFICATE

Performance Certificate on Consumer Meter Monthly Billing Data (A)

Ref LoA No:
Name of Division:
For the Month:
Year:

Sl No	Name of CCC	No. of Total consumers Under Scope of this project	No. of cons. fitted with Smart meters (B)	% of cons. fitted with Smart meters (C)=A /B*100	No. of cons having WBSEDCL issue (like consumer not found, disconnected premises etc.) (D)	Actual no of billable consumer (E) = (A) – (D)	No. of cons. billed through AMI (F)	**% of cons. billed through AMI (G) = F/E*100**	No. of cons. billed through CMRI (H)	**% of cons. billed by CMRI (I) = (H)/E*100**	Remarks
1											
2											
3											
: :											
N											
Weighted average percentage for the division											

NB: Billing data and all types of meter data should be available in MDMS (except any major system or sub-system failure at MDMS end); as the MPLS link between MDMS and HES is under the scope of this bidder.
One consolidated performance certificate covering billed % against total no. Consumer under scope of this project are to be calculated as per SLA reference.
Other SLA parameters like different scheduled meter data, Remote disconn.-reconn., Stytem availability etc. should be calculated from system with SLA reporting.

`The defined reports available can be generated without any issue using the application.

ANNEXURE-XIX: PROFORMA OF IRREVOCABLE STANDBY LETTER OF CREDIT

Date:
[Insert ADVISING BANK NAME AND ADDRESS with contact person details]

Sub: Irrevocable Standby Letter of Credit No…… amounting to [insert SBLC value in figures] ……. in respect of purchase Order No. ……. dated …… ("PO") towards …….. [project/P.O.]

1. We, [Insert the name Issuing Bank name and address] ……., hereby issue our irrevocable Standby Letter of Credit No ……., ("Standby L/C"], as follows :

a. SBLC Amount:	…… (Insert SBLC amount in figure and words)
b. Date of expiry and place:	……., India.
c. Beneficiary:	……..
d. Applicant:	WBSEDCL
e. Concerning:	This Standby Letter of Credit will cover undisputed monthly bills of ……. (name of vendor) for……. (name of the work/ job) as per the Agreement dt: …… executed between WBSEDCL and ……. (name of vendor)

2. The SBLC is payable on sight against submission of required documents.
3. Beneficiary's manually signed and appropriately completed declaration, stating that:
   "This is to certify that WBSEDCL has not released the payment against bill no …….. dt …….. presented herewith on ……. In accordance with Agreement between WBSEDCL and …….. (name of vendor) for (nature of project / job). The amount claimed is as in the same invoice."
4. The SLBC will be made operative upon receipt of the Advance Payment in the account of …….. [Insert the details of Applicant's account].
5. Documents presented under this Standby L/C have to be issued in English Language.
6. **Terms and Condition Of Standby LC:**

Standby LC will be provided to vendor against OPEX cost of the project, as per following terms and conditions:

a. Value of the Letter of Credit (LC) will be 2 months of monthly payment bill considering total number of Consumer and DT meter under scope of this project. The exact amount will be decided after placement of LOA.

b. LC will be issued only after completion time of installation phase i.e 2 years of project Line T1 (IB.25.1) and would remain valid upto end of contract period.

c. The Letter of Credit is confirmed, conditional, standby & irrevocable.

d. If WBSEDCL fails to pay the payable amount against any bill within & including the thirtieth working day after due date (i.e., 60th Day from the successful acceptance of the Bill) then vendor may draw upon the Letter of Credit and accordingly the Bank shall release the amount equal to the payable amount.

e. All claims should pertain to the period after LC issuing date.

f. This SBLC covers only the undisputed bills. No other charges can be claimed under this SBLC.

g. Documents which are required to be submitted by the vendor to the issuing Bank while invoking the SBLC are:
   i. Original invoice
   ii. Non payment certificate (as mentioned in clause no. 3)
   iii. Sight Draft to the extent of bill(s) in default.

h. In case the total value against outstanding bills exceed the LC limit the bank shall release the amount equal to the letter of credit limit.

i. The Letter of Credit can be negotiated subsequent to reinstatement of Letter of Credit. However maximum limit of amount to be negotiated at each time shall not exceed the total Letter of Credit value.

j. The Letter of Credit has to be negotiated at the Bank Branches at Kolkata.

k. All documents enclosed must conform to the terms & conditions of Letter of Credit.

7. **Reimbursement Instructions:**

Four (4) bank working days after your SWIFT advice confirming that you have received a complying presentation and sent relative document(s) to us by courier service.

Documents are to be sent to :

……. [Insert name, address and RTGS details of Advising Bank]

This Standby L/C is subject to the Uniform Customs and Practice for Documentary Credits (2007) Revision International Chamber of Commerce (ICC) Publication No. 600.

This is an operative instrument and no mail confirmation will follow.

_____ _____

Authorized Signature Authorized Signature