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
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CIN: U40109WB2007SGC113473

WBSEDCL

e- TENDER NOTICE

(LOCAL COMPETITIVE BIDDING)

BID DOCUMENT

Cloud based End to End Advanced Metering Infrastructure (AMI) Solution for all RLI connections, Consumers having Connected Load 5 KVA to 50 KVA with all Distribution Transformer meters at WBSEDCL

Tender Fee: Rs 28,320/-

20/2/19

Tender Notice No: WBSEDCL/ IT&C/ 33.10(iv)/1402 **Dated:20.02.2019**

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.

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INSTRUCTION TO BIDDER (IB)

IB.1. General:

IB.1.1. Erstwhile WBSEB has been restructured the into two successor entities, namely West Bengal State Electricity Distribution Company Limited (WBSEDCL) and West Bengal State Electricity Transmission Company Limited (WBSETCL), under the ownership of the State Government. The two Companies started functioning from April 1, 2007.

IB.1.2. WBSEDCL provides power to 96% of West Bengal, catering to every sector — from domestic to huge industrial units. It serves a customer base of more than 2 (two) crores across West Bengal. The service network spans over 5 Zones, 19 Regional Offices, 70 Distribution Divisions and 512 Customer Care Centres.

IB.1.3. Changed work culture and improved mind-set has helped the Company move towards better customer care, with special focus on fast-track systems for commercial and industrial power. Major initiatives have improved distribution efficiency.

IB.1.4. WBSEDCL has covered all categories of Consumers with connected load 50 KVA and above under the system of remote collection of Energy Meter Data at Central Data Center without human intervention.

IB.1.5. A target has been initiated to roll out cloud based Advanced Metering Infrastructure (AMl) for all RLI Consumers, Consumers having Connected Load 5 KVA to 50 KVA with all Distribution Transformer meters.

IB.2. Objective: The objective of the tender document is to select contractor for supply, installation, testing, commissioning and maintenance of Advanced Metering Infrastructure, including smart meters, communication infrastructure along with applications for Head End System (HES), Meter Data Management (MDM) System hosted in cloud. The project shall also include integration of HES with MDMS and MDMS with existing Utility applications as defined in this specification document. The key strategic objectives for AMI implementation include:

IB.2.1. Achieve Operational Efficiencies: Reduced operating costs in areas such as meter reading and punching, connection/disconnection, consumer complaints, reduced float between meter reading and bill generation.

IB.2.2. Revenue Protection: Reduced commercial loss with accurate energy accounting, detection of meter tampering and improved meter reading accuracy.

IB.2.3. Improved Load and Power Quality Management: Better visibility of loading and power quality factors on the transformers to enable accurate capacity planning and prevention of failure/under-utilization of asset.

IB.2.4. Faster Outage Detection: Near real time notification outages to enable faster detection and restoration.

IB.2.5. Improved Customer Service: Provide near real-time, accurate and detailed information on consumption, cost and outages.

IB.2.6. Achieve Energy Efficiency: Ability to monitor electricity consumption in near real time, consumers can manage consumption to achieve energy efficiency and save money.

IB.2.7. Achieve Environment and Social Benefits: Facilitating energy efficiency, improved load management and reduced commercial losses to enable reduced greenhouse gas emissions.

IB.2.8. Advanced Customer Applications: Advance consumer application enables customer with real time energy monitoring, demand control and information exchange for the benefit of both customer and utility.

IB.2.9. These additional features should also be considered:

- **IB.2.9.1.** Support Net Metering or adding renewal energy sources to circuit efficiently.
- **IB.2.9.2.** Energy audits can be done at distribution transformer level as per desired frequency to check leakage and pilferage.
- **IB.2.9.3.** Withdrawal of power above sanctioned load may be monitored and controlled.
- **IB.2.9.4.** Load curtailment can be done from control centre on mutual agreement.
- **IB.2.9.5.** Real time data availability on any tamper.
- **IB.2.9.6.** Remote connect and disconnection of power supply.
- **IB.2.9.7.** Sending alert to consumer for higher load withdrawal, bill non-payment etc.
- **IB.2.9.8.** Time of day (TOD)/TOU metering, prepaid functionality, net metering and billing. Facility of recording in 8 registers of 8 different TOU needs to be incorporated.
- **IB.2.9.9.** Integration with other existing system like IVRS, SAP ISU, SAP ERP, SCADA, GIS mapping, outage management system, CRM system, Mobile based applications and any other future requirement of utility.
- **IB.2.9.10.** The system should be capable of functionalities like trigger Alarm, event detection, notification and reporting, remote firmware upgradation etc.

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

IB.3. Eligibility of Bidder:

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

IB.3.2. Lead Bidder: One of the consortium members responsible for performing key components of the contract shall be designated Lead Bidder. 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) 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 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 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, etc.

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

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

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. Audited annual financial statements and financial Net-worth for the last three years only of foreign entity;

IB.3.7.6. 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.3.7.7. 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.3.7.8. 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.3.12**.

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) 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.3.12. Qualifying Requirement (QR) of Bidder and Partners in case of consortium: Bidder must meet the following requirements individually and in case of a consortium, collectively by the members of Consortium, except where specifically mentioned:

IB.3.12.1. Qualifying Requirement (QR) of Bidder:

	Qualifying Requirement (QR) of Bidder		
Sl.	**Description**	**Qualification Criteria**	**Evaluation/ Document Required**
1	Bidders Identity	The bidder shall be a private/public Company registered under Companies Act 1956 / 2013 proprietary firm / partnership firm.	Certificate of Incorporation and Registration.
2	Quality Certification	a) The Bidder should be an ISO 9001:2008 certified. OR Bidder should have CMMI Level 3 (minimum) certification.	A valid ISO/CMMi certificate on or before the date of publication of the tender.
		b) Bidder may have Smart Grid Maturity Model Experience or equivalent model (internationally accepted) experience.	Self-Certification.
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 2011-12 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, Smart Grid Functionalities 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. 235 Crores during last three financial years ending on 31- Mar-2018 (i.e. for the F.Y. 2015-16, 2016-17 & 2017-18).	Income Tax return, All enclosures forming the part of Income Tax return (as applicable) and Duly attested Audited Balance Sheet PL Account for companies registered under company Act and for others Tax Audit Report.
		b) The bidder should have a minimum working capital of Rs.235 Crores during financial year ending on 31-Mar-2018.	Audit report for company registered under Company's Act & Tax Audit report for others to be submitted as a proof of net worth.
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.20.**	Signed resume of employees need to be submitted as per enclosed format in **ANNEXURE-X.**
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 10 years back to back support of as per the format attached for Manufacturer's authorization form (MAF)
7	Cloud Service Provider Partner Status	If the bidder does not have its own ISO 27001 certified Tier-3 MeitY empanelled Data Centre within INDIA then bidder should submit valid letter from the owner of such data centre confirming that such service including Hardware, Software, Database infrastructure shall be available for the next 10 (Ten) years.	Certificate from owner of data centre offer the services.
8	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.	Self Certificate on company letterhead with company stamp and signed by authorized signatory as per **ANNEXURE-XII and ANNEXURE-XIII.**

9	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
10	Smart Meter Capability	The smart meters proposed should meet the relevant standards applicable in India and the meter supplier should have capabilities (both production and financial) to supply the full quantity of meters within 1 Year of the award of contract.	Self-declaration and BIS certificate (BIS Certificate should be provided within 6 months from date of issuance of LOA. But at the time of bid submission bidder must have to produce valid document that they have submitted sample meter to any NABL accredited Lab for certification).
11	HES Interoperability	HES system should be inter-operable amongst different makes of meters (atleast 2 types from leading Meter OEM in INDIA). Bidder shall consider at-least three different makes of Meters for this project with atleast 5% of meters for each category (DT meter, 3-ph and 1-ph Consumer meter) from each manufacturer.	Agreement copy of Meter OEM and Bidder with mentioning the quantity and validity should be produced.
12	MDM criteria	(a) The MDM solution must be named in Gartner's Magic Quadrant for Meter Data Management (MDM) Products (For the year 2016 to 2018). MDM should be capable enough to integrate at least 3 types of HES and should be scalable enough to fit for at least 20,00,000 no smart meters.	Necessary documents for Gartner's Magic Quadrant enlistment, Authorization letter from MDM solution provider for scalability, List of clients, 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 integration with 3 types HES to be submitted.

		(b) The MDM solution must have been deployed in at least 2 number of power utilities and should be handling meter data [of at least 30-minute interval data] from at least 50,000 number of interval meters in each utility	References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion of installation. Certificate from the client on successful implementation and operation of the project.
		(c) The MDM solution must have been integrated with SAP-ISU solution in at least 2 power utilities	
13	In case of consortium, all qualifying requirements specified, should be met by all consortium partners combinedly.		

IB.3.13. Government owned enterprises may only participate if they are legally and financially autonomous and not a dependent agency of WBSEDCL.

IB.3.14. 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.3.15. 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.3.16. 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.4. Responsibility Of Bidders:

IB.4.1. 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.4.2. 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.4.3. The bid shall include all the information as per bid document.

IB.4.4. 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.4.5. 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.5. 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.6. Key Dates: Schedule of Dates for e-Tendering:

Sl. No.	Activity	Date & Time
1	**Publishing Date**	27.02.2019 at 14:00 Hrs
2	**Document Download start date**	27.02.2019 at 14:00 Hrs
3	**Seek clarification start date**	05.03.2019 at 14:00 Hrs
3	**Seek clarification end date**	14.03.2019 at 14:00 Hrs
4	**Date of Pre-bid Discussion**	18.03.2019 at 14:00 Hrs
5	**Bid submission start date**	28.03.2019 at 14:00 Hrs
6	**Bid submission end date**	10.04.2019 at 16:00 Hrs
7	**Last date of physical submission of Tender Fee and EMD**	12.04.2019 at 14:00 Hrs
8	**Technical Bid opening date**	13.04.2019 at 14:00 Hrs
9	**Financial Bid opening date**	To be intimated later

IB.7. 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.8. Pre-Bid Discussion:

IB.8.1. 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.8.2. Relevant queries in soft copy EXCEL format as per **ANNEXURE-XI** must be sent within the scheduled dates to the following mail id: ceit@wbsedcl.in and dipakk.pal@wbsedcl.in

IB.8.3. Non-attendance at the pre bid discussion will not be a cause for disqualification of the bidders.

IB.9. 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.10. 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.11. 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 British English Language only.

IB.12. 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.13. Tender Fee:

IB.13.1. 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.13.2. 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.14. Earnest money [Bid Guarantee]:

IB.14.1. 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.14.2. Scanned copy of Demand Draft (DD) / Banker's Cheque (BC) / Bank Guarantee (BG) towards EMD of **Rs. 9.00 Cr./- (Rupees Nine 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.14.3. 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.14.4. 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.14.5. 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.14.6. No interest shall be payable by WBSEDCL on the above Bid Guarantee.

IB.14.7. The Bid Guarantee shall be forfeited for any of the following reasons:

IB.14.7.1. If during the period of bid validity, the bidder withdraws or modifies the bid in part or as a whole.

IB.14.7.2. 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.14.7.3. If the vendor / bidder fails to extend the validity period of EMD as per "Earnest Money" Clause of bid document.

IB.14.7.4. If any cartel is formed by the tenderer in their quotation.

IB.15. 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.15.1. 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.15.2. 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.15.3. 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.16. Signing of Bids:

IB.16.1. 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.16.2. 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.16.3. All the pages of the bid and where, entries/amendments have been made, shall be signed by the person/persons signing the bid.

IB.16.4. 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.17. Submission Of Bid: Bids shall be submitted as under:

IB.17.1. 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.17.2. Part 1: Technical Proposal: The Technical Proposal shall contain scanned copies and/or declarations in the following standardized formats in two covers (folders).

IB.17.2.1. Statutory Cover:

A. Contents of "Drafts" folder:

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. Contents of "NIT" folder:

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

C. Contents of "Annexure" folder:

a. All **ANNEXURE I-XIX** are to be submitted in details (some may be blank, from ANNEXURE XIV-XIX) in Annexure folder in their respective format.
b. **BoQ in Un-priced condition:** BoQ
c. 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 clause IB.3.7

D. Contents of "Forms" folder:

a. **Mandatory Condition:** Form-I
b. **Sheet Containing Document Details:** Form-II

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

IB.17.2.2. Non-Statutory Cover (My Document):

A. Company Details: 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. <u>Credentials:</u>

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

IB.17.2.3. <u>Financial Proposal:</u>

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

IB.18. Submission of original copies of documents of Tender Fee and Earnest Money Deposit:

IB.18.1. 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.18.2. 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.18.3. 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.19. Conditional and incomplete tenders are liable to summary rejection.

IB.20. 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.21. 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.22. Opening and evaluation of tender:

IB.22.1. Opening of technical proposal:

IB.22.1.1. 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.22.1.2. All bids found to be responsive as regards Clause **IB.22.1.1** will be examined in respect of "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 technical evaluation. Must Conditions are to be submitted as per format enclosed with the bid document as **FORM-I**.

IB.22.1.3. 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.22.1.4. Techno-commercial Deviations, if any, must be brought out in the specified Deviation Schedule (**ANNEXURE-IX**). 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.22.1.5. 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.22.2. Opening of financial proposal (price bids):

IB.22.2.1. 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.22.2.2. No deviation in any form in the price-bid sheet is acceptable.

IB.22.2.3. The encrypted copies will be decrypted and evaluated online.

IB.22.2.4. 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.22.2.5. The Tender Accepting Authority may ask any of the tenderers to submit analysis to justify the rate quoted by that tenderer.

IB.22.2.6. For any discrepancy in the amount of figures and words, the quoted amount in figure will prevail.

IB.22.3. Evaluation and Comparison of Bids (Price bids):

IB.22.3.1. On examination of documents submitted under different covers WBSEDCL will evaluate and compare the bids determined to be substantially responsive at each step.

IB.22.3.2. Evaluation of Bid will include and will take into account:

IB.22.3.2.1. Total Quoted price.

IB.23. 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.24. Evaluation of bid shall be made on the total price of all the items, clubbed together (both CAPEX & OPEX part and deducted buy back items). 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.25. 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.

After contract awarded to bidder (as per clause: IB.30), bidder is expected to complete the implementation of full AMI system on all the envisaged connections of his part within **24 months** from the date of award of contract by the WBSEDCL defined by **T1** at per time schedule **IB.25.1**. T1 is divided into 8 quarters (Q1 to Q8) 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 Q8 total 18 months. Count of meter roll out in each phase / quarter will be decided by = (Total meter of awarded to bidder / 6). For example, if L1 bidder is awarded with all 5 no. Zones (**clause SW.1**) then the total no of smart meters under the scope L1 will be 5,22,350. So, the number of smart meters will fall under each phase/ quarter roll out (from Q3 to Q8) will be: (5,22,350/6) = 87,058. Service period of total AMI system defined by **T2** will be **96 months** from end of T1. Service will be reviewed annually.

IB.25.1. Time Schedule

Sl. No	Activity Name	Project Line T1 (total 2 years)								Project Line T2 (Total 8 Years)
	Quarters ->	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	M25 to M96
1	Contract Finalization									
2	Resource Mobilization									
3	Site Finalization									
4	system architecture Finalization									
5	Phase 1 roll out of AMI									
6	Phase 2 roll out of AMI									
7	Phase 3 roll out of AMI									
8	Phase 4 roll out of AMI									
9	Phase 5 roll out of AMI									
10	Phase 6 roll out of AMI									
15	**Overall system acceptance**									
16	**Service period**									

Complete system is to be established by selected AMI Implementation Agency (AMI-IA) within 24 months from the date of award of work and thereafter the same agency to provide support services for 96 months.

Based on above requirement, bidder shall submit a detail Weekly Gantt chart along with the following implementation schedule. Bidders shall drill down these activities into sub activities in the chart. The chart shall also detail out time and resource effort required to execute each activity. The detailed bar charts for all the work activities shall, however, be discussed and agreed to by the successful Bidder with the owner before start of the execution of work.

Sl. No	Activity Name	Start Date	Weekly Plan						End Date
			W1	W2	W3	W4	W5	Remarks	
1	Resource Mobilization								
2	System Design and approval from Owner								
3	Proof of concept of the Overall Solution								
4	Establishment of AMI System								
5	Roll Out in Project Area								
6	Service period 8 yrs								

IB.26. Price:

IB.26.1. Price offer shall be submitted in the prescribed format only.

IB.26.2. No deviation in any form in the Price Bid Sheet is acceptable.

IB.27. 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.28. Statutory Obligation: Statutory obligations as per law of the land are to be complied.

IB.29. Variation during execution: No. of locations as incorporated in this tender are provisional, which may vary up 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.30. Issuance of LOA: Methodology of award of Contract:-

IB.30.1. WBSEDCL will award the contract to the vendor whose bid has been determined to substantially responsive and has been determined the lowest 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.30.2. L1 will be awarded for providing End to End solution for AMI. 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.31. 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-XIV**. Submission of conditional acceptance of LOA shall be treated as non-compliance of this clause.

IB.32. 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.33. 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.34. 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.34.1. 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.35. 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.36. General Responsibilities and Obligations: This section describes the general responsibilities and obligations of the Contractor and the Employer.

IB.36.1. Responsibilities for the Implementation Plan: The bidder's technical proposal shall include a project implementation plan and schedule spread over 24 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.

IB.36.2. Contractor's Responsibilities and Obligations: Contractor's obligations include, but are not limited to, the following:

IB.36.2.1. To provide a working system that meets or exceeds the functional and performance requirements of this specification without affecting the operation of the existing systems;

IB.36.2.2. To perform equipment engineering and design specific to each location including review of, and conformance with local environmental and earthing considerations;

IB.36.2.3. Development of installation, commissioning and safety guidelines and procedures for the complete system;

IB.36.2.4. Project management, project scheduling, including monthly project reports documenting progress during the contract period;

IB.36.2.5. Coordination with Employer staff, consultant and other concerned Contractors for phased implementation and system integration, testing & commissioning of the overall project;

IB.36.2.6. Engineering and technical assistance during the contract period;

IB.36.2.7. Site visits and studies necessary to identify and provide all equipment needed to implement the project especially the need for measuring appropriate signal strength for Suitable communication network;

IB.36.2.8. Capturing Latitude, Longitude of each installed field devices and maintained device lifecycle through proper asset management;

IB.36.2.9. Achieving interoperability for AMI through incorporation of the communication modules (NICs) inside the Smart meters of any make of Smart meters as short listed by utility for this project area in the future;

IB.36.2.10. Supply, installation and termination of all wires/cables for fully functional system;

IB.36.2.11. Integration of new Meters at HES and MDM level;

IB.36.2.12. Due diligence in properly planning and executing the work so as to minimise inconvenience to consumer and ensuring there is no physical damage to consumer property;

IB.36.2.13. Sharing of relevant interface details at DCU, HES and MDM layers;

IB.36.2.14. Overall integration of equipment/subsystem as defined in this RFP document;

IB.36.2.15. To ensure that all the required hardware, software, and firmware satisfy the requirements of this specification and are suitable for future scaling, optionally with upgrades;

IB.36.2.16. To conduct factory and site acceptance testing of all hardware, software and firmware provided;

IB.36.2.17. Conduct type tests or provide documented evidence of type testing and BIS certification to the employer as sought in specifications;

IB.36.2.18. To provide a Quality Assurance Plan and access to the manufacturing process, as required;

IB.36.2.19. To provide storing, maintenance of storing area and security including full responsibility for protection from theft and fire for all the items to be supplied. The warehouse may be a temporary storage area to be constructed by contractor;

IB.36.2.20. Project management, project scheduling, including periodic project reports (weekly/monthly basis) documenting progress during the contract period;

IB.36.2.21. Installation, testing & commissioning of all equipment/ systems such as Smart Meter, DCU, HES, MDM, Cloud Control centre hardware & software etc;

IB.36.2.22. Provide all additional equipment such as repeater, router etc. necessary to ensure full functionality of system;

IB.36.2.23. Integration of Billing & collection system, CRM and GIS data with MDM and support integration in future applications as and when available by Utility;

IB.36.2.24. Carry out minor civil works related to smart meter, DCU, any other field devices as required for installation;

IB.36.2.25. All documentation and drawings as specified;

IB.36.2.26. All required trainings and technical expertise;

IB.36.2.27. The Contractor shall appoint key personnel for the project such as Project Manager, Design Engineer, Site Manager as well as Installation, testing and Commissioning Engineer;

IB.36.2.28. Notification services for field updates to the hardware, software, and firmware;

IB.36.2.29. Attend progress review meeting;

IB.36.2.30. Assistance in development & implementation of consumer engagement plan;

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

IB.36.3. The Employer/ Utility Responsibilities and Obligations:

IB.36.3.1. Review and approval of the Contractor's designs, drawings, survey reports and recommendations;

IB.36.3.2. Review and approval of test procedures;

IB.36.3.3. Participation in and approval of Type, Factory and Site acceptance tests;

IB.36.3.4. Review and approval of training plans;

IB.36.3.5. Providing support and access to facilities at the sites;

IB.36.3.6. Arranging necessary shutdowns and work permits;

IB.36.3.7. For integration with utility's existing application, data points or service points of existing application will be arranged by WBSEDCL;

IB.36.3.8. Providing available details of the consumer details and informing the contractor of any changes in the area network during the project installation and maintenance period;

IB.36.3.9. Regulatory support/changes as required;

IB.36.3.10. WBSEDCL will provide permissions as necessary for installation of Meters and DCUs so that the work of installation proceeds without any hindrance;

IB.36.3.11. Organise Project Review meetings;

IB.36.3.12. Development & implementation of consumer engagement plan;

IB.36.3.13. Overall project management;

IB.36.3.14. Releasing funds to contractor as per agreed terms of Payment;

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SCOPE OF WORK (SW)

SW.1. Introduction: WBSEDCL has decided to implement Cloud based Advanced Metering Infrastructure (AMI) Solution for all RLI Consumers, Consumers having Connected Load 5 KVA to 50 KVA with all Distribution Transformer meters throughout the jurisdiction of WBSEDCL. Total numbers of such category consumers are 5,22,300 approximately. Distribution Zone Wise, connection phase wise segregation of Consumers is indicated below:

Zone Code	Zone Name	DT Meter	1-phase Consumer	3-phase Consumer	Total
3100000	Kolkata Zone	43122	24796	84018	155103
3200000	Midnapore Zone	71066	3418	33316	75057
3300000	Berhampore Zone	46289	4165	32682	79969
3400000	Siliguri Zone	38323	3667	27442	92831
3500000	Burdwan Zone	61722	9439	38835	119340
Total Meters		**2,60,572**	**45,485**	**2,16,293**	**5,22,350**

Capacity Rating Wise DTR Break Up					
Sl No	Capacity Ratings (KVA)	Quantity (No.)	Sl No	Capacity Ratings (KVA)	Quantity (No.)
1	1000	12	10	150	64
2	630	71	11	100	40500
3	500	52	12	63	65500
4	400	3	13	50	61
5	350	15	14	25	96596
6	315	2083	15	16	32567
7	250	472	16	10	21866
8	200	128	17	Others	89
9	160	493			
TOTAL DTR			**2,60,572**		

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

SW.2. This bidder scope of work shall include, in complete conformity with subsequent sections of the specifications, site survey, planning, design, engineering, manufacturing, transportation & insurance, supply, installation, testing, asset mapping, demonstration for acceptance, training, operation, maintenance, documentation of:

SW.2.1. Single phase whole current smart meter with suitable communication technology;

SW.2.2. Three phase whole current smart meter with suitable communication technology;

SW.2.3. CT operated three phase smart meter with suitable communication technology;

SW.2.4. Communication Infrastructure (Shall be provided based on Radio Frequency (RF) mesh Unlicensed frequency band as permitted by Wireless Planning & Coordination Wing (WPC) / Power Line Carrier Communication (PLCC) or LoRA or GPRS/3G/4G/ NB-IOT communication technology or combination of these technologies as per the specifications mentioned in this document and to ensure the performance level given in this document);

SW.2.5. Integration of Network Integration Card (NIC)/ Communication Module with meters of at least 3 different manufacturers, to enable the respective meters to seamlessly integrate with DCU, HES and MDMS thus enabling interoperability of the system. In future, it would be bidders' responsibility to integrate new meter or any other application/equipment as decided by WBSEDCL;

SW.2.6. Data Concentrator Unit (DCU), Head End System (HES), Meter Data Acquisition System (MDAS) and Network Management System (NMS);

SW.2.7. Mobile app (Android and iOS based) and web portal application for consumers and application for utility;

SW.2.8. Other necessary software with valid perpetual licenses;

SW.2.9. Cloud hosting of AMI system application and data;

SW.2.10. Integration of different devices/equipment/software covered in scope of this project with each other as per functional requirements;

SW.2.11. Integration with existing SAP ERP, SAP ISU Billing System, GIS, CRM and others Revenue/ Advisory services and various future applications as and when available by utility will be guided by clause no: SW.14. ;

SW.2.12. Various type of analytics and reports as defined in this specification to aid in decision making at various levels of utility;

SW.2.13. Capturing the baseline parameters/KPIs for all individual items for asset management;

SW.2.14. System Security and access with due consideration of data privacy, confidentiality;

SW.2.15. Latest Cyber Security Guidelines of CERT-In specified at http://www.cert-in.org.in / NCIIPC/ Ministry of Power or any other competent authority shall be followed;

SW.2.16. Preparation of an approach paper describing overall architecture and

operational philosophy of the proposed AMI solution and methodology for achieving different functionalities, specified in this document and also highlight additional features, if any.

SW.3. Complete system is to be established by selected AMI Implementation Agency (AMI-IA) within 24 months from the date of award of work and thereafter the same agency to provide support services for 96 months.

SW.4. 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.5. 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 purchaser in this document.

SW.6. 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.7. The vendor will be responsible for the purchase, installation, testing, training, asset mapping, system hosting and adjustments of all components of the system, as well as any communications-related issue with communications service provider in order to facilitate all the functionalities of AMI SYSTEM.

SW.8. The execution of the total project is divided in three parts:

SW.8.1. Supply, delivery, installation and commissioning of LT CT operated smart meter with NIC card for DTR along with LT CT junction box including LT control cable, sockets etc. required for connection of metering installation and integration to remote host in **CAPEX model.**

SW.8.2. Data fetching from DT meter as per data frequency settings and on demand poll basis within integrated AMI system in **OPEX model**.

SW.8.3. Supply, delivery, installation of 1-ph and 3-ph whole current smart energy meter for consumer, implementation of whole AMI system in **OPEX model.**

SW.8.4. Bidder should consider buy back for old meter i.e. uninstalled existing 1-ph, 3-ph and DT meter with CT (if applicable).

SW.9. Smart Meter scope and Installation:

SW.9.1. Procurement and installation of Smart meters with plug in type NIC card and accessories as per the standards set in the specifications. For installing meter at DTR, vendor has to provide LT CT junction box including supply of LT

control cable, sockets and other necessary equipments required for installation. Existing DT cable can be used. Warranty of these meters should be **10 years** from the date of supply. Specifications of DT smart meters will be strictly adhered to clause no: **TS.7.**

SW.9.2. Pilfer Proof Meter Box (PPMB) suitable to house LT CT operated smart meter for DTR may be used to offer protection of electrical equipment against harsh weather. The meter box shall be suitable for outdoor installation & pole mounted type, anti-corrosive, dust proof, shock, vermin & waterproof, fire proof, pilfer proof and UV stabilized.

SW.9.3. All the 1-ph and 3-ph whole current smart energy meters should be plug in type NIC card and the same meter having programable pre-paid, post-paid and Net metering facilities and the same can be configured OTA. Other necessary equipments required for installation are to be supplied by the respective AIA including guarantee from OEM as well AIA as per WBSEDCL rules. Specifications of 1-phase and 3-phase smart meters will be strictly adhered to clause no: **TS.3.** and **TS.5.** respectively.

SW.9.4. 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 made of transparent engineering plastic conforming to IS: 11731. Type test of material is required to be furnished along with the offer. Details specification of Single-phase smart meter Box and Three Phase Smart Meter Box should be as per clause **TS.4.** and **TS.6.** respectively.

SW.9.5. 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.9.6. The bidder shall take custody of all dismantled material from site. In case any external modem, SIM, antenna etc. found attached to the old meter then those items 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.9.7. Installation of AMI system should be at per **TS.14.0**.

SW.10. Communication Network:

SW.10.1. Establishing a communication infrastructure that shall be based on either cellular network (GPRS/3G/4G/NB-IoT) or LoRa or RF mesh network (as per specifications) or a combination of both (hybrid model) depending on the best solution out of all available options as per site requirement with Supply / Planning /Setup / tuning of RF Mesh Communication or Cellular network Infrastructure including Network Management System (NMS), Head End System (HES) and Meter Data Management System (MDM) for the project area. The choice of the ISPs for cellular network is open and shall not rest upon WBSEDCL. Site visits and necessary studies to identify and provide all equipment needed to implement the project especially the need for measuring

appropriate signal strength for communication network.

SW.10.2. The system and all individual equipment must comply with all relevant statutory requirements and regulations that are set by government authorities, such as the Wireless Planning & Coordination (WPC) Wing of the Ministry of Communications and Information Technology. Wireless technologies need to comply with the Indian statutory bodies that govern communication related aspects such as WPC (Wireless Planning Co-ordination wing) which oversees licensing and management of all wireless spectrums in India. Equipment Type Approval (ETA) is to be obtained for communication modules as per Department of Telecom, Government of India requirements. Radio emission characteristics for the chosen band shall comply with latest NFAP (National Frequency allocation Plan) and the G.S.R (General Statutory Rules) notifications from Department of Telecom, Government of India.

SW.10.3. Up-gradation of the Firmware/ software in the communication modules/devices should be done remotely on time to time to meet the increasing demand of the system in operation/ overcoming system limitations / bugs. Also, incorporation of new hardware may be needed (communication devices, meter, NIC etc.), if required, in future. Such upgrades shall seamlessly fit into the existing end to end system in operation and shall be backwardly compatible to the earlier generation devices / software / Firmware in operation and also the solution designed shall have a high success rate in case of OTA firm-ware up-gradation on number of meters/communication devices simultaneously and the Access points & Nodes shall have more than adequate memory capacity for the Firmware upgrades to happen smoothly, and securely, as well as, avoiding overwriting operations during the Firmware upgrades, thus avoiding obsolescence of the hardware installed at site in quick time.

SW.10.4. The design of the system is to have self-healing features for effective working with a specified degree of redundancy with performance parameters those that capture this commitment consistently such that 98% of communication of Meters in the network should be accessible from HES. Also, a disaster recovery mechanism shall be implemented for HES, MDM and the network solution.

SW.10.5. Bidder to commit that the communication media is transparent and shall be exclusively used for data transfer of the utility and that capacity can be allocated such that it will not be used for any other purpose without any consent from WBSEDCL. Bidder shall submit corporate principal certificate for adherence of this clause.

SW.10.6. All network communications equipment shall support local (on-site) and remote (system head end) non-intrusive diagnostics capable of detecting any abnormal operating parameters including, but not limited to, network communications, memory failure, power supply degradation, microprocessor failures (e.g. Computer Operating Properly watch dog events), firmware/ software problems, excessive device temperature, SNR degradation etc.

SW.10.7. The network solution provider shall ensure Turn Around Time (TAT) for response under service disruption. The bidder shall submit a report on the network status on daily, weekly and monthly basis, so that proactive responses may be generated for the betterment of the system.

SW.11. HES (Head End System): 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**.** Supply and setup of Head End System (HES) system as per specifications clause **TS.11.**

SW.12. MDM (Meter Data Management): Create user friendly meter data management system platform with rights and privileges as defined by the WBSEDCL and option for customization & allows for changes as and when required without any extra charges. Initial user and its database creation are the task where vendor required collecting all user related data from site office of WBSEDCL and creating the initial database. Supply and setup of Meter Data Management (MDM) system as per specification clause **TS.12**. Providing access to the MDM platform for about 2000 role based concurrent users initially and another 10% users may be added during next ten years through web application.

SW.13. Cloud Hosting: 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 ISO 27001 certified MeitY empanelled minimum Tier-3** Data Centre within INDIA and WBSEDCL officials shall have right to visit this Data Centre for inspection. 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. Cloud Hosting and management of supplied software applications as per specifications clause **TS.13**.

SW.14. Integration Scope: Integration of different devices/ equipment/ software's covered in scope of this project with each other as per functional requirements.

SW.14.1. All the external and existing application integration with AMI system should be done through MDM interface only. 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. The integration may use a continuous integration middleware layer 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 publish / subscribe mechanism**. Data to be integrated must be validated by the developed interfaces.

SW.14.2. All interfaces are to be self-checking so that any exceptions or data validation errors are reported by the system. In addition, integration logs should be maintained that confirm the success or otherwise of the interface, complete

with control totals.

SW.14.3. For integration with utility's existing application, data points or service points of existing application will be arranged by WBSEDCL. However, designing, development, testing, deployment of service points or data points at AMI system end will be arranged by bidder.

SW.14.4. Currently, integration is required with WBSEDCL's business application systems like SAP-ERP and Metering /Billing/collection applications (SAP-ISU), GIS mapping, MDAS, CRM and Outage management system. Integration with other applications like Smart Grid application, IVRS, Work force Management etc. is required as future requirement as and when implemented.

SW.14.5. Installations, testing and setup of all identified hardware and associated equipment, application software and setup of Cloud Data Centre, Smart Meter at DTR and selected Consumers and suitable Communication network covered under the specification provisioning of all required manpower and tools/kits for safe, reliable, proper and correct installation and providing support services for Smart meters, communication infrastructure and IT infrastructure including but not limited to installation and configuration of software, configuration, customization and integration of the software at Cloud Data Centre, DR Centre and various other locations, installation of AMI equipment and hardware and other equipment supplied to the satisfaction of WBSEDCL.

SW.15. Security features conforming to the specifications to prevent unauthorized access to the AMI including Smart meter & meter data etc. and to ensure authentication for all AMI elements by third party.

SW.16. Coordination with WBSEDCL's staff, consultant and other Contractor's (Engaged in other scheme) for phased implementation and system integration, testing & commissioning of the overall project.

SW.17. Monitoring: The proposed system is expected to provide continuous on line monitoring and logging, analyse the results and submit report (capability to generate spread sheet and MIS report) to WBSEDCL.

SW.17.1. Log Monitoring:

SW.17.1.1. System logs for a selected day & System history log
SW.17.1.2. System outage/downtime.
SW.17.1.3. Phasor diagram along with phase angles
SW.17.1.4. Tamper information
SW.17.1.5. Field & Network Device failure
SW.17.1.6. Availability of communication link
SW.17.1.7. Any other customized forms/reports as required by the utility.
SW.17.1.8. Numbers of Interruptions and Interruption durations against each consumer.
SW.17.1.9. Remote firmware upgrades information with versioning.

SW.17.2. 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 NMS system shall be able to continuously collect the following information:

SW.17.2.1. CPU loading (Peak and Average)
SW.17.2.2. Memory utilization (Peak and Average)
SW.17.2.3. Disk utilization (Peak and Average)
SW.17.2.4. Network utilization (Peak and Average)
SW.17.2.5. Operating system resource utilization reports
SW.17.2.6. System error log

SW.17.3. Cyber Security System Monitoring: The Contractor shall also be responsible for monitoring of the cyber security system. The logs of the system shall be 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 Contractor** during contract period. Contractor shall implement the recommendations/remedial actions suggested by the Auditor after audit.

SW.17.4. Billing Data: Entire Billing Data Transfer in specific format for integration with the existing SAP-ISU shall be made. A provision of downloading data through CMRI for maximum 15% of the consumers is kept. 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. 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
3	**DTR Meter Data of the last day of the month at 24.00 Hrs**	AMI	Within 2nd Day of Each Month
4		CMRI	Within 10th 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.17.5. Periodicity of data collection: System shall be capable of collecting data from all the meters of consumers at least once in every day. The modems (remote devices) push the data at pre-configured interval of time according to the schedule. There should be provision for manually dialing the modems connected to meters of various manufacturers. Generally, the software shall be configured in such a way that data from meters to be collected automatically with the help of scheduler feature provided for auto dialing. The software shall support both inbound and outbound communication.

SW.17.5.1. Table for periodicity of data:

SL. No	Parameters	DT Meter	3-Ph Meters	1-ph Meters
1	Billing Data	NA	Monthly	Monthly
2	Load Profile Data	Daily	Daily	Daily
3	Instantaneous	Daily	8 Hour Interval	8 Hour Interval
4	Midnight Data	NA	Daily	Daily
5	Critical Event alarms	On Occurrence/ On Restoration	On Occurrence/ On Restoration	On Occurrence/ On Restoration
6	All event as info	15 days	Daily	Daily

SW.18. Software requirements of Application portal and access of processed data and reports:

SW.18.1. Consumer Application:

SW.18.1.1. Customer Portal solution shall be based on Web as well as Mobile app (Android based) through WBSEDCL existing portal and Google play store for all customers under the scope of AMI of WBSEDCL command area.

SW.18.1.2. Customer can view the real time meter data with present billing and payment status. But all type of payment and recharge will be done through existing WBSEDCL application/ Portal and necessary integration will be carried out by vendor at free of cost.

SW.18.1.3. Consumer shall be able to see a graphical view of information related to his energy consumption, current and historical consumption and interval data, outage flags, voltage and power quality indications for selected period etc., also provide platform for peak load management functionality by providing existing tariff & incentives rates, participation options etc.

SW.18.1.4. The web portal and app provide the consumer near real time online views of both usage and cost differentiating high energy usage periods, helping consumers to understand electricity usage and cost information, alerts and notifications and energy savings tips with different levels of

detail. The portal should support the view for past electricity usage, last week's, yesterdays, current days or other period etc. as per selection. The portal should provide user friendly access to consumer for their data via colorful graphs and charts and can download the data into a spreadsheet.

SW.18.1.5. Provide cross-browser compliant software (compatible with Internet Explorer, Chrome, Firefox, and Safari).

SW.18.1.6. Customer application will be having real time data exchange with utilities CRM, SAP ISU and payment module.

SW.18.1.7. Providing access to the application for about 20,000 concurrent users initially and another 10% users may be added during next ten years.

SW.18.1.8. Software patches, updates, and minor version upgrades, when they become available for general release should be carried out by vendor throughout the contract period.

SW.18.1.9. Consumer application should be developed with all but not limit to the specified functionalities at per clause: **TS.12.3.8.**

SW.18.2. Utility Application:

SW.18.2.1. The client end would be workstation/ Web Browser (client machine: Windows / Linux system with Internet Explorer or Google chrome). The application will be accessed thorough Internet. The software must provide for an authentication system to allow role based system access, based on the requirements and level of the user. So, there should be proper access control and proper network security and firewall configuration. Providing access to the application for about 2000 role based concurrent users initially and another 10% users may be added during next ten years through web application.

SW.18.2.2. A Dashboard should be developed to view the processed data, in order to identify the number of readings fetched through AMI, number of readings fetched through CMRI, date and last data available through AMI, Meter status, device signal status, GPRS status, analytical data etc. A least-privilege concept such that users are only allowed to use or access data for which they have been given authorization shall be available**.** Any changes or requirement time to time shall have to be incorporated without any extra cost.

SW.18.2.3. Dashboard should be developed to view live status of all communication modules (Repeater, DCU, HES etc) up to smart meters by grouping of hierarchy.

SW.18.2.4. Dashboard will support view consumer details with parameters like connected/ disconnected status, connection phase, connected load and

current demand, outstanding details with colour change indicator grouped by Consumer Category/Zones, Circles, Divisions and Supply Offices (CCC) on the selected filter criteria.

SW.18.2.5. Utility will perform reconnection & disconnection command (on each consumer wise/ batch commend for multiple consumer) through the dashboard applications and the status of the same should be available on dashboard. After each successful disconnection and reconnection SMS will be sent out to the specified consumer without any extra charges.

SW.18.2.6. All type of tamper information and event logging will be available on dashboard. The web based portal should facilitate users to access overall information collated from the multiple operational sources for enhanced decision making. The information in the form of various visualizations (interactive graphs, charts, tables etc) and alerts shall be provided.

SW.18.2.7. The billing data is to be sent in a specific format as required for integration with the existing SAP-ISU system for billing purpose to our Data Center at Rajarhat. All the analytical, exception data and reports will be accessed by the site offices through MDM platform provided by the vendor through internet. Also checking and data validation will have to be done with the SAP-ISU data for billing purpose and only valid data will be accepted in the ISU system.

SW.18.2.8. After data acquisition from the meters data analytics should be done through data analytics software to generate exception reports, alert and messages as per predefined logic. Alert of exceptions should be sent through SMS / email to specific mobile numbers/ mail ids without any extra charges.

SW.18.2.9. Consumers will get SMS and email alert sent by utility on various event like: consumption, overload, load shading, schedule shutdown, payment due etc. Also, consumer will get SMS regarding any information requested on demand basis without any extra charges.

SW.18.2.10. All subsequent modification or alteration of the software, developed by the vendor, will be installed by them onsite, during the entire contract period at no extra cost.

SW.18.2.11. The vendor shall be responsible for updating and up gradation (if required) of all Software and Hardware for successful operation of the project during the contract period.

SW.18.2.12. Utility application should be developed with all (also considering TS.12.25) but not limit to the specified functionalities**.**

SW.18.3. The application will be on standard format and design, decided by utility and the vendor will have to customize the software within 15 days after getting

written instruction from the ordering authority regarding the changes or modifications to be incorporated in the software. The revised software would be installed by the vendor onsite, at no extra cost.

SW.18.4. During the contract period, whenever required all data and shall be handed over to WBSEDCL in such a way that it can be migrated and configured in any other similar server system or cloud at no cost. After the contact period the vendor should return or dispose the data as per the instruction of WBSEDCL authority.

SW.19. Project Management:

SW.19.1. General Requirements: The Contractor shall assign a project manager with the authority to make commitments and decisions that are binding on the Contractor. WBSEDCL will designate a Nodal officer to coordinate all project activities. All communications between utility and the Contractor shall be coordinated through the project managers/ nodal officer. The project managers shall also be responsible for all communications between other members of the project staffs including sub- contractor, if any.

SW.19.1.1. Project Schedule: The detail project implementation schedule shall be submitted by the Contractor after award for Utility's approval, which shall include at least the following activities:

SW.19.1.1.1 Site Survey
SW.19.1.1.2 Documents, Data Requirement Sheet, Drawing submission and approval
SW.19.1.1.3 Type Testing Schedule
SW.19.1.1.4 Hardware purchases, development/manufacturing and integration
SW.19.1.1.5 Dispatch Schedule
SW.19.1.1.6 Receipt, Storage, Installation & Field update schedule
SW.19.1.1.7 Factory & Site Testing Schedule
SW.19.1.1.8 Training schedule
SW.19.1.1.9 Field trial run schedule.

The project implementation schedule shall include the estimated period for completion and its linkage with other activities.

SW.19.1.2. Progress Report: A progress report shall be prepared by the Contractor for each month against the activities listed in the project schedule. The report shall be made available to 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.19.1.3. Transmittals: Every document, letter, progress report, change order, and any other written transmissions exchanged between the Contractor and utility shall be assigned a unique transmittal number. The Contractor shall maintain a correspondence index and assign transmittal

numbers consecutively for all Contractor documents. Utility will maintain a similar correspondence numbering scheme identifying documents and correspondence that utility initiates.

SW.19.1.4. Review Meeting: Progress meetings shall be scheduled by the utility and attended by the Contractor each reporting period to review progress of the project. Progress meetings shall be used to review the progress report, written correspondence exchanged since the last meeting, and open action items. The Contractor shall also attend technical meetings as and when required by 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.19.1.5. Document Review and Approval Rights: To ensure that the proposed systems conform to the specific provisions and general intent of the Specification, the Contractor shall submit documentation describing the systems to the Utility for review and approval. The employer will respond with written comments to the Contractor within thirty (30) Working days after receipt of the documents. Documents requiring correction must be resubmitted by the Contractor 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 Contractor to make any necessary documentation changes at no additional cost to the employer to achieve conformance with the Specification. Any purchasing, manufacturing, or programming implementation initiated prior to written the employer approval of the relevant documents or drawings shall be performed at the Contractor risk. Review and approval by the utility shall not relieve the Contractor of its overall responsibilities to satisfy system functions and performance requirements in accordance with the Specification. To help the utility manage the review and approval of documents during any given period, the Contractor shall stagger the release of documents over the time allocated in the project schedule. The number and size of documents shall be factored into the document release schedule. At any time, not more than five (5) documents shall be submitted to the employer for review and approval.

SW.19.2. Temporary/ Permanent disconnected consumer: In case of non-utilized meter due to permanent disconnection or any other reason, the same smart metering infrastructure may to be refixed by the vendor at some other location as per instruction of local officials of WBSEDCL without any extra cost.

SW.19.3. Damaged/ Burnt Meter Replacement:

SW.19.3.1. DT Smart Meter: For any damaged or burnt of DT smart meter, under

warranty period it should be replaced within 4 days from detection.

SW.19.3.2. Consumer Smart Meter: 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.19.4. The meter which does not communicate to 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.19.5. 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.19.6. 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.19.7. 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.19.8. The vendor shall carry out civil works and other installation work at their own cost. Refer to installation procedure of technical specification.

SW.20. Key Resource scope: The bidder should have minimum 15 no technical persons on roll of the company having relevant experience. The Bidder must demonstrate that it will deploy at least the following personnel for the key positions that meet the following requirements:

SW.20.1. Resource qualification/ Experience criteria:

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	Assistant Project Manager	2		10	3
3	Site Engineers	5		5	2
4	Communication Experts	2		5	2
5	Metering Expert	2		5	2
6	System Administrator	1	MCA/B.E/B.Tech Electronics & Communication/Computer Science/IT	5	2
7	Application Expert	2		5	2

SW.20.2. The Bidder shall provide the CVs of the proposed personnel in the relevant Forms included in **ANNEXURE-X** Sample Forms of the bidding documents.

SW.20.3. 5 no Site Engineers will remain stationed at each WBSEDCL's zone office location wise for the complete project engagement period. However, for the other key resources, bidder shall submit a detailed Resource Deployment Plan.

SW.20.4. For the field activities, bidder shall propose a detailed Man-power Deployment Plan with the technical bid document.

SW.20.5. Above mentioned requirements are minimum, however for all field activities and requirements to meet the project timelines, bidder to propose their project team.

SW.20.6. 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.20.7. Bidder to submit a detailed resource deployment plan for the entire project timeline.

SW.20.8. WBSEDCL has all rights to reject any under qualified, low experienced resource at any time.

SW.21. Reporting Scope:

SW.21.1. AMI 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 for integration with the utility existing systems. The scope shall include but not limited to the requirements given elsewhere in the Technical specification.

Sl No	Description Of Report	Frequency	available at
1.	Metering Report: Grouped by Consumer Category/Zones, Circles, Divisions & Supply Offices (CCC)/Load Groups/ connection Phase based on the selected filter criteria	Daily	Centrally and Site offices
2.	Meter Billing data availability with AMI and CMRI flag	Monthly	Centrally and Site offices
3.	Remote reconnection and disconnection event Report: Grouped by Consumer Category/Zones, Circles, Divisions & Supply Offices (CCC)/Load Groups/ connection Phase based on the selected filter criteria with mentioning number of attempts.	Daily	Centrally and Site offices
4.	Meter analytical data availability report.	Daily	Centrally and Site Offices
5.	Message Log Report – Events & Alarms.	Daily	Centrally and Site offices
6.	DT Loading: Categorize DT as overloaded, optimally loaded, near-optimal, under loaded	Daily, Monthly and User Selectable Time Period	Centrally and Site offices
7.	Load recording (Consumers): Actual consumption recorded higher than the sanctioned load identifying the top 50/100 [configurable] consumers CCC wise list.	Daily, Monthly	Centrally and Site offices
8.	Summary report on top 50/100 [configurable] high loss DTs, top overloaded DTs, Top DTs with most outages (number and duration), most power quality issues (over voltage, under voltage, current unbalance, out of band frequency), high failure rate etc.	Monthly & User Selectable Time Period	Centrally and Site offices
9.	Theft and Tamper Alert: as per IS 15959 Part 2Report.	Daily, Monthly and User Selectable Time Period	Centrally and Site offices
10.	Voltage Deviation Index and Frequency Deviation Index	Daily	Centrally and Site offices
11.	Comparison Consumption (system used to detect & track theft suspects)	Daily, Monthly and User Selectable Time	Centrally and Site

		Period	offices
12.	Consumption lower than the expected pattern (pattern of previous year applied to the monthly average) or monthly average	Monthly	Centrally and Site offices
13.	Availability Report of HES, MDM, Cloud and network components	Daily	Centrally
14.	Automatic LT Energy loss report (DT meter reading minus summation of readings of all those consumer meters served by the selected DT) would be reported	Daily	Centrally and Site offices
15.	Low Power Factor	Daily, Monthly and User Selectable Time Period	Centrally and Site offices
16.	Meter Current Unbalance	Daily, Monthly and User Selectable Time Period	Centrally and Site offices
17.	Availability Report of consumer application, apps.	Daily	Centrally
18.	Availability Report of utility application, dashboard and other management services.	Daily	Centrally
19.	Authentication Failure Report	Monthly	Centrally
20.	Unauthorized access report	Monthly	Centrally
** Centrally stands for user access level of HQ and site offices stands for user access of respective zone, circle, division and supply offices. A least-privilege concept such that users are only allowed to view or access report for which they have been given authorization shall be available.			

SW.22. Analytics Scope: AMI system shall provide following analytics as a graphical representation and also in report format on demand. Required analytics graphs can be drilled down to customer level or last entity level. Analytics data should be system generated only and can be exported in various formats such as HTML, PDF, CSV, XLS for integration with the utility existing systems. The scope shall include but not limited to the requirements given below:

Serial No.	Required analytics	1-phase	3-phase	DT meter
1	Exception reports for consumers where data have been collected manually	✓	✓	
2	Exception reports for DTRs where data have been collected manually			✓
3	Tamper event analysis with snapshot values	✓	✓	
4	Load Survey analysis to analyze the loading pattern of a consumer/DTR	✓	✓	✓
5	Consumer and division-wise meter failing events	✓	✓	
6	Division-wise and DTR-wise meter failing events			✓
7	Industry and consumer category-wise load pattern analysis	✓	✓	
8	Low current, low voltage, abnormal frequency and phase angle error analysis	✓	✓	✓

Serial No.	Required analytics	1-phase	3-phase	DT meter
9	Monthly energy consumption report and analysis	✓	✓	✓
10	Consumer-wise billing data availability	✓	✓	
11	CCC-wise CT/PT anomaly analysis			✓
12	Billing profile of suspected consumers	✓	✓	
13	Consumer-wise Trend Record Demand vs Billable Demand analysis	✓	✓	
14	Consumer-wise Trend Max recorded Demand analysis	✓	✓	
15	Power failure report analysis	✓	✓	✓
16	Consumer monitoring	✓	✓	
17	Report No. of exception cases listed for investigation	✓	✓	
18	Billing analysis with graphical representation and interface	✓	✓	
19	Monthly revenue summary report	✓	✓	
20	Consumption report as per slab of consumption	✓	✓	
21	Energy audit analysis			✓
22	Monthly & yearly trend analysis of change in consumers, consumption trend, CD trend, Load Factor, Revenue/Payment trend (DT where applicable)	✓	✓	✓
23	Consumer-wise Deviation analysis against historical consumption trend	✓	✓	
24	Interruption details analysis	✓	✓	✓
25	Automated Data availability report and analysis	✓	✓	✓
26	GPRS outage report and analysis	✓	✓	✓
27	DT Load imbalance report and division-wise analysis			✓
28	DTR Health report and analysis			✓
29	CCC-wise disconnection and reconnection report and division-wise analysis	✓	✓	

SW.23. Documentation Scope:

SW.23.1. 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 site 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, manufacturing, system deployment, factory testing, erection, site testing, training etc**.**

SW.23.2. 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.23.3. Hardware Documentation Requirements: The following document shall be submitted as applicable for the subsystem:

SW.23.3.1. System description documents (Overview)
SW.23.3.2. Data requirement sheets for all items
SW.23.3.3. Functional description document
SW.23.3.4. Database documents
SW.23.3.5. Drawings/Documents for manufacturing/assembly of the equipment/system
SW.23.3.6. Drawings/Documents for installation of the equipment/system at site
SW.23.3.7. 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.23.3.8. Factory test procedure and report
SW.23.3.9. Manuals for each equipment
SW.23.3.10. System configuration parameter
SW.23.3.11. Site testing procedure and report
SW.23.3.12. Training documents
SW.23.3.13. System administrator documents
SW.23.3.14. User guide
SW.23.3.15. Software licenses
SW.23.3.16. Type test reports
SW.23.3.17. Cable sizing calculations
SW.23.3.18. Inventory of the hardware
SW.23.3.19. General and internal arrangement drawing of panels indicating modules, components location etc.
SW.23.3.20. Installation drawing
SW.23.3.21. Schematic drawing.

SW.23.4. Software Documentation Requirements: The documents to be submitted shall include the following information.

SW.23.4.1. Software Inventory: An inventory of all software shall be maintained by the Contractor. The Contractor shall submit the following inventory lists: the preliminary inventory list at the time of the Functional

Description document approval, an updated inventory list immediately prior to the start of the 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 Contractor documents, language and libraries used, and an indication of whether the program is to be standard, modified, or custom.

SW.23.4.2. 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.23.4.2.1 Introduction describing the purpose of the function with references to other documentation to aid the reader's understanding of the functions performed.

SW.23.4.2.2 Performance requirements that describe the execution periodicity and the tuning parameters that control or limit the capabilities of the software.

SW.23.4.2.3 Complete description of the operation, data and logic interfaces with other functions.

SW.23.4.2.4 Sample displays where applicable.

SW.23.4.3. 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.23.4.3.1 The overall organization and architecture of the software logic such as a breakout of the software into software modules.

SW.23.4.3.2 Mathematical algorithms and formulae.

SW.23.4.3.3 Complete description of the algorithms, operation and the data and logic interfaces with other functions

SW.23.4.3.4 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.23.4.3.5 Databases internal and external to the software, along with a description of all inputs required and the output produced by the software modules.

SW.23.4.3.6 Interfaces with other software modules.

SW.23.4.3.7 Design limitations such as field length and the maximum quantity of data items that can be processed.

SW.23.5. 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.23.5.1. The overall organization of input records
SW.23.5.2. The format of each data record
SW.23.5.3. 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.23.6. 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.23.6.1. All user guidance and error messages, along with the steps necessary to recover from errors
SW.23.6.2. 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.23.6.3. Alarms and messages issued by the function and the conditions under which they are generated
SW.23.6.4. Procedures to be followed for computer system restarts, failures, and failovers.

SW.23.7. System Administration Documentation: System administration documentation shall be provided to guide [employer/utility] personnel in the operation and procedures required to generate and update the systems, including system software, database, application software and other elements of the systems. System administration documents shall be provided for the following items:

SW.23.7.1. Network communications management
SW.23.7.2. Processor configuration
SW.23.7.3. System performance monitoring
SW.23.7.4. System restart/failover management and diagnostic procedures
SW.23.7.5. System generation and management
SW.23.7.6. Database generation and management
SW.23.7.7. Display generation and management
SW.23.7.8. Report generation and management
SW.23.7.9. Diagnostic programs
SW.23.7.10. Software utilities
SW.23.7.11. Software maintenance
SW.23.7.12. Application software parameters and tuning guides
SW.23.7.13. Web administration
SW.23.7.14. Other Contractor supplied system software not included above.

SW.23.8. Test Documentation: Documentation for all factory, field and availability

tests shall be provided.

SW.23.9. Training Documentation: Training documentation shall be provided for all courses in accordance with the requirements.

SW.24. Testing Scope: All materials and parts of the system/sub-system to be supplied under the project shall be of current manufacture and from a supplier regularly engaged in the production of such equipment.

SW.24.1. Testing, commissioning and Successful operation: The scope includes testing and commissioning & implementation of all equipment, sub-systems and systems of the project and putting them into successful technical & commercial operation. Individual component wise test plan and procedure will be followed as per testing annexure of each component's Technical Scope, specified in this document. The scope shall include but not limited to the requirements given elsewhere in the specification. The bidder shall be responsible to provide all necessary testing and commissioning personnel, tools/kits, test equipment etc.

SW.24.2. Testing and acceptance procedure: Testing and quality assurance in software development is more rigorous since each component has to be more reliable, if it is to be reused. A system is tested at various stages of development and deployment. For example, each component is tested as a unit for checking the correctness of its own code. Further, the component is tested with its dependent components. After final release of the entire set of components, system is tested for the correctness of system functionality. Finally, the components are further tested in simulated production load for performance and load analysis.

The Implementation Agency shall be responsible for the testing processes such as planning (includes preparing test plans and defining roles and their responsibilities), preparation (consists of preparing test specification, test environment and test data) and execution (includes testing at various levels like unit level, integration level, system level and production).

SW.24.3. Test Plan: Test plans are prepared for each phase of testing. The initial test plan is created during the Project Planning phase. The initial test plan describes who performs which type of testing and when. Ideally master test plan covers all types of test i.e. from unit testing to production testing. The Implementation Agency is expected to submit the test plans to Utility for approval. Any changes made to the test plan during the project life cycle should be communicated to UTILITY for approval.

SW.24.4. Test Scenarios: The Selected Bidder should prepare test scenario for each business scenario. A test scenario when executed should fulfil a business requirement as per the scope of business functionality. Test scenarios include following:

SW.24.4.1. Test Specification: During the test specification phase, the test cases are specified. It consists of description of the input, process to be

executed and a prediction of output results.

SW.24.4.2. Test Environment: Other than Development, for SIT, UAT, performance testing and pre-production purpose provisions of dedicated different server environments should be there. Component developer does unit testing and integration testing. Integration testing can be delegated to a specialized testing group. Each of the members in the testing group is provided with testing environment according to his/her role and responsibilities. Following is sample testing environment for testing:

SW.24.4.2.1 A workstation
SW.24.4.2.2 A set of tools and applications required on workstation like access to user interface, browser etc.
SW.24.4.2.3 Access to centralized document database (where all the project related documents are maintained)
SW.24.4.2.4 Access to testing tools and defect logging tools
SW.24.4.2.5 Access to the central database or repository for development and unit testing (this database contains sample test data)
SW.24.4.2.6 Access to deployed components.

SW.24.5. Test Data: Test data is prepared for testing at each stage. The test data should be prepared in such a way that it covers basic path and every alternate path of the code. The basic path and alternate paths are prioritized to capture relevant data. Tools can also be used to generate test data.

SW.24.6. Test Execution: The following testing steps are usually employed in the project lifecycle. The Implementation Agency is expected to follow these steps:

SW.24.6.1. 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.24.6.2. 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.24.6.3. Incremental Integration Testing - Continuous testing of an application as new functionality is added.

SW.24.6.4. 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.24.6.5. 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.

SW.24.7. Following special types of testing are done during Pre-Production Testing Phase:

SW.24.7.1. 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.24.7.2. 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.24.7.3. 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.24.7.4. 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.24.7.5. 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.24.7.6. Recovery/Error Testing - Testing how well a system recovers from crashes, hardware failures, or other catastrophic problems.

SW.24.8. Acceptance Testing – During the test scenarios definition, for each of the business scenario, an acceptance criterion is defined. Acceptance criteria include expected behaviour of the s/w component and the expected results (data). Expected results form a part of the Exit Criteria. In addition to expected result and behaviours, some conditions are also specified in the exit criteria. They can be:

SW.24.8.1. Number of bugs to be discovered for a functional module. This depends on size of the functionality and is an indicator of amount of testing done.

SW.24.8.2. If any medium or low-priority errors are outstanding - the implementation risk must be signed off as acceptable by Utility and Implementation Partner along with consortium partners.

SW.24.8.3. All High Priority errors from System Test must be fixed and tested. Implementation Agency needs to get the acceptance criteria approved from Utility for all the functional components of the system. The Acceptance Criteria for each release into production environment will be agreed upon by Implementation Agency in consultation with Utility prior to release from Testing to production environment. After installation, if any bug is reported or there is non-compliance to requirements then a proper procedure should be followed. End-user should report ("Change Request") to his/her supervisor about the bug that will in turn get forwarded to Project Manager (PM). PM will forward the List of change request to Implementation Partner along with consortium partners. After the bug is fixed, it should be reflected in the production copy after testing it.

SW.24.8.4. The successful bidder should be able to successfully demonstrate integration of their NIC/Communication module with meters of at least 3 manufacturers till HES and/or MDMS and need to pass the following use cases before final acceptance of the complete system:

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.)

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
		At scheduled freq. meter sends data to HES (thru DCU/ACP). Consumption details will be 15 min block data, and data could be incremental to what was sent by meter in preceding instance	Meter	HES	Meter no, reading date & time, KW, KVA, KWH, KVAH, PF
		At scheduled freq. meter sends billing data to HES (thru DCU/ACP.	Meter	HES	Meter no, reading date & time, KW, KVA, KWH, KVAH, PF
2.	Meter disconnection/ reconnection for Consumer Meter	Meter Connect / Disconnect operation	MDM	HES	Meter no, group of meters, instruction to close switch
		Customer meter connection / disconnection	HES	Meter	Meter number, action (reconnect)
		Connection Status Update Request	MDM	HES	Meter no, group of meters, switch status
		Connection Status Update	HES	MDM	Meter no, group of meters, switch status
3.	Utility detects tampering or theft at 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
		Meter sending the high priority events to HES as and when occurred	Meter	HES	Meter no, event date & time, event Code /description
		Meter is sending the non-critical events data to HES as per scheduled frequency.	Meter	HES	Meter no, event date & time, event Code /description
		On detection of valid tamper event or malfunction, connection is disconnected.	MDM	HES	Customer no, meter no, action to be triggered(disconnect), action date & time
		HES sends disconnect command to meter (thru DCU/ACP)	HES	Meter	Meter no, action (disconnect)

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
		Once pre-programmed disconnecting tamper event becomes NORMAL meter performs auto re-connection and send notification to HES	Meter	HES	Meter number, action (connect)
		HES sends re-connect command to meter (thru DCU/ACP)	HES	Meter	Meter no, action (re-connect)
4.	Missed interval readings	Missed Interval and Reads Data (Gap Reconciliation)	HES	MDM	Meter no, readings with date & time
		On identifying missed interval, HES will re acquire data for the missing period from meter	HES	Meter	Meter no, from date & time, to date & time (for which data is missing)
		On receiving data request command from meter, meter will send data to HES	Meter	HES	Meter no, reading date & time, KW, KVA, KWH, KVAH
5.	Connection has an outage	Outage/restore event recorded by meter is sent to head-end as and when event occurs	Meter	HES	Meter no, event date & time, event (outage/restoration)
		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
		The outage/restore event recorded by meter is sent to HES as and when event occurs	Meter	HES	Meter number, event date and time, event (outage/restoration)
7.	Remote firmware upgrades/ meter configuration changes	Configuration Commands: Change tariff parameters, Synchronize clock, Registers reset	MDM	HES -> Meter	Meter number, tariff parameters, registers status, event type and priority

Sr	Use Case	Activity	Source	Destination	Info Exchanged with visibility on dashboard
		(status, maximum, tampering)			
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
9.	New meter installed at site	Energization (Trigger showing meter has energy flowing thru)	MDM	HES	Meter no, Energization date & time
		Meter Read/ commissioning/sync Failures	HES	MDM	Meter no, date of last successful readings received, last logged date & time
10	Time synchronization	Sync up of meters / DCUs/ master data and Network Hierarchy in case of installation of new meters / DCUs	HES	MDM	Network identification info including DCUs
11	Metering network changes	Change in Meter / DCU Network Hierarchy	HES	MDM	Network identification info including data concentrators

SW.24.8.5. 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.25. Training Scope: General requirement for training to be imparted is as follows:-

- ✓ Training shall be conducted by Contractor personnel who are experienced instructors and speak understandable English/Hindi/Bengali.
- ✓ The contractor 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 Contractor. Each trainee shall receive individual copies of documents used for training. Training material shall be organized by functional process that will serve as the training documentation for a particular functional area.
- ✓ 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 contractor, 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:

- ✓ AMI Administration & Configuration
- ✓ AMI Installation and Trouble-Shooting
- ✓ Cloud management, administrative access, trouble shooting etc.
- ✓ Application Management
- ✓ Application Data Analysis.

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

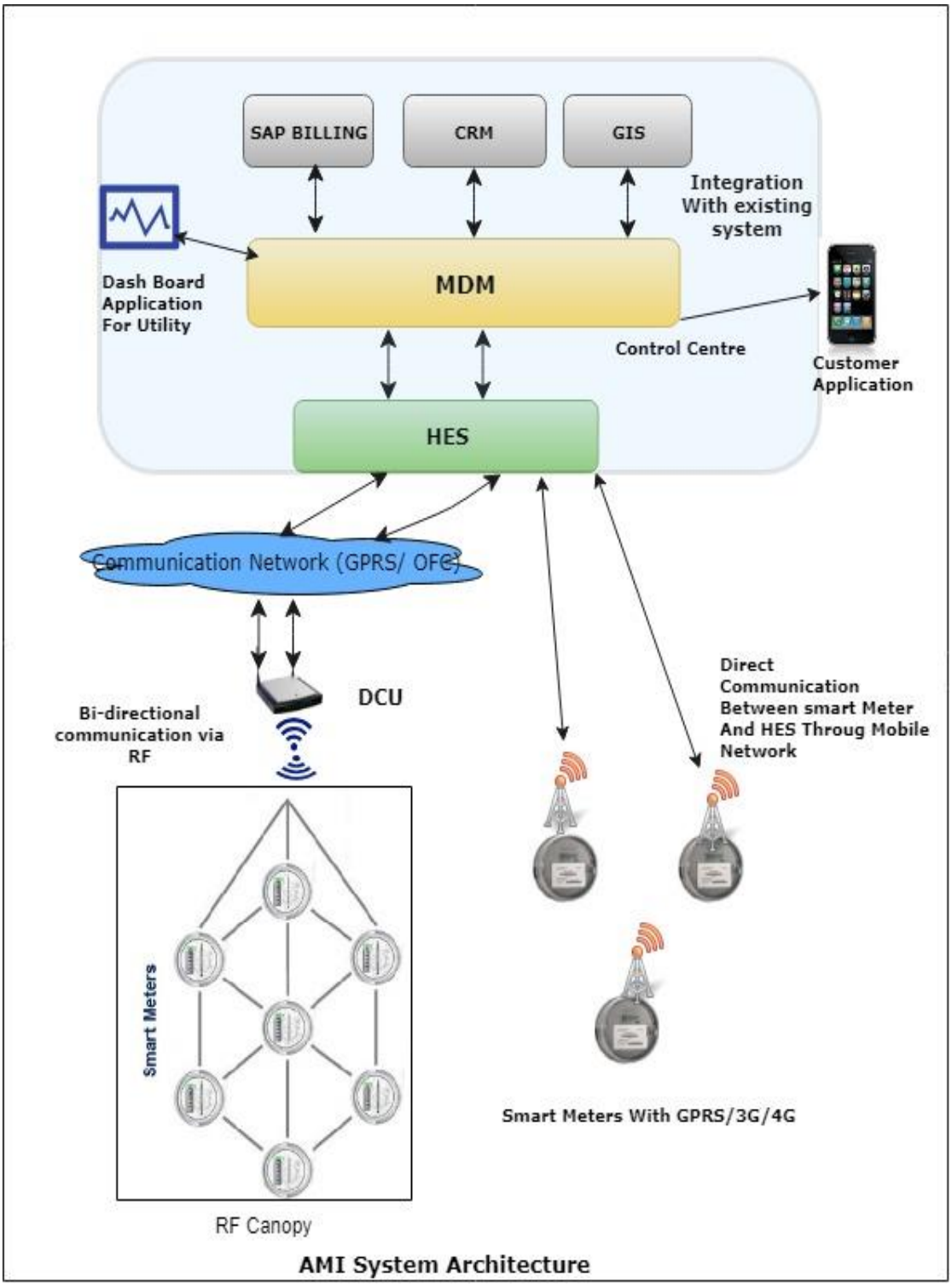
SW.25.1. Professional Training - This is the training for the core group (Implementation Team) of the utility. This team will comprise of members from all the Business Functions, Metering and IT of WBSEDCL. Each member would be trained in the relevant function / module. This Training would be required to be given to approximately 20-25 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. Total professional training time scope should not be less than 18 Man Days.

SW.25.2. 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 6 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. Total end user training time scope should not be less than 30 Man Days.

SW.26. Approach Methodology:

SW.26.1. The main objective of the AMI is to implement smart metering system and data analytics with an objective of Revenue protection measures, improvement in Billing / Collection efficiencies and betterment /automation of customer services in a targeted manner. The above objective shall be achieved by providing an AMI based data Logging System using Communication Technologies like GPRS/3G/4G or RF mesh or both or any other suitable communication system for selected consumer meters in the entire Utility area. System can be capable of handling any type of Smart meters as per specifications including integration of NIC modules such that there shall be no dependencies on protocols of different meters of different make/manufacturer.

SW.26.2. The AIA have to build up architecture for the whole AMI system. In this architecture AIA have to use smart energy meters with plug in type Network Interface control (NIC) card as communication module of RF or GPRS/3G/4G or both. Establishing a communication infrastructure that shall be based on either cellular network (GPRS/3G/4G) or RF mesh network (as per specifications) or a combination of both (hybrid model) depending on the best solution out of all available options as per site requirement will be decided by bidder with Supply / Planning /Setup / tuning of RF Mesh Communication or Cellular network Infrastructure including Network Management (NMS) & Head End System (HES) for the project area. The choice of the ISPs for cellular network is open and shall not rest upon WBSEDCL. These meters with RF will communicate HES through DCU or Gateway and meters having GPRS/3G/4G communications may directly communicate to HES. Then data will be reached to MDM through HES. MDM, HES and other application module to be hosted in cloud service.



SW.26.3. Whereas bidder intends to set up a communication canopy over any of the unlicensed frequencies in India (865-867 MHz) and canopy should be designed to operate at minimum 50% of designed capacity (peak data requirement with guaranteed performance) for full scale deployment and balance capacity shall cater to performance expectations during difficult & challenging times and also for meeting future applications. The RF canopy thus established, using wireless

technology, shall be in the form of a RF mesh with field devices like nodes, routers/repeaters, collectors/gateways etc. and Meters forming the mesh & operating in a licensed / unlicensed frequency band. For solution on licensed band, frequency license should be approved by Ministry of IT & Communications, Govt. of India for use in Power Utility. These devices shall facilitate a network infrastructure which can be distributed over a large span of distance covering the selected area.

SW.26.4. If DCU is used then it should be DLMS complied and if it is any other Gateway with IPV-6 then the data received at HES must be converted to comply with DLMS protocol. The DCU or Gateway will communicate to HES through GSM/GPRS/3G cellular network with >99% system availability.

SW.26.5. The Collector/Gateway/Repeaters/Extender Bridge units are to be installed at a suitable maintainable height primarily on purchaser owned properties so as to have a maximum coverage area. Bidder may also envisage to utilize mobile towers of service providers for installation of network elements at bidders cost. In case bidder uses 3rd party mobile towers for creating RF canopy, bidder is required to submit documentary proof for back to back arrangement with tower owner for entire duration of project i.e. 10 years. The communication network shall be reliable, scalable and shall have facility for auto registration and self -healing. Tripartite agreement will be executed between utility, bidder and ISP as per the guidelines of TRAI (if required). It should be fault tolerant & "sleepy" in nature to optimize on resources. Suitable network management system (NMS) shall also to be provided to monitor the performance of the communication module round the clock from the Control Centre of purchaser. The NMS shall provide view of all the networking elements deployed at site and enable configuration, parameterization of the networking devices and the nodes over the air. The communication network may also have to support other communication technologies (Ethernet/ PLC) for specific need based isolated deployment and if so, this shall have to be integrated into the same HES for ease of operation. Bidder to share capability of the offered solution and components including future product roadmap (support for Ethernet). Purchaser will provide the necessary latitude & longitude of all the relevant substations/ assets, purchaser establishments and other information as decided to facilitate bidder. However, it will be the responsibility of bidder to make necessary site visits & ensure that proposed solution will work as per SLA terms. For any further details regarding location of end points, bidder may do site visits under intimation to purchaser office.

SW.26.6. The AIA will have to present a practical demonstration of their architecture in a proto type HES after their architecture is placed to WBSEDCL. The sample meters will then be tested at DTD laboratory, WBSEDCL. The AIA will be declared as qualified to open commercial bid after successful result of their demo and meter test results.

SW.27. Installation Certificate: After Successful installation of Smart DTR Meter in circuit with all necessary accessories, installation certificate for DT meter as per **ANNEXURE-**

XVI should be submitted for bill claim.

SW.28. Performance Certificate: The performance certificate as per **ANNEXURE-XVII** must be submitted on monthly data. Consolidated performance report of all consumer meter and DT meter under scope of this project will be considered for monthly billable data.

SW.29. Commissioning Certificate: Vendor shall commission the entire system for required use after successful trial-run. Vendor shall complete installation & commissioning (with successful trial-run) of all equipments with creating the initial database and user management and integration with other related system. The concerned Supervising Officer for all site offices shall sign "Commissioning Certificate" for:

SW.29.1. Successful commissioning of Smart Meter with all necessary accessories at Consumer Premises or DTR and Handover of all user id and password to their respective user assigned for that site tested by successful login (A)

SW.29.2. Satisfactory hands-on live training on how to use and operate the system.

SW.29.3. The format for Commissioning Certificate is available in **ANNEXURE-XVI**.

Technical Specification [TS]

TS.1. General Requirements:

TS.1.1. Bidders must conform to the requirements and provide any special equipment(s) necessary to meet the functional & performance requirements stated herein. It should be noted that preliminary design information specified in this specification are indicative only except the quantities of smart meters. An analysis of the functional and performance requirements of this specification and/or site surveys, design, and engineering may lead the Bidders to conclude that additional items (for example communication repeater, Extender, router etc.) are required that are not specifically mentioned in this specification. The Bidders shall be responsible for providing at no added cost.

TS.1.2. The desired functional and technical specifications of smart meters have been mentioned in the subsequent sections of this document. However, the intent is not to specify and capture all the aspects of design and installation associated with smart meters mentioned herein. It shall be the obligation of bidder(s) that all the systems, sub-systems and equipment's/devices shall conform in all respect to high standards of engineering, design and workmanship, and shall be capable of performing continuous commercial operation as per best industry standards.

TS.1.3. The offered items shall be designed to operate in varying environments. Adequate measures shall be taken to provide protection against contaminants, pollutants, rain water & moisture, lightning & short circuit, vibration and electro-magnetic interference etc. The Bidders shall demonstrate a specified level of performance of the offered items during well- structured factory and field tests.

TS.1.4. All equipment provided shall be designed to interface with other equipment and shall be supporting all present requirements and spare capacity requirement identified in the technical specifications. The successful Bidder (Contractor) shall be required to visit project area for detail site surveys for performing the design and implementation functions.

TS.2. Core Components Of AMI System: Following core components of AMI shall be provided:

TS.2.1. Smart Meters
TS.2.2. Communication Infrastructure and Network Management System (NMS)
TS.2.3. Head End System (HES)
TS.2.4. Meter Data Management System (MDM)
TS.2.5. Cloud Service

TS.3. Smart Meters: Technical Specifications for DLMS complied A.C. Single Phase, 2Wire Solid State (Static) Fully Electronic Prepaid as well as Post paid Smart Energy Meter with Net metering facility, Accuracy Class: 1.0, Current Rating (5-30) A, With Backlit LCD Display for 240 V System.

TS.3.1. Scope:

TS.3.1.1. This specification covers design, engineering, manufacture, testing as per format submitted with offer for inspection and supply of A.C. Single phase, two wire solid state (static) fully electronic DLMS complaint, with Prepaid & Post Paid feature, energy meters of accuracy class 1.0 and current rating (5-30) A, with backlit LCD display for 240 Volt systems as per requirement in this specification. The meter should be capable of recording and displaying energy in KWH and demand in KW for single phase two wire A.C. loads respectively for power factor range of Zero lag – unity – Zero lead. Meters should have facility/ capability of recording tamper information with Remote Firmware upgrade and remote token recharge with tariff file updation facility.

TS.3.1.2. It is not the intent to specify completely herein all the details of the design and construction of meter. However the meter shall conform in all respects to high standards of engineering, design and workmanship shall be capable of performing commercial operation continuously in a manner acceptable to WBSEDCL, who will interpret the meanings of drawings and specification and shall have the right to reject any work or material which in its judgment is not in accordance therewith. The offered meter shall be complete with all components, accessories necessary for their effective and trouble free operation of the system for the purpose mentioned above. Such components shall be deemed to be within the scope of bidders supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

TS.3.1.3. 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 as per clause IB.3.12. (10).**

TS.3.2. STANDARDS APPLICABLE: Unless specified elsewhere in this specification, the performance & testing of the meters should conform to the following Indian/International standards, to be read with up to date and latest amendments/revisions thereof as on 90 days prior to floating of tender.

Sl. No.	Standard No.	Title
1	IS 13779, 1999 read with its latest Amendments	Specification of AC Static Watt hour meters class 1.0 and 2.0
2	IS 15959 part 2, IS 16444 part1 Smart meter standards.	Data exchange for electricity Meter reading, Tariff and Load Control – Indian Companion Specification Category C3 meters.
3	CBIP Research Publication No.325 read with latest amendments.	Specification for AC Static Electrical Energy Meters

4	IS 12346 (1999)	Specification for testing equipment for A.C. Static Electrical Energy Meter (latest amendment).
5	C.E.A. Regulation No. 502 / 70 / CEA / DP&D dt 17/03/2006 with all amendments.	Central Electricity Authority (Installation and Operation of Meters) Regulation, 2006.
6	IS 14434 (1998)	Polycarbonate Moulding and Extrusion Materials.
7	IS-15884	AC circuit connected Static Smart prepaid Meters for Active Energy (Class 1 and Class 2)
8	IS-16444	A.C. Static direct connected watt-hour smart meter
9	IS-16444 and CEA guideline	Power On-Off event.
10	CEA document August 2016	Functional specifications and functional requirements of AMI.

TS.3.3. CLIMATIC CONDITION: The meters to be supplied against this specification should be suitable for satisfactory continuous operation under the following tropical conditions. Meters should be capable of maintaining required accuracy under hot, tropical and dusty climatic conditions.

TS.3.3.1. Maximum Ambient Air Temperature in shade: 55 Degree C
TS.3.3.2. Minimum Ambient Air Temperature: (-) 10 Degree C.
TS.3.3.3. Maximum Relative Humidity : 95% (non-condensing)
TS.3.3.4. Minimum Relative Humidity: 10%
TS.3.3.5. Height above mean sea level: Up to 3000 meters
TS.3.3.6. Average number of tropical monsoon per annum: 5 months
TS.3.3.7. Annual Rainfall : 100 mm to 1500 mm

TS.3.4. SUPPLY SYSTEM:

System	1 Phase 2 Wire
Rated voltage (Vref)	240 V – Phase to Neutral
Rated Current	Basic current:- 5 Amps (Ib), Maximum current:- 30 Amps (I max)
Rated Frequency	50 Hz

TS.3.5. POWER FACTOR RANGE: The meter should be suitable for full power factor range from zero (lagging) through to Unity to zero (leading).

TS.3.6. POWER SUPPLY VARIATION: The meter should be suitable for working with following supply system variations.

System	1 Phase 2 Wire
Specified range of operation	70% to 120% of reference Voltage i.e. 240 Volt.

Frequency	50Hz +5%

TS.3.7. ACCURACY:

TS.3.7.1. Class of accuracy of the meter should be 1.0. The accuracy should not drift with time.

TS.3.7.2. Maximum error limit at 1% Ib, UPF should be within +/- 2%.

TS.3.7.3. For voltage variation use of "between 70% to 50%"of Vref. Allowable error limit is +/- 4%.

TS.3.8. POWER CONSUMPTION:

TS.3.8.1. Voltage Circuit: As per IS 16444.

TS.3.8.2. Current Circuit: As per IS 16444.

TS.3.8.3. Power consumption of relay and load switch as per IS16444.

TS.3.9. STARTING CURRENT & RUNNING AT NO LOAD: The meter should 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 70%Vref and 120%Vref voltage is applied and no current flows in the current circuit, the test output of the meter should not produce more than one pulse.

TS.3.10. MAXIMUM CONTINUOUS CURRENT: The maximum continuous current in meters should be the current at which the meter purports to meet the accuracy requirement of the specification. The same is indicated in table in clause TS.3.4 above.

TS.3.11. GENERAL & CONSTRUCTIONAL REQUIREMENTS:

TS.3.11.1. Meters should be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following should be ensured.

TS.3.11.1.1. Personal safety against electric shock.

TS.3.11.1.2. Personal safety against effects of excessive temperature.

TS.3.11.1.3. Protection against spread of fire.

TS.3.11.1.4. Protection against penetration of solid objects, dust & water.

TS.3.11.2. The meter should be designed with ASIC (application specific integrated Circuit) and should be manufactured using SMT (Surface Mount Technology) components. Power supply and voltage divider circuits may be of PTH (Pin through Hole) technology.

TS.3.11.3. The meter should be housed in a safe, high grade, unbreakable, fire resistant, UV stabilized, virgin Polycarbonate casing of projection mounting type. The meter cover should be transparent, for easy reading of displayed parameters, and observation of operation indicators. The meter base may

not be transparent, but it should not be black in colour. The meter casing should not change in shape, colour, size, and dimensions when subjected to 200 hrs on UV test as per ASTMD 53. It should withstand 650 deg. C. glow wire test and heat deflection test as per ISO 75. For testing of changing colour72 hrs on UV test is applicable. The meter cover should be sealable to the meter base with at least 2(two) nos. seals.

TS.3.11.4. The meter should be supplied with a transparent extended terminal block cover (ETBC). The ETBC should not be easily detachable from the base and be secured to the base using a hinge/ without hinge arrangement. ETBC should be closed at the bottom to prevent access for wires to terminal holes, but should have a slot of size 20mm X 20 mm(at least 375sq mm) on extreme right hand side of the bottom of the terminal cover. ETBC with 2 U-cuts of 20X20 mm at the front side instead of right side is also considered. The terminal block should be made of high grade non-hygroscopic, fire retardant, fire resistant and glass reinforced poly-carbonate with terminal holes of minimum diameter 5.5mm and should be suitable to accommodate the insulation of the conductors, meeting the requirement of IS 13779 / CBIP technical report-325 (As this is the latest CBIP Guidelines). The minimum centre to centre distance between adjacent terminals should be 13 mm. Terminal cover should have provision for sealing with at least one seal. The embedded portion of the sealing arrangement, i.e. the arrangement to hold the sealing screw for terminal cover should be such that the same cannot be uprooted in any case without breaking/damaging the terminal block. The bidder shall submit relevant documents regarding the procurement of polycarbonate material. The polycarbonate material of the following manufacturers only shall be used:

TS.3.11.4.1. 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.

TS.3.11.4.2. BAYER - Grade corresponding to above

TS.3.11.4.3. DOW Chemicals- - DO –

TS.3.11.4.4. MITSUBISHI- - DO –

TS.3.11.4.5. TEJIN- - DO –

TS.3.11.4.6. DUPONT- - DO –

TS.3.11.5. All insulating material used in the construction of meters should be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion should be effectively protected against corrosion during operating life by providing suitable protective coating.

TS.3.11.6. The meter should conform to the degree of protection minimum IP 51 for protection against ingress of dust, moisture and vermin.

TS.3.11.7. The meter should be capable of providing phase to neutral protection up to 433 V for 1(one) hours.

TS.3.11.8. The manner of fixing the cables to the terminal block should ensure adequate and durable contact such that there is no risk of loosening or undue heating. Meter should have 2 (two) screws in each terminal for effective clamping of cables. 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. Electrical connections should be so designed that contact pressure is not transmitted through insulating material. All terminals and connecting screws and washers should preferably be of tinned / nickel plated brass material. The terminals and all connecting screws will be of suitable material capable of withstanding a current of 150% of Imax for two hours, continuously.

TS.3.11.9. The meter should be compact in design. The entire construction should be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter should be convenient to transport and immune to shock and vibration during transportation and handling.

TS.3.11.10. The meter should have fixing holes, at least one at top and two at bottom. The top hole should be such that the holding screw is not accessible after fixing the meters. The lower fixing screws should be provided under the sealable terminal cover.

TS.3.11.11. 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 should be E-Beam / Spot welded. In case of Hall Effect Sensor, meter should record as per requirement of technical specification in normal and tamper conditions and life of battery used for recording and display during single wire operation should be guaranteed for 10 years.

TS.3.11.12. The meter cover should be permanently fixed to the meter base by using Ultra sonic welding in such a way that the meter cover can't be opened without breaking the same, i.e. the meter should be break-to-open type. In case any attempt is made to separate the meter cover from the base by using any tools / implements / device, there should be visible evidence of tampering or attempt to open. The bidder will have to specify the type of technology used by him and will also indicate the tests / standard required for testing the same along with test certificates. However, sealing with commonly available adhesives will not be accepted.

TS.3.11.13. Meter should 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 should not disappear even if cover is re-fitted. It should be treated as non roll over event.

TS.3.11.14. Sealing Arrangement: The sealing screws used for the meter cover shall be fixed upside down so that these are tightened from the rear or screw less design for fixing the base and cover but provision for sealing arrangement must be there. A run through screw (stud) has to be provided from bottom side & sealing is to be done on the top side of the meter. Two independent sealing screws are to be provided at each sides of the meter casing. 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 should also be Tinned Brass or Nickel plated steel. Meters must be supplied with two no manufacture's seal between meter base and cover at both sides. If lock /click fit integrated seals are used during sample Meter, after through checking acceptance of said seal will be decided

TS.3.12. ANTI-TAMPER FEATURES: The meter should have the following anti-tamper features and should record and register forward energy accurately under the following conditions: Reverse power indication LED should be provided or indication should be in display circuit whenever applicable. In any case, meter should record energy accurately, taking the values of Phase current and Neutral current into account, whichever is higher.

TS.3.12.1. Input phase and neutral connections are interchanged.

TS.3.12.2. Incoming mains is connected to outgoing terminals and load is connected to incoming terminals.

TS.3.12.3. Any combination as permissible in all four connecting points should not affect the accuracy of the meter.

TS.3.12.4. Load return is connected to a local earth and not returned to the meter as well as the phase and neutral at supply side are reversed.

TS.3.12.5. Occurrence of combination of **TS.3.12**. '**2.'** and '**4.'** or '**3.**' and '**4.**'.

TS.3.12.6. A part of the load is returned to a local earth and the other part is returned to the meter. "Earth load indication" should appear in display with logging of tamper, if difference between phase current and neutral current lies more than 6%. Test will be done through actual load. In this case allowable limit will be within ± 2% w.r.t. Master Meter.

TS.3.12.7. Meter should record energy with maximum error of (+) 6% to (-) 4% on Injection of DC (+) ve & DC (-) ve in neutral having magnitude up to 600 V (as 535 to 580 volt is the output voltage of the device) & injection of chopped AC in neutral& injection of pulsating D.C. in meter neutral. Tests in this respect will be conducted by using a device available with us for

chopped AC injection (60V to 300V) & steady DC injection & Pulsating DC injection set. Steady DC voltage will be rectified from a three phase power supply. Single phase Circuit diagram of the device enclosed with the tender documents.

TS.3.12.8. The meter should be either immune to Electro Static Discharge or sparks of 35 KVp approximately generated from automobile ignition coil and high frequency Jammer. Tests in this respect will be conducted by using commonly available devices and during spark discharge test, spark will be applied directly at all vulnerable points of the meter for a period of 10 to 20 minutes and meter should record ±4 % w.r.t. Master Meter under this condition. After application of spark discharge meter should record correctly within the specified limits of errors. Beyond 35 KVp meter should record as tamper if not immune. It should record the event under Indian Event Reference of others type with Event ID's 249 for Occurrence and 250 for Restoration with OBIS (0.0.99.98.4.255). Other details are applicable as per "Others Tamper Profile of IS 15959 and CBIP 325 guidlines.

TS.3.12.9. N.B.: Meters should offer compliance to requirements of CBIP-325 and its amendments for tampering using external magnets. The meter should be immune to tamper using external magnets. The meters should be immune to 0.2T of A.C. magnetic fields and 0.2 T of D.C. magnetic fields, beyond which it should record as tamper if not immune. Meter should record Imax with the application of 0.5T permanent magnet with logging in BCS, if not immune. MINIMUM LAST POWER ON 60 DAYS LOAD SURVEY with IP 15 min (IN KWH, VOLTAGE & AMP) MUST BE AVAILABLE IN BCS in graphical as well as tabular representation.

TS.3.12.10. The meter should offer a link less design i.e. there should be no isolation link provided between the current and voltage circuits and hence there would not be any possibility of tampering with the same. The meter should be capable of recording the following tamper events in memory (minimum 200 events, occurrence & restoration are considered separate event) with date and time stamp preferably along with snapshots of V, I, PF and Kwh. The logging will be on FIFO basis.

TS.3.12.10.1. Current reversal
TS.3.12.10.2. Power failure
TS.3.12.10.3. Neutral Disturbance
TS.3.12.10.4. Single wire
TS.3.12.10.5. Magnetic Tamper

TS.3.13. DISPLAY:

TS.3.13.1. Display of Meter Serial No: Meter should have provision for displaying either Meter Serial No of 9 complete digit (First 2 digit provided for Alpha and last 7 digit provided for Numerical values) or Meter serial number

should displayed in Billboard fashion "Separate Scrolling Mode" to accommodate 9 digit Alpha – Numeric Meter Serial No. In this case Meter Serial number should remove from Auto & Push Button Display.

TS.3.13.2. The measured value(s) should be displayed on a Liquid Crystal display (LCD) register. The height X width of the digit should be minimum 7.5 X4.0 mm. Higher square area also acceptable. The KWh energy registration should take place with at least 6 complete digits. No decimal is accepted for main KWh & KVAh register. The display should have backlit capability for easy reading from2meters. When the LCD is placed at a constant temperature of 65 degree C for a period of 30 minutes in operating condition and 80 degree C for 30 mins. Under de-energized / storage condition, it should not get deformed. The LCD should be of TN (Twisted Pneumatic) type with display size area of at least 40 X 15 mm. The display should have wide viewing angle of at least 70 deg. Dot Matrix type LCD will not be acceptable. Display should have viewing angle 35 degree up and down from eye level.

TS.3.13.3. The data should be stored in non-volatile memory (NVM). The non-volatile memory should retain data for a period of not less than 10 years under un-powered condition. Battery back-up memory will not be considered as NVM.

TS.3.13.4. The register should be able to record and display starting from zero, for a minimum of *1500 hours (as per in IS 13779 and CBIP 325),* the energy corresponding to rated maximum current at reference voltage and unity power factor. The register should not roll over in between this duration.

TS.3.13.5. In addition to provide serial number of the meter on the display plate, the meter serial number should also be programmed into meter memory for identification through communication port for CMRI / Laptop / meter reading print out.

TS.3.13.6. It should be possible to read the meter during power off condition. It should also be possible to read the meter with CMRI / Laptop in this condition. If battery is used for the same, it should 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 should not be the same. The battery should be of high quality Lithium / Lithium – ion battery, with life of at least 10 years. In case of Lithium battery, no. of operations per day are to be restricted to maximum 5(five) operations so that battery life is not hampered during ten years.

TS.3.14. DISPLAY SEQUENCE: The meter should display the required parameters in two different modes as per the sequence given below:

TS.3.14.1. Auto Display Mode:

TS.3.14.1.1. For Prepaid Mode:

(a) LCD Test
(b) Meter serial no
(c) Real Time
(d) Date
(e) Credit Balance in INR
(f) Present load cost in Rs/KWH
(g) Cumulative KWH consumed.

TS.3.14.1.2. For Post-paid Mode:

(a) Cumulative KWH with legend
(b) Current month MD in KW with Date and Time
(c) Instantaneous voltage
(d) Instantaneous phase current
(e) Instantaneous neutral current
(f) Real Date and Time.

TS.3.14.2. Push Button Mode:

TS.3.14.2.1. LCD Test
TS.3.14.2.2. Meter serial no
TS.3.14.2.3. Real Time
TS.3.14.2.4. Date
TS.3.14.2.5. Cumulative Active forwarded energy in kWh.
TS.3.14.2.6. Cumulative Apparent forwarded energy in kVAh.
TS.3.14.2.7. Last Bill Maximum demand (kW)/KVA with date and time.
TS.3.14.2.8. Billing period counts
TS.3.14.2.9. Total tamper count.
TS.3.14.2.10. Last Bill Active Forward energy in kWh.
TS.3.14.2.11. Last Bill Apparent energy in kVAh.
TS.3.14.2.12. Instantaneous Load (KW/KVA)
TS.3.14.2.13. Instantaneous voltage.
TS.3.14.2.14. Instantaneous Phase Current.
TS.3.14.2.15. Instantaneous Neutral Current
TS.3.14.2.16. Maximum demand kW and KVA for Current month with date & time.
TS.3.14.2.17. Supply Frequency
TS.3.14.2.18. TOD Energy in KWh. (Separately for all TOD registers)
TS.3.14.2.19. Instantaneous Power Factor.
TS.3.14.2.20. NIC card status.

The meter should also be capable of offering a high resolution display which should enable conducting of dial testing by the user in the shortest possible time and as a minimum, the meter should be capable of offering a resolution of 4 digits after decimal & 2 digits before decimal for the high resolution KWh display or 2 digits after decimal and 4 digits before decimal for the high resolution Wh display. Any other useful display will be acceptable. Accuracy test for low load will be measured by short dial test as well as pulse count test.

TS.3.14.3. Engineering Display Mode: This display shall be available only upon the application of valid codes on the meter, and shall enable the display of

the following:

TS.3.14.3.1. Software version.
TS.3.14.3.2. All the limiting parameters value such as load limit, current limit & emergency credit limit.
TS.3.14.3.3. Switch operation counts.

TS.3.15. MAXIMUM DEMAND REGISTRATION AND RESET: Meter should continuously monitor and calculate the average maximum demand for each demand interval time of 30 minutes and maximum of these in a calendar month should be stored along with date and time when it occurred. The maximum demand should automatically reset at 24:00 hrs. of the last date or 00:00 hrs. of the first date of each calendar month and the corresponding value along with date/time stamp shall be transferred to Billing (History) registers. The integration period should be set as 30 minutes/ 15 minutes, on real-time basis. The billing purpose parameters (active forwarded energy, maximum demand in kW) along with recharge amount Rs., Consumption amount Rs. And KWH for prepaid should be recorded and should be available in Bill (History) for a minimum period of last 12 months.

TS.3.16. TIME OF USE / TIME OF DAY MONITORING: The meter should offer the capability of time of use monitoring for energy. Provisions shall be there for 8 nos of TOD slots with 3 nos of slots by default. Time slots T1= 06-00 Hrs. to 17-00 Hrs. T2=17-00 Hrs. to 23-00 Hrs and T3 = 23-00 Hrs to 06-00 Hrs of next day. Register are fixed (3 Nos) but In case of any change of TOD timing in future as per directive of SERC, the same is to be incorporated by the supplier even after completion of the order as per instruction from the appropriate authority. The TOD timings must be programmable and it can be possible to change the time slot / period for TOD recordings through authenticated BCS using Laptop and transferring vend codes through HES. In BCS TOD parameters are KWh, KW, KVAh and KVA.

TS.3.17. SELF-DIAGNOSTIC FEATURE: The meter should be capable of performing complete self diagnostic check to monitor integrity of data memory location at all time. The meter should have indication for unsatisfactory / non-functioning / malfunctioning of the following:

TS.3.17.1. Time and date on meter display
TS.3.17.2. All display segments on meter display
TS.3.17.3. Real Time Clock (RTC) status in meter reading prints out at BCS end.
TS.3.17.4. Non-volatile Memory (NVM) status in meter reading prints out at BCS end.
TS.3.17.5. Synchronisation of time of meter & HES clock from MDAS instantly for less than 3 minute and through HES for more than 3 minute with alarm at HES.

TS.3.18. COMMUNICATION PORTS AND PROTOCOL: The meter should have a galvanically isolated optical communication port for data communication with CMRI / Laptop. No extra port is required. The port should be compatible with IEC 1107. The main communication protocol of the meter will be through RF

with NIC card or GPRS/3G or 4G LTE. The RF module will communicate in 865-867 MHz free license Band certified from WPC, Ministry of Communication, GOI.

TS.3.19. CMRI/ LAPTOP/ BCS REQUIREMENTS: The Common Meter Reading Instrument (CMRI / Laptop) should be capable of being loaded with user-friendly software (MS-DOS 5.0 or higher version compatible) for reading / downloading meter data. Windows based Base Computer Software (BCS) should be provided for receiving data from CMRI / Laptop and downloading instructions from base computer software to CMRI / Laptop. The BCS should be WIN 7/8/10 pro based and copy righted. The data stored in the meters memory should be available on the BCS. This BCS should have, amongst other requirements, features and facilities described later in this specification, the facility to convert meter reading data into user definable ASCII file format so that it may be possible for the user to integrate the same with the user's billing data and process the selected data in desired manner. All the data available in the meter including energy, MD, and history data should be convertible to user defined ASCII file format for integration with third party software. The vendor should supply necessary base computer software for reading / viewing of meter data and converting to user defined ASCII files formats. The user should have the flexibility to select the parameters to be converted into ASCII file. The vendor should also supply the necessary CMRI / Laptop software. The supported parameters must be downloaded from the meter itself. This functionality must be implemented in single software; no separate executable will be used for different types of meters which supports DLMS. Mapping of OBIS code as per DLMS protocol for instantaneous / billing / event / transaction parameters will be checked through third party DLMS conformity testing tool. Test for automated Meter reading will be conducted by downloading Meter data through Modem at our system through third party software also. The bidder has to supply also the Meter Reading protocol and API (if required) free of cost. The protocol should not be complicated & should be easily understandable to introduce compatibility between meters, BCS and CMRI of other makes. The bidder shall indicate the relevant standard to which the protocol complies. The compatibility of transferring data from the meter to CMRI & then to the BCS should be easily established. Any change or up gradation of CMRI software or BCS in future, required for any reason, has to be done by the supplier at his own cost. BCS supplied by the manufacturer should be compatible with meters to be supplied against this tender as well as with previous supplied meters. Optical Port of manufacturer cord should have either magnetic locking or Click slip (latch) fitting. It should not be possible to change/alter date and time in the meter by sending commands from the CMRI or directly through Laptop. For alteration of RTC time, MD resetting, change of TOD timing, it should be possible to be done only through authenticated commands from BCS after scheduling of CMRI/Laptop for a particular meter at the time of reading the meter. No alternation/change on the above points should be possible through authenticated commands from BCS without scheduling of CMRI/Laptop for meters. Moreover, no alternation/change should be possible using CMRI only, i.e. the control has to be with the BCS. Billing parameters (KWH, KVAH, MD in KW & KVA, TOD wise KWH, Average P.F, and Average L.F).

Additional facility as web-based UI to check CMRI data may be provided.

If any OBIS code is not available for single phase then consider the OBIS code of three phase meter and for current use red phase current OBIS code. Only one BCS should be provided for programming and reading.

TS.3.20. DISPLAY POWER UP IN ABSENCE OF MAINS SUPPLY: The meter should have the provision of providing the display of billing parameters (Auto Display) in absence of main supply. Press of push button should activate the display to facilitate hands free meter reading with auto-off provision. Meter may be Power on after 2 years, battery backup Power must be stable on that condition. Battery for RTC should not be less than 350mAh (±10%). It should be possible to read the meter using CMRI / PC during power-off condition using this facility. Battery for downloading and Display power up purpose should not be less than 650 mAh (±10%) and it should be chargeable. The meter must be capable of down loading data through optical port during Power Off condition.

TS.3.21. MARKING OF THE METER: The marking on the meter should be in accordance with relevant clauses of IS 13779. Colour of the Name Plate will be Light Grey. The basic marking on the meter nameplate should be as follows (all other markings as per IS 15959A2_R1 clause E - 10.1 should also be there):

TS.3.21.1. Manufacturer's name & trade mark
TS.3.21.2. Type Designation
TS.3.21.3. No. of phases & wires
TS.3.21.4. Serial number (Size not less than 5mm)
TS.3.21.5. Month & Year of manufacture
TS.3.21.6. Reference Voltage
TS.3.21.7. Rated Current
TS.3.21.8. Operating Frequency
TS.3.21.9. Principal unit(s) of measurement
TS.3.21.10. Meter Constant (imp/kwh)
TS.3.21.11. Class index of meter
TS.3.21.12. "Property of WBSEDCL"
TS.3.21.13. Purchase Order No. & Date
TS.3.21.14. BIS marking
TS.3.21.15. Place of manufacture
TS.3.21.16. Bar coded Serial no. of the meter along with manufacturing year & month.
TS.3.21.17. Firmware Version
TS.3.21.18. Communication Tech with carrier frequency.

TS.3.22. CONNECTION DIAGRAM & TERMINAL MARKINGS: The connection diagram of the meter should be clearly shown on terminal cover.

TS.3.23. OUTPUT DEVICE: The meter should have a test output accessible from the front and capable of being monitored with suitable testing equipment while in operation at site. The test output device should be provided in the form of LED output. There should be adequate clearance of the test output from other

outputs so that there is no interference of other outputs while performing accuracy test with standard scanners. The relation between test output and the indication on display should comply with the marking on the name plate (imp per KWh).

TS.3.24. ELECTRO-MAGNETIC-COMPATIBILITY & INTERFERENCE REQUIREMENT: The meter should meet EMI / EMC requirements as specified in the relevant standards described in Clause 2.0 of this specification.

TS.3.25. SEALING ARRANGEMENT: All meters shall be sealed by the manufacturer at its works with 2 (two) nos. Polycarbonate seals with manufacturer's logo and sequential numbers. A Tracking and recording software for all new seals shall be provided by the manufacturer of the meter so as to track total movements of the seals starting from manufacturing, procurement, storage, record keeping, installation, series of inspections, removal & disposal. Seal tracking software should be submitted and installed at PC/Laptop of the purchaser before commencement of supply of meters.

TS.3.26. Repeater: In case of RF the repeater enclosure, Fixing arrangement and power supply must be similar to DCU/Gateway enclosure and IP certified. The repeater is basically a RF trans-Receiver in the 865-867 MHz free licensed band and WPC certified as mentioned for the module inside the energy meter.

TS.3.27. Load Control Switch: Meter shall be remotely settable to support double pole Relay for connection/disconnection; Phase and Neutral relay Disconnection on the following conditions:

TS.3.27.1. Over current

TS.3.27.2. Load Control Limit

TS.3.27.3. Pre-programmed Tamper conditions (Meter Cover open detection, Neutral disturbance, Magnetic Interference and single wire).

TS.3.27.4. 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 is as follows:

TS.3.27.4.1. The switch re-connection shall be decided by meter locally. It will try to re-connect the load up to 3times, with 5 minutes interval (not in case of Prepaid meter with limiting balance).

TS.3.27.4.2. If the consumption is still more than the programmed limits, it will lock out and wait for 30 minutes (lock out period).

TS.3.27.5. If the consumption is still above the limit, the procedure as defined above shall be repeated.

TS.3.27.6. The brief technical particulars of this Disconnector / load switch are furnished below:

TS.3.27.6.1. Disconnector's Specification:

S.No.	DESCRIPTION	Requirement
1	Operating Voltage range	v ref (-30% to +20%).

2	Operating Current range	IS 16444
3	Maximum switching power	22 kVA per phase/ per IS 15884 Annex G
4	No. of poles	Double pole in a single relay
5	Operation of switches	Simultaneous
6	Utilization Categories	UC2 or better
7	Min. number of operation	3000 (close, open each)

TS.3.27.6.2. Reconnection mechanism: Reconnection shall normally be done from MDM/HES. In case of failure of communication, reconnection shall be possible through HHU locally and the same shall be **password protected**. For reconnection mechanism a local reset button shall also be provided on the Smart Meter.

TS.3.27.7. Indication of status of relay i.e. Connected / Disconnected should be available on display as well as through communication. Connection and Disconnection should also be logged as events.

TS.3.27.8. In prepaid mode the relay will be automatically be connected from HES when recharged data is available to HES.

TS.3.28. SMART PREPAID FEATURES:

TS.3.28.1. The meter shall have a non-volatile memory to retain the vital information in Case of power outages so that data will not lose.

TS.3.28.2. The credit shall be debited by the meter based on the electricity consumption according to the rate including the fixed charges, minimum charges etc, as defined in tariff configuration.

TS.3.28.3. The Meter shall be able to deduct fixed charges as a whole for the full month as per the tariff applicable.

TS.3.28.4. Visible low credit warning shall be provided with bi-colour LED / LCD indication (preferably Green for healthy zone, else change from green to flickering Red colour) when the credit falls below defined alarm limit.

TS.3.28.5. An audible sound alarm to be provided inside the meter to alert for any prepaid feature alarm. The alarm can be kept off or on from remote HES or through Optical port locally and must be password protected. Also, an alarm facility in consumer app is also preferable.

TS.3.28.6. When the credit reaches to Zero/ Allowable negative balance, the meter shall disconnect the output supply except emergency credit limit of one working Day from 17:30 hours of previous working day / second Saturdays & Sundays, National Holidays, state fixed holidays & next day till 10:00 hrs). It shall give alarm when the credit balance is Rs one hundred (Rs 100.00).

TS.3.28.7. Meter shall Disconnect the output supply and Restore only when meter balance reach to the amount additional than zero.

TS.3.28.8. The meter shall disconnect supply after end of such holiday hours. When meter is recharged with new credit, it shall adjust the debited amount first then normal operation shall go on.

TS.3.28.9. Relay shall be provided in all phases & Neutral element in the meter to let alone fraud and single wire tamper. It shall be bi-stable type latching switch designed and manufactured in accordance with international standard of IEC and DIN EN 61810 part 1 / VDE 0435 part 201 as well as they meet overload and short circuit requirement of IEC and DIN EN 61036 / 61037 & ANSI C12.

TS.3.28.10. The meter shall have a data downloading facility with smart prepaid meter events like transactions (including the debit / credit balance, consumption particulars details and also Fixed charges, Unit charges, etc. as are applicable for post paid meter connections), alarm, overload, tamper, load survey, etc, through optical port provided with the help of HHU on which the data downloading software is available. The required software shall be supplied by the vendor free of cost.

TS.3.28.11. The Load survey Data including voltage, current, KWh, KVAh, KVARH Lag, KVARH Lead, Demand (KW/KVA) & P.F. shall be for last 30 days and Historical Data for last six months.

TS.3.28.12. The Tamper Data.

TS.3.29. The following provisions are mandatory for an AIA:

TS.3.29.1. NABL calibration of all the instruments used for testing with sealing of above instruments from NABL authority. Certificates with NABL Logo must be presented at the time of inspection.

TS.3.29.2. Automatic meter test bench is mandatory with NABL certification as mentioned in 1 above with at least 10 no. meter testing facility at a time with optical scanner.

TS.3.29.3. BIS certificate to be provided as per clause **IB.3.12. (10).**

TS.3.29.4. All other type test, GOI or manufacturer certificates related to components, EMC/EMI, WPC etc. are to be submitted before offer for testing.

TS.3.29.5. The test procedure for accuracy of meter, Checking of Downloaded Data through BCS and to compare it with MDM data, Test on Tamper, Test on Ultrasonic welding of Meter, Component verification by breaking a meter, Physical Checking of meter are to be followed as per the Annexe-I.

TS.3.29.6. The list of test cases to be done in time of testing:

TS.3.29.6.1. Linking of DCU/Gateway and HES

TS.3.29.6.2. Capture of Instantaneous Parameters of meter

TS.3.29.6.3. Capture of billing data from meter

TS.3.29.6.4. Remote Connect/Disconnect of relay switch of meters

TS.3.29.6.5. Last Gasp/First Breadth as Alert/Event.

TS.3.29.7. A demonstration on 6 above with meter is to be done at the time of qualifying the bidder technically. If it passes all the criteria at this demonstration then the price BID will be opened.

TS.3.30. The following additional tests shall be carried out in addition to the acceptance tests specified in IS 13779 / 1999 (amended up to date):

TS.3.30.1. Acceptance Tests for smart prepaid features:

TS.3.30.1.1. Test of credit balance & debit

TS.3.30.1.2. Test of friendly credit hours, start & end time there of

TS.3.30.1.3. Test of disconnect the output supply when credit reach to Zero.

TS.3.30.1.4. Test of reconnect the output supply on providing credit limit.

TS.3.30.1.5. Test of disconnect output supply if load / current exceeded the preset value in the meter.

TS.3.30.1.6. Test of reconnect output supply if load / current falls below the preset value in the meter.

TS.3.30.1.7. Test of visible & audible low credit warning.

TS.3.30.1.8. Test of application of tariff and TOU.

TS.3.30.1.9. Samples picked up by the inspecting officer for acceptance tests shall be first subjected to 'soaking' at 70 +/- 2 Deg. C for four hours. After normalizing the acceptance tests as stipulated in CBIP (with latest amendments) and IS shall be carried out by the supplier in presence of purchaser's representative. Also the following additional tests are carried out on mutually agreed quantity of meters from each lot offered for inspection.

TS.3.30.1.10. Shock Test.

TS.3.30.1.11. Vibration Test.

TS.3.30.1.12. Magnetic induction of external origin (AC&DC).

TS.3.30.1.13. Tamper & Fraud protection as per Cl. 12.0.

TS.3.30.2. Transportation Test: At least 50% of the samples of the meter shall be tested for error at Imax, Ib and 5% Ib at unity power factor and 50% Imax and 10% Ib at 0.5 lagging power factor besides checking them for starting current. The meter shall be tested with meter cover duly tightened and sealed properly. After recording these errors, the meter be put in their normal packing and transported for at least 50 km in any transport vehicle such as pick up van, Jeep, etc, on even rural roads and then re tested at all these loads after the transportation. The variation in errors recorded before and after transportation shall not exceed 1% at higher loads and 1.5% at low loads.

TS.3.30.3. Other Acceptance Tests:

TS.3.30.3.1. The meter shall withstand continuously for a period of at least 1 hour at a voltage of 440V between phase & neutral without damage / problems.

TS.3.30.3.2. Tamper conditions as stated in this specification.

TS.3.30.3.3. Glow wire testing for polycarbonate material

TS.3.30.3.4. Power consumption tests

TS.3.30.3.5. Limits of Error: Limits of variation in percentage error due to change in voltage shall not exceed the values given below:

Sl. No.	Influence quantities	Value of current	Power Factor	Limits of variation in % error for class meter
A	Voltage Variation -15% to + 10%	Ib Ib	1.0 0.5	0.7 1.0
B	Voltage variation -40% & +20%	Ib Ib	1.0 0.5	1.1 1.5

TS.3.30.3.6. The meter shall be tested at - 15% and at - 40% of reference voltage as well as + 10% and + 20% of reference voltage and shall record energy within limits of variation indicated above. However the meter shall continue to register energy up to 50% of the rated voltage.

TS.3.30.3.7. For other influence quantities like frequency variation, the limits of variation in percentage error will be as per IS 13779 / 1999 (amended up to date).

TS.3.30.3.8. The meter shall comply all the tests for external AC / DC (except 0.2 T AC magnet) magnetic field as per CBIP Tech-Report 88 with latest amendments. Moreover the magnetic influence test for permanent magnet of 0.5 T for minimum period of 15 minutes shall be carried out, by putting the magnet on the meter body. If the accuracy of the meter gets affected during the test, then the same shall be recorded as magnetic tamper event with date & time stamping and the meter shall record energy considering Imax and reference voltage at unity power factor. After removal of magnet meter shall be subject to accuracy test as per IS 13779 / 1999 (amended up to date). No deviation in error is allowed in the accuracy as per specifications.

TS.3.30.3.9. Test on Ultrasonic welding to be done for 2 no. meters as a destructive test. The meter cover will be forcibly opened by breakthrough with knife, Screwdriver or similar tools. If the cover detached with cracks at both cover and base then it will be treated as passed. Otherwise it will be declared as failed.

TS.3.30.3.10. The meter shall withstand impulse voltage at 10 KV.

ANNEX –I

TS.3.31. TESTS:

TS.3.31.1. Type Testing of Meter: The offered meters should be type tested at any NABL accredited laboratory in accordance with IS 13779 with latest amendments, CBIP Report 325 with latest amendments. The type test report should not be more than 3 (three) years old. A copy of the Type Test results should be enclosed with the offer. If there is any modification in the design/parameters of the specifications or use of constituent materials in the offered meters submitted with the offer, from the meter which was submitted type tested, which may affect the characteristics as well as parameters of the meter, revised type test certificates as per the design, parameters and constituent material used in the offered meter, shall have to be submitted failing which the offer may be liable to be rejected.

Type Test Certificate from any NABL accredited Lab. shall only be considered. Type test certificate should contain the following information clearly: 1) Class of accuracy. 2) Meter constant.

TS.3.31.2. Acceptance tests: The acceptance tests as stipulated in CBIP / IS (with latest amendments) and shall be carried out by the supplier in presence of purchaser's representative. Lot size, sampling and procedure to be followed for acceptance test will be as stated below. The following tests shall be carried out on all the meters thus selected at random. The WBSEDCL's Engineers will witness the various quality control measures adopted for verification of different components of meters and satisfy themselves about the same. They will also inspect the protocol for maintaining the accuracy of the meter testing equipment with reference to the standard at manufacturer's meters testing station.

TS.3.31.2.1. Physical examination of the meters.
TS.3.31.2.2. Non-registration with Voltage along at 70% V ref and at 120% Vref.
TS.3.31.2.3. Starting current at 0.2% I basic Upf.
TS.3.31.2.4. High voltage test.
TS.3.31.2.5. Insulation resistance test.
TS.3.31.2.6. Test of protection for withstanding 433 volt between phase & neutral for a period of at least 1(one) hours without any load.
TS.3.31.2.7. Test of endurance up to 150% I max.
TS.3.31.2.8. Limits of error on all the sample meters at:

1% I basic 1.0 pf. (±2% is preferable but should not exceed ±3%)
2% I basic 1.0 pf.
5% I basic 1.0 pf., 0.5 pf. Lag & 0.8 lead
10% I basic 1.0 pf., 0.5 pf. Lag & 0.8 lead
50% I basic 1.0 pf., 0.5 pf. Lag & 0.8 lead
100% I basic 1.0 pf., 0.5 pf. Lag & 0.8 lead
200% I basic 1.0 pf., 0.5 pf. Lag

600% I basic 1.0 pf., 0.5 pf. Lag
Test of meter constant and meter dial for one unit at 200% I basic, 0.866 pf. Lag.
Power loss on voltage & current circuit.
Repeatability of error test at 5% I basic Upf & 100% I basic Upf.
The maximum divergent should be less than 0.1(Utility specific requirement)
If anyone of the meter fails on any of the above tests, the lot will be rejected.
Further testing for 1 No. sample meter will be carried as follows:
Magnetic induction of external origin (AC & DC).
Electro Static Spark Discharge of 35KVp
Tamper and Fraud protection as per Clause 12 (Anti-Dry -heat test as per clause 12.6.1 of IS: 13779/99.

At least one sample selected from first lot of the meters offered for inspection will be sealed by us and handed over to the supplier for dry heat testing at NABL accredited laboratory, cost to be borne by the bidder. Presence of purchaser's representative during dry heat test at NABL accredited laboratory is not required. But in the test report meter Sl. No. & meter body seal nos. is to be mentioned.

Shunt test by applying 100 Amps continuous load for minimum two hours after removing it from the meter for verification and conformation for quality of shunt & its E-beam welding.

Physical verification of internal components as per given ***component list***.

If the meter fails on any of the above test, the lot will be rejected. Facilities/arrangement for conducting ageing test should be available with the manufacturer.

TS.3.31.3. Retesting after delivery: WBSEDCL will carry out re-testing of the supplied meters at their laboratory. Re-testing of the supplied meters will be conducted on sample meters collected from different stores of the consignees as per the procedure followed for acceptance test (except dry heat test & shunt test) during inspection & testing of the supplied meters at manufacturer's works. Re-testing of the supplied meters will be completed within one month from the date of receipt of meters at different stores. Date of re-testing of meters will be intimated to the supplier for witnessing testing of the meters. In case the meters are not in order as per our observation during inspection and testing of the supplied meters, the lot will be declared defective and in that event meters supplied are to be replaced by the manufacturers free of cost including free transportation from the site to their works and back. The replaced meters are to be offered for inspection & testing and Acceptance test of will have to be carried out by the supplier in presence of purchaser's representative.

TS.3.31.4. Routine Tests: Each and every meter of the offered lot shall undergo the routine tests as well as functional tests as per IS: 13779/1999, CBIP Report-325 and after sealing of the meters, the manufacturers will submit the routine test report of all the meters as well as a statement showing

seal Sl. Nos. against each meter, Sl. No. of offered lot in soft copy (MS WORD or EXCEL format), to the Chief Engineer, DTD, along with offer letter for acceptance test.

TS.3.31.5. Test Facilities: The tests for equipment / instrument shall be carried out as per relevant Standards and test certificates shall be furnished for scrutiny. The Bidder shall indicate the details of the equipment available with him for carrying out the various tests as per relevant Standards. The bidder shall indicate the sources of all equipments/ instruments.

NOTE: The standard meters used for conducting tests shall be calibrated periodically at any NABL Accredited Test Laboratories and test certificates shall be available at Works for verification by purchaser's representative. The manufacturer shall have the following testing facilities to ensure accurate calibration:

TS.3.31.5.1. AC high voltage test
TS.3.31.5.2. Insulation test
TS.3.31.5.3. Test of no load condition
TS.3.31.5.4. Test of Starting condition
TS.3.31.5.5. Test on Limits of error
TS.3.31.5.6. Power loss in voltage and current circuit
TS.3.31.5.7. Test of Repeatability of error
TS.3.31.5.8. Test of meter constant
TS.3.31.5.9. Test of magnetic influence.

TS.3.31.6. Component Specification: The meters shall be designed and manufactured using SMT (Surface Mount Technology) components, except for power supply components, LED / LCD etc., which are PTH type. All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed makes so as to ensure higher reliability, longer life and sustained accuracy.

Sl. no.	Component Function / Feature	Requirement	Make / origin
1	Current Element	E-beam /spot welded shunts shall be provided in the phase element and C.T. in the neutral. Alternatively, both the current elements (phase & neutral) shall have Shunts with proper isolation	Any make or origin conforming to IS-2705
2	Measurement / computing chips	The Measurement / computing chips used in the meter should be with the Surface mount type along with the ASICs.	USA :Analog Devices, AMS, Cyrus Logic, Atmel, SAMES, Texas Instruments, Teridian, Japan: NEC, Freescale, Renesas, Holland: Phillps
3	Memory chips	The memory computing chips	USA: National Semi

		should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	Conductor, Atmel, SAMES, Texas Instruments,Teridian, ST, Microchip, Japan: Hitachi, OKI, Renesas, Freescale, Holland / Korea: Phillps
4	Display modules	The display modules should be well protected from the external UV radiations. The display should be clearly visible over an angle of at least a cone of 70o.The construction of the modules should be such that the displayed quantity should not disturbed with the life of display. The display should be TN type industrial grade with extended temperature range. Singapore	Singapore: Bonafied Technologies, Korea: Advantek, Japan : Hitachi, SONY, Hijing, Truly Semiconductor. Chaina: Tianma
5	Communication modules	As per clause no 1.2 (b) of IS 16444. Meter should have provision of communication module compatible with both the variant mentioned in IS 16444. This module should be able to get connected to the NAN / WAN network of service provider (RF/ 4G) of CED. Meter should be able to provide required power supply to NIC card provided by communication provider shall be approved by CED.	Any national or international make with proven in any project in India.
6	Optical port	Optical port should be used to transfer the meter data to meter reading instrument. The mechanical construction of the port should be such to facilitate the data transfer easily.	USA: National Semiconductors, Texas Instruments, HP, Agilent, Avago Japan: Hitachi, , Germany /USA :Osram Germany: Siemens, Holland / Korea: Philips, Taiwan: Everlight,
7	Power Supply	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the	As Specified

		meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections	
8	Electronic components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes.	USA: Atmel, Philips, ST, National Semiconductors, Onsemi, Texas Instrument, Japan: Toshiba, Fairchild, Murata, Hitachi.EPSON. Ligitec, Panasonic OKI, EPCOS, Rohm, Freescale Germany: Siemens. Korea: Samsung.
9	Mechanical parts	The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. The other mechanical components should be protected from rust, corrosion etc. by suitable plating / painting methods.	
10	Battery	Lithium / Lithium-ion /Ni-Mh with guaranteed life of 10 years	Renata, NationalPanasonic Varta, Tedrium, Sanyo, Tekcell, Tadiran, Duracell, Mitsubishi, Sony, Maxell, Elegance.
11	RTC / Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Dallas, Atmel, Motorola, NEC, Renesas, Texas Instruments, ST, Microchips, Epson Holland / Korea: Philips, Japan: NEC, OKI, Hitachi, Mitsubishi, Freescale

TS.4. Technical Specification for Pilfer Proof Meter Box Suitable For Single Phase Static Energy Meters:

TS.4.1. Scope: This specification covers manufacture and supply of Pilfer Proof Meter Box (PPMB) suitable to house Single Phase Static Energy Meter. The Meter Box shall be wall mounted type, ability so as to offer protection of electrical equipment against harsh weather. The box shall be anti-corrosive, dust proof, shock, vermin & waterproof, pilfer proof, fire proof and UV stabilized. The enclosures shall not deform or melt when exposed to fire.

TS.4.2. Technical Requirement:

TS.4.2.1. 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 2.0 mm having good di-electric and mechanical strength.

TS.4.2.2. The material must be such that the Meter Box should not change in color, shape. Size, dimensions when subjected to Ageing Test. The Meter Box should have top tapered surface and round corners to prevent any water logging on the top of meter cover.

TS.4.2.3. The overall dimensions of the enclosure shall be suitable for housing single phase meter as offered by the bidder and there should be a clearance of 30 ± 2 mm from top & both sides of the meter. Bottom side clearance should be 75 ±5 mm from the lower edge of terminal block of the meter. Clearance from front side and back side of the meter should be 15 ± 2 mm and 10 ± 2 mm respectively. Meter Box with higher dimensions may be considered if found suitable.

TS.4.2.4. The Meter Box should 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 should ensure desired degree of safety. The material used should 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 fibers should be visible at any place.

TS.4.2.5. The box should comply in all respect with the requirement of latest amendments of IS /ASTM. Applicable degree of protection shall be IP 42 or better.

TS.4.2.6. All accessories like nuts, bolts, washers etc. shall be galvanized.

TS.4.3. Construction:

TS.4.3.1. The enclosure shall be single piece moulded with hot process compression molding or injection molding.

TS.4.3.2. Dimension of the box to be specified by the bidder.

TS.4.3.3. Hinges: A minimum of 2 nos. brass/stainless steel/MS with Zinc plated hinges in left side of the door and 1 no. brass/stainless steel/ MS with Zinc plated hinge/stainless steel / MS with Zinc plated 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.

TS.4.3.4. Suitable grove with locking arrangement shall be provided for opening of the enclosure door.

TS.4.3.5. Earthing Bolt: If supplied (not mandatory) 8mm dia. G.I. bolt with 2 nos. washers for earthing shall be provided.

TS.4.3.6. Fixing arrangement: The meter box shall have 4 nos. of mounting brackets made out of same material as meter box with provision for 6 mm dia hole for mounting the box on the wall or wooden board with suitable screws. The meter box shall have provision to fix it on the wall or wooden board with the meter in assembled condition. Four (4) nos. self threaded screws of minimum size of 4 mm dia and 25 mm long shall be provided with each meter box. Any other suitable arrangement for fixing the box may be accepted after verification.

TS.4.3.7. Sealing arrangement: The Box should have provision for padlocking and also for sealing arrangement of the base with cover providing holes for 1 no. seal to make it fully tamper proof. Any other alternating sealing arrangement to make the box tamper proof shall also be accepted.

TS.4.3.8. Incoming and outgoing cable arrangement: Suitable 2 (two) Nos. of holes at bottom (12 mm. dia) shall be provided in the box for cable/wire entry. 2 (two) holes must be totally covered with neoprene rubber gasket (NRG). NRG will be punched for entry of incoming and outgoing cable/wire.

TS.4.3.9. 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 should be sufficient. The tongue of the base shall ensure proper sealing arrangement against ingress of rainwater and dust inside the box.

TS.4.3.10. 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.

TS.4.3.11. Soft neoprene/nitride rubber gaskets shall be provided all rounds wherever required for protection against entry of dust and water. The gasket shall confirm to Type-III as per IS 11149. The enclosure shall comply with IP-42 or better degree of protection.

TS.4.3.12. The Enclosures shall be Crystal clear (transparent) polycarbonate.

TS.4.3.13. 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.

TS.4.3.14. Property of WBSEDCL

TS.4.3.15. Name/Brand name of Manufacturer

TS.4.3.16. Meter Box Sl. No. (Embossed / laser printing on both the base and covers of Meter Box)

TS.4.3.17. Sign of Danger.

TS.4.4. Submission of Sample:

TS.4.4.1. The bidder shall submit a sample Meter Box as per our specification along with the sample meter to the office of the Chief Engineer, (DTD), Abhikshan Bhavan, Sector-V, Salt Lake, Kolkata-91 before the last day of submission of bid.

TS.4.4.2. Submission of sample meter box as per size available with the bidder but it shall conform to our clearance and quality mention in the specification, otherwise it is not acceptable. 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. 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.

TS.4.5. Quality Control: 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. 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.

TS.4.6. General Construction Requirement:

TS.4.6.1. Viewing Window:

TS.4.6.1.1. 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.

TS.4.6.1.2. The minimum thickness of the viewing window shall be 2.0 mm. (flashing with top).

TS.4.6.1.3. The viewing window shall be provided with fixed rain hood.

TS.4.6.1.4. 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 enclosure.

TS.4.6.1.5. No viewing window is required for transparent polycarbonate meter box. In that case the box shall be crystal clear / transparent.

TS.4.6.2. Construction of louver: No louver is required for transparent polycarbonate meter box.

TS.4.6.3. 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.

TS.4.7. Replacement Of Defective Box: The Meter Box declared defective by the WBSEDCL shall be replaced by the supplier up to the full satisfaction of the WBSEDCL at the cost of supplier within 30 days from date of defective declaration. Failure to do so within the time limit prescribed shall lead to imposition of penalty of twice the cost of meter box. In this connection the decision of WBSEDCL shall be final.

TS.4.8. Testing:

TS.4.8.1. 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 3 (three) years old. 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.

TS.4.8.2. Acceptance Test:

TS.4.8.2.1. The acceptance test as stipulated in TS.4.11 shall be carried out at the time of inspection of the offered material.

TS.4.8.2.2. Where facilities do not exist at supplier's works for carrying out one or more of the Acceptance Tests as per **TS.4.11**, 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.

TS.4.8.2.3. The sampling plan for carrying out the acceptance tests shall be as per IS.

TS.4.8.3. Routine Test: The routine tests as stipulated in the TS.4.11 shall be carried out and routine test certificate/reports shall be submitted to Chief Engineer (DTD), WBSEDCL, Abhikshan, Sector-V, Salt Lake City, Kolkata-700091 while offering inspection & testing of the meter with meter box.

TS.4.9. Submission Of Drawing: Three (3) copies of drawing complete in all respect should be submitted to the C.E (DTD) under intimation to the Material Controller for accordance of approval immediately after placement of order. 25 copies of approved drawing are to be submitted for distribution to sites.

TS.4.10. Inspection: The inspection will be carried out by WBSEDCL if required and successful bidder shall facilitate the pre-dispatch inspection at their works site. If found unsatisfactory as to workmanship or material, the same is liable to rejection.

TS.4.11. Guaranteed Technical Particulars: The bidder shall furnish all the necessary information as per following 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.

Sl. No.	Item Description	Manufacturer's Particular
1.	Name & address of manufacturer	
2.	Material used for moulded meter box	Engineering Plastic (Acrylonitrile Butadine Styrene) / Polycarbonate
3.	Grade of Material	Fire retardant, self extinguishing
4.	Properties of material for meter box	
a)	Heat Deflection Temperature (Min. 140°C @1.8 MPa) Ref. Std. IS/ASTM)	100°C (minimum for Engineering Plastic) / 140°C(Minimum for Polycarbonate)
b)	Exposure to flame (Ref.	Self-extinguishing
c)	Melting Point (Ref. Std. IS/ASTM)	180°C (Minimum for Engg. Plastic) / 210°C (Minimum for Polycarbonate)
d)	Resistance to heat & fire	Glow wire test at 650°C
e)	Mechanical Property	

Sl. No.	Item Description	Manufacturer's Particular
i)	Tensile Strength (MPa)	To be specified by Bidder
ii)	Flexural Strength (MPa)	To be specified by Bidder
iii)	Modulus of Elasticity (MPa)	To be specified by Bidder
5.	Constructional features of the box	
(a)	Clear inside dimensions of Meter Box	Refer Drawing
	i) Height	To be specified by Bidder
	ii) Width	To be specified by Bidder
	iii) Depth	To be specified by Bidder
	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
(c)	Minimum clearance from meter on	15±2 mm
(d)	Minimum clearance from back of	10±2 mm
(e)	Viewing Window:	
	i) Material of transparent cover	Glass/Polycarbonate with Rubber Gasket
	ii) Size of opening (Min)	90 mm x 75 mm
	iii) Thickness of moulded sheet	2.0 mm
	iv) Fixing method	Fixed from inside with rubber gasket
(f)	Earthing arrangement	May or may not be required
(g)	Sealing Arrangement	Hole 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	4 nos. holes
	ii) Dimension of holes	6 mm
	iii) Dimension of box fixing	4X25mm self threaded
	iv) Total no. of fixing screws to be provided	4 nos.
(j)	Hinges	Concealed hinges
(k)	Incoming & outgoing cable holes	2 Nos, 12mm dia holes at bottom entry totally covered with Rubber Gasket(NRG)
(l)	Whether the cover is overlapping type having collars on all 4 sides	Yes
(m)	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	Yes
(n)	Whether the meter box having push button to access to the meter for taking reading during power off condition without opening of meter	To be provided
(o)	Weight of complete box in kg with ± tolerance.	To be specified by Bidder
6.	Type test report as per Technical	To be submitted by Bidder
7.	Degree of Protection	IP42 or better
8.	Any other Information	

TS.5. Technical Specifications for DLMS complied A.C. Three Phase Four Wire Solid State (Static) Fully Electronic Prepaid as well as Post paid Smart Energy Meter with Net Metering Facility, Accuracy Class: 1.0, Current Rating (20-100) A, (5-30) A& (10-60) A, With Backlit LCD Display for 3X240 V System.

TS.5.1. Scope:

TS.5.1.1. This specification covers design, engineering, manufacture, testing as per format submitted with offer for inspection and supply of A.C. Three phase, Four wire solid state (static) fully electronic, Lag only, DLMS complaint, with Prepaid & Post Paid feature, energy meters of accuracy class 1.0 with backlit LCD display for 3X240 Volt systems as per requirement in this specification. Considering the current rating (5-30) A, (10-60) A and (20-100) A, the quantity to be delivered as approx. 50%, 30% and 20% respectively of total 3-phase meter quantity mentioned in SW.1. with variation. Exact quantity of different current rating meter will be confirmed in the time of installation. The meter should be capable of recording and displaying energy in KWH, KVAh, KVArh (inductive), KVArh (capacitive), KVA and demand in KW for power factor range of Zero lag – unity – Zero lead. Meters should have facility/ capability of recording tamper information with Remote Firmware Upgrade and remote vend code transfer with tariff file updation facility. Net metering features as per CEA functional requirement and IS16444.

TS.5.1.2. It is not the intent to specify completely herein all the details of the design and construction of meter. However the meter shall conform in all respects to high standards of engineering, design and workmanship shall be capable of performing commercial operation continuously in a manner acceptable to WBSEDCL, who will interpret the meanings of drawings and specification and shall have the right to reject any work or material which in its judgment is not in accordance therewith. The offered meter shall be complete with all components, accessories necessary for their effective and trouble free operation of the system for the purpose mentioned above. Such components shall be deemed to be within the scope of bidders supply irrespective of whether those are specifically brought out in this specification and / or the commercial order or not.

TS.5.1.3. 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 as per clause IB.3.12. (10).

TS.5.2. Standard Applicable: Unless specified elsewhere in this specification, the performance & testing of the meters should conform to the following Indian/International standards, to be read with up to date and latest amendments/revisions thereof as on 90 days prior to floating of tender.

Sl. No.	Standard No.	Title
1	IS 13779, 1999 read with its latest amendments	Specification of AC Static Watt hour meters class 1.0 and 2.0
2	IS 15959:2011 with latest amendment no 3.	Data exchange for electricity Meter reading, Tariff and Load Control – Indian Companion Specification Category C3 meters.
3	CBIP Report No.325 read with latest amendments.	Specification for AC Static Electrical Energy Meters
4	IS 12346 (1988)	Specification for testing equipment for A.C. Static Electrical Energy Meter (latest amendment).
5	C.E.A. Regulation No. 502 / 70 / CEA / DP&D dt 17/03/2006	Central Electricity Authority (Installation and Operation of Meters) Regulation, 2006.
6	IS 14434 (1998)	Polycarbonate Moulding and Extrusion Materials.
7	IS-15884	AC circuit connected Static Smart prepaid Meters for Active Energy (Class 1 and Class 2)
8	IS-16444	A.C. Static direct connected watthour smart meter

TS.5.3. CLIMATIC CONDITION: The meters to be supplied against this specification should be suitable for satisfactory continuous operation under the following tropical conditions. Meters should be capable of maintaining required accuracy under hot, tropical and dusty climatic conditions.

TS.5.3.1. Maximum Ambient Air Temperature in shade: 55 Degree C
TS.5.3.2. Minimum Ambient Air Temperature: (-) 10 Degree C.
TS.5.3.3. Maximum Relative Humidity: 95% (non-condensing)
TS.5.3.4. Minimum Relative Humidity: 10%
TS.5.3.5. Height above mean sea level: Up to 3000 meters
TS.5.3.6. Average number of tropical monsoon per annum: 5 months
TS.5.3.7. Annual Rainfall: 100 mm to 1500 mm.

TS.5.4. SUPPLY SYSTEM:

System	3 Phase 4 Wire
Rated voltage (Vref)	3X240 V – Phase to Neutral
Rated Current	Basic current:- 10 Amps (lb), Maximum current:- 100 Amps (I max)
Rated Frequency	50 Hz

TS.5.5. POWER FACTOR RANGE: The meter should be suitable for full power factor range from zero (lagging) through to Unity to zero (leading).

TS.5.6. POWER SUPPLY VARIATION: The meter should be suitable for working with following supply system variations:

System	3 Phase 4 Wire
Specified range of operation	70% to 120% of reference Voltage i.e. 240 Volt.
Frequency	50Hz +5%

TS.5.7. ACCURACY:

TS.5.7.1. Class of accuracy of the meter should be 1.0. The accuracy should not drift with time.

TS.5.7.2. Maximum error limit at 1% Ib, UPF should be within +/- 2%.

TS.5.7.3. For voltage variation use of "between 70% to 50%"of Vref. allowable error limit is +/- 4%.

TS.5.8. POWER CONSUMPTION:

TS.5.8.1. Voltage Circuit: As per IS16444.

TS.5.8.2. Current Circuit: As per IS16444.

TS.5.8.3. Power consumption as per IS16444.

TS.5.9. STARTING CURRENT & RUNNING AT NO LOAD: The meter should 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 70%Vref and 120%Vref voltage is applied and no current flows in the current circuit, the test output of the meter should not produce more than one pulse.

TS.5.10. MAXIMUM CONTINUOUS CURRENT: The maximum continuous current in meters should be the current at which the meter purports to meet the accuracy requirement of the specification. The same is indicated in table in clause TS.5.4 above.

TS.5.11. GENERAL & CONSTRUCTIONAL REQUIREMENTS:

TS.5.11.1. Meters should be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following should be ensured.

TS.5.11.1.1. Personal safety against electric shock.

TS.5.11.1.2. Personal safety against effects of excessive temperature.

TS.5.11.1.3. Protection against spread of fire.

TS.5.11.1.4. Protection against penetration of solid objects, dust & water.

TS.5.11.2. The meter should be designed with ASIC (application specific integrated Circuit) and should be manufactured using SMT (Surface Mount

Technology) components. Power supply and voltage divider circuits may be of PTH (Pin Through Hole) technology.

TS.5.11.3. The meter should be housed in a safe, high grade, unbreakable, fire resistant, UV stabilized, virgin Polycarbonate casing of projection mounting type. The meter cover should be transparent, for easy reading of displayed parameters, and observation of operation indicators. The meter base may not be transparent, but it should not be black in colour. The meter casing should not change in shape, colour, size, and dimensions when subjected to 200 hrs on UV test as per ASTMD 53. It should withstand 650 deg. C. glow wire test and heat deflection test as per ISO 75. For testing of changing colour72 hrs on UV test is applicable. The meter cover should be sealable to the meter base with at least 2(two) nos. seals.

TS.5.11.4. The meter should be supplied with a transparent extended terminal block cover (ETBC). The ETBC should not be easily detachable from the base and be secured to the base using a hinge/ without hinge arrangement. ETBC should be closed at the bottom to prevent access for wires to terminal holes, but should have a slot of size 20mm X 20 mm(at least 375sq mm) on extreme right hand side of the bottom of the terminal cover. ETBC with 2 U-cuts of 20X20 mm at the front side instead of right side is also considered. The terminal block should be made of high grade non-hygroscopic, fire retardant, fire resistant and glass reinforced poly-carbonate with terminal holes of minimum diameter 5.5mm and should be suitable to accommodate the insulation of the conductors, meeting the requirement of IS 13779 / CBIP technical report-325 (As this is the latest CBIP Guidelines). The minimum centre to centre distance between adjacent terminals should be 13 mm. Terminal cover should have provision for sealing with at least one seal. The embedded portion of the sealing arrangement, i.e. the arrangement to hold the sealing screw for terminal cover should be such that the same cannot be uprooted in any case without breaking/damaging the terminal block. The bidder shall submit relevant documents regarding the procurement of polycarbonate material. The polycarbonate material of the following manufacturers only shall be used:

TS.5.11.4.1. 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.

TS.5.11.4.2. BAYER - Grade corresponding to above

TS.5.11.4.3. DOW Chemicals- - DO –

TS.5.11.4.4. MITSUBISHI- - DO –

TS.5.11.4.5. TEJIN- - DO –

TS.5.11.4.6. DUPONT- - DO –

TS.5.11.5. All insulating material used in the construction of meters should be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion should be effectively protected against corrosion during

operating life by providing suitable protective coating.11.6 The meter should conform to the degree of protection minimum IP 51 for protection against ingress of dust, moisture and vermin.

TS.5.11.6. The meter should be capable of providing phase to neutral protection up to 433 V for 10 minutes.

TS.5.11.7. The manner of fixing the cables to the terminal block should ensure.

TS.5.11.8. Adequate and durable contact such that there is no risk of loosening or undue heating. Meter should have 2 (two) screws in each terminal for effective clamping of cables. 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. Electrical connections should be so designed that contact pressure is not transmitted through insulating material. All terminals and connecting screws and washers should preferably be of tinned / nickel plated brass material. The terminals and all connecting screws will be of suitable material capable of withstanding a current of 120% of Imax for two hours, continuously.

TS.5.11.9. The meter should be compact in design. The entire construction should be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter should be convenient to transport and immune to shock and vibration during transportation and handling.

TS.5.11.10. The meter should have fixing holes, at least one at top and two at bottom. The top hole should be such that the holding screw is not accessible after fixing the meters. The lower fixing screws should be provided under the sealable terminal cover.

TS.5.11.11. The meter cover should be permanently fixed to the meter base by using ultra sonic welding in such a way that the meter cover can't be opened without breaking the same, i.e. the meter should be break-to-open type. In case any attempt is made to separate the meter cover from the base by using any tools / implements / device, there should be visible evidence of tampering or attempt to open. The bidder will have to specify the type of technology used by him and will also indicate the tests / standard required for testing the same along with test certificates. However, sealing with commonly available adhesives will not be accepted.

TS.5.11.12. Meter should 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 should not disappear even if cover is re-fitted. It should be

treated as non roll over event.

TS.5.11.13. Sealing Arrangement: The sealing screws used for the meter cover shall be fixed upside down so that these are tightened from the rear or screw less design for fixing the base and cover but provision for sealing arrangement must be there. A run through screw (stud) has to be provided from bottom side & sealing is to be done on the top side of the meter. Two independent sealing screws are to be provided at each sides of the meter casing. 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 should also be Tinned Brass or Nickel plated steel. Meters must be supplied with two no manufacture's seal between meter base and cover at both sides. If lock /click fit integrated seals are used during sample Meter, after through checking acceptance of said seal will be decided.

TS.5.12. ANTI-TAMPER FEATURES: The meter should have the following anti-tamper features:

TS.5.12.1. Current Reversal: The meter shall be capable of recording energy correctly even if the input and output terminals are interchanged in one, two or all the three phases including logging of tamper.

TS.5.12.2. The meter shall work correctly irrespective of phase sequence of supply (there must be an indication in display & down loaded data). Tamper alerts is not required. But it must be shown in instantaneous parameters both in tabular as well as in phasor diagram.

TS.5.12.3. The meter shall work correctly even in absence of neutral as per IS13779. Accuracy in between 70% Vref to 50 % Vref must be maintained within +4%.

TS.5.12.4. Meter should record energy within maximum error of + 4% on injection of DC (approximately 550V), pulsating DC (7-10 Hz), Chopped AC in Neutral. However, meters which are immune or maintain better accuracy, will be preferred. Maximum chopping for AC injection will be 25% to 30% at peak end.

TS.5.12.5. The registration shall not be affected more than + 4% if high frequency (60-100 Hz) A.C. Voltage w.r.t. earth is applied to the meter neutral. Meters which are immune or will maintain better accuracy, will be preferred.

TS.5.12.6. High Frequency Jammer Circuit Test – Meter should be immune on this test

TS.5.12.7. The meter should be immune to Electro Static Discharge or Sparks of 35 KV (approx) induced by using frequency-generating devices having very high output voltage. Test as per CBIP325 guidlines.

TS.5.12.8. N.B.: - Tests in this respect will be conducted by using commonly available devices and during spark discharge test, spark will be applied directly at all vulnerable points of the meter for a period of 10 to 20 minutes. The accuracy of the meter and acceptance criteria as per guidelines specified in Appendix J of CBIP 325. After application of spark discharge meter should record correctly within the specified limits of errors. Beyond 35 KV the meter should record tamper if not immune. It should record the event under Indian Event Reference of others type with Event ID's 249 for Occurrence and 250 for Restoration with OBIS (0.0.99.98.4.255). Other details are applicable as per "Others Tamper Profile of IS 15959. The meter shall be capable of recording; occurrences and restoration with date and time i.r.o. the following tamper conditions:

TS.5.12.8.1. Missing Potential for all phases (phase wise), even without any load drawal.

TS.5.12.8.2. Current reversal for all phases (phase wise). (It must not be restored without threshold current).

TS.5.12.8.3. Power failure: Minimum 50 events need to be given separately. Occurrence time shall be of 5 minutes & restoration time shall be instantaneous. First breath and last gasp conditions detection and communication to HES as per CEA guidelines.

TS.5.12.8.4. Magnetic Disturbances (As per IS 13779 & CBIP 325 along with latest amendments)

TS.5.12.8.5. Neutral Disturbances (Meter may remain immune and maintain its class of accuracy. If not immune then error must be in positive side).

TS.5.12.8.6. C.T. open

TS.5.12.8.7. C.T. Bypass/ C.T. Short.

TS.5.12.8.8. Over Current (during existence of this tamper current unbalance tamper should not log).

TS.5.12.9. Snapshot values of Phase Voltage, Phase Current & Phase wise Power Factor, Active Energy value during occurrence & restoration to be provided in all the above mentioned tamper conditions in BCS with date and time. (In Event logging Snapshots should be considered when the actual phenomenon occurred).

TS.5.12.10. The occurrence and restoration of tamper should be equal to 5 min (programmable). (Except Magnetic and Neutral Disturbances tampers) Magnetic tamper should appear instantaneously, ND within 3 min.

TS.5.12.11. All authenticated commands should be Base Computer Software controlled.

TS.5.12.12. All transactions with meter should be date and time logged, in the downloaded data minimum last 12 such transactions need to be provided.

TS.5.12.13. Properly designed meter tamper logic should be provided and clearly explained in the bid. The tamper logic should be capable of discriminating the system abnormalities from source side and load side and it should not log/record tamper due to any source side abnormalities. More than one tamper CT related/ PT related/ others should not be logged at a time. A minimum of 300 events (one event means either occurrence or restoration) of all types of tamper with date & time stamping should be available in meter memory compartment wise. The logging will be on FIFO basis. The events will be divided into three compartments like CT related (148 Events), PT related (88 Events) and others (64 Events).

TS.5.12.14. Meter should have a continuous and clear indication in its display if top cover is removed or opened and even re-fixed (non rollover) and only cover open must be logged in BCS without any restoration. Auto scroll display may be sacrificed for that COVER OPEN.

TS.5.13. DISPLAY:

TS.5.13.1. Display of Meter Serial No: Meter should have provision for displaying either Meter Serial No of 9 complete digit (First 2 digit provided for Alpha and last 7 digit provided for Numerical values) or Meter serial number should displayed in Billboard fashion "Separate Scrolling Mode" to accommodate 9 digit Alpha - Numeric Meter Serial No. In this case Meter Serial number should remove from Auto & Push Button Display.

TS.5.13.2. The measured value(s) should be displayed on a Liquid Crystal display (LCD) register. The height X width of the digit should be minimum 7.5 X4.0 mm. Higher square area also acceptable. The KWh energy registration should take place with at least 7 complete digits. No decimal is accepted for main KWh & KVAh register. The display should have backlit capability for easy reading from2meters. When the LCD is placed at a constant temperature of 65 degree C for a period of 30 minutes in operating condition and 80 degree C for 30 mins. Under de-energized / storage condition, it should not get deformed. The LCD should be of TN (Twisted Pneumatic) type with display size area of at least 40 X 15 mm. The display should have wide viewing angle of at least 70 deg. Dot Matrix type LCD will not be acceptable. Display should have viewing angle 35 degree up and down from eye level.

TS.5.13.3. The data should be stored in non-volatile memory (NVM). The non-volatile memory should retain data for a period of not less than 10 years under un-powered condition. Battery back-up memory will not be considered as NVM.

TS.5.13.4. The register should be able to record and display starting from

zero, for a minimum of 1500 hours (as per in IS 13779 and CBIP 325), the energy corresponding to rated maximum current at reference voltage and unity power factor. The register should not roll over in between this duration.

TS.5.13.5. In addition to provide serial number of the meter on the display plate, the meter serial number should also be programmed into meter memory for identification through communication port for CMRI / Laptop / meter reading print out.

TS.5.13.6. It should be possible to read the meter during power off condition. It should also be possible to read the meter with CMRI / Laptop in this condition. If battery is used for the same, it should 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 should not be the same. The battery should be of high quality Lithium / Lithium - ion battery, with life of at least 10 years. In case of Lithium battery, no. of operations per day are to be restricted to maximum 5(five) operations so that battery life is not hampered during ten years.

TS.5.14. DISPLAY SEQUENCE: The meter should display the required parameters in two different modes as per the sequence given below.

TS.5.14.1. Auto Display Mode:

TS.5.14.1.1. For Pre-paid:

(a) LCD Test
(b) Meter serial no
(c) Real Time
(d) Date
(e) Credit Balance in INR
(f) Present load cost in Rs/Kwh
(g) Cumulative KWH consumed
(h) Cumulative KVAH consumed.

TS.5.14.1.2. For Post-paid:

(a) Cumulative KWH with legend
(b) Cumulative KVAH with legend
(c) Current month MD in KW with legend
(d) Current month MD in KVA with legend
(e) Vrn, Vyn, Vbn
(f) Ir, Iy, Ib, In
(g) Real Time and date
(h) Meter serial No.

TS.5.14.2. Push Button Mode:

TS.5.14.2.1. LCD Test
TS.5.14.2.2. Meter serial no
TS.5.14.2.3. Real Time

TS.5.14.2.4. Date
TS.5.14.2.5. Cumulative Active forwarded energy in kWh.
TS.5.14.2.6. Cumulative Apparent forwarded energy in kVAh.
TS.5.14.2.7. Last Bill Maximum demand (kW)/KVA with date and time.
TS.5.14.2.8. Billing period counts
TS.5.14.2.9. Total tamper count.
TS.5.14.2.10. Last Bill Active Forward energy in kWh.
TS.5.14.2.11. Last Bill Apparent energy in kVAh
TS.5.14.2.12. Instantaneous Load (KW/KVA)
TS.5.14.2.13. Instantaneous voltages
TS.5.14.2.14. Instantaneous Phase Currents
TS.5.14.2.15. Instantaneous Neutral Currents
TS.5.14.2.16. Maximum demand kW and KVA for Current month with date & time
TS.5.14.2.17. Cumulative demand in KVA
TS.5.14.2.18. Supply Frequency
TS.5.14.2.19. TOD Energy in KWh
TS.5.14.2.20. Instantaneous Power Factor
TS.5.14.2.21. NIC card Status or
TS.5.14.2.22. GPRS Signal strength
TS.5.14.2.23. History registers for reactive energy
TS.5.14.2.24. Registers for temper information, self diagnostic connection check.

The meter should also be capable of offering a high resolution display which should enable conducting of dial testing by the user in the shortest possible time and as a minimum, the meter should be capable of offering a resolution of 4 digits after decimal & 2 digits before decimal for the high resolution KWh display. Any other useful display will be acceptable. Accuracy test for low load will be measured by short dial test as well as pulse count test.

TS.5.14.3. Engineering Display Mode: This display shall be available only upon the application of valid codes on the meter, and shall enable the display of the following:
TS.5.14.3.1. Software version
TS.5.14.3.2. All the limiting parameters value such as load limit, current limit & emergency credit limit.
TS.5.14.3.3. Switch operation counts.

TS.5.15. MAXIMUM DEMAND REGISTRATION AND RESET: Meter should continuously monitor and calculate the average maximum demand for each demand interval time of 15 minutes and maximum of these in a calendar month should be stored along with date and time when it occurred. The maximum demand should automatically reset at 24:00 hrs. of the last date or 00:00 hrs. of the first date of each calendar month and the corresponding value along with date/time stamp shall be transferred to Billing (History) registers. The integration period should be set as 15 minutes, on real-time basis. All the billing parameters including active forwarded energy, maximum demand in kW, etc. should be recorded and should be available in Bill (History) for a minimum period of last 12 months.

TS.5.15.1. RESETTING OF MAX. DEMAND: The meter should be capable of recording the Apparent MD with integration period of 15minutes (programmable). The meter should also record MD at preset date and time.MD reset should be through all of the three means: 1) Manually 2) Through authenticated MRI or Remote Communication Command, 3) Automatic resetting at 00:00 Hrs at fast day of the Month. Facility to invoke any of the above through authenticated MRI command should be provided. By default auto monthly MD. reset and also will be through push button on any date of the month. MD reset button should have proper sealing arrangement. Push button for scrolling display & MD reset should be separate.

TS.5.16. TIME OF USE / TIME OF DAY MONITORING: The meter should offer the capability of time of use monitoring for energy. Provisions shall be there for 8 nos of TOD slots with 3 nos of slots by default. Time slots T1= 06-00 Hrs. to 17-00 Hrs. T2=17-00 Hrs. to 23-00 Hrs and T3 = 23-00 Hrs to 06-00 Hrs of next day. Register are fixed (3 Nos) but In case of any change of TOD timing in future as per directive of SERC, the same is to be incorporated by the supplier even after completion of the order as per instruction from the appropriate authority. The TOD timings must be programmable and it can be possible to change the time slot / period for TOD recordings through authenticated BCS using Laptop and transferring vend codes through HES. In BCS TOD parameters are KWh, KW, KVAh and KVA.

TS.5.17. SELF DIAGNOSTIC FEATURE: The meter should be capable of performing complete self diagnostic check to monitor integrity of data memory location at all time. The meter should have indication for unsatisfactory / non-functioning / malfunctioning of the following:

TS.5.17.1. Time and date on meter display
TS.5.17.2. All display segments on meter display
TS.5.17.3. Real Time Clock (RTC) status in meter reading prints out at BCS end.
TS.5.17.4. Non-volatile Memory (NVM) status in meter reading prints out at BCS end.
TS.5.17.5. Synchronisation of time of meter & HES clock from MDAS instantly for less than 3 minute and through HES for more than 3 minute with alarm at HES.

TS.5.18. COMMUNICATION PORTS AND PROTOCOL: The meter should have a galvanically isolated optical communication port for data communication with CMRI / Laptop. No extra port is required. The port should be compatible with IEC 1107. The main communication protocol of the meter will be through RF/RF with NIC card. The RF module will communicate in 865-867 MHz free license Band certified from WPC, Ministry of Communication, GOI.

TS.5.19. CMRI / LAPTOP / BCS REQUIREMENTS: The Common Meter Reading Instrument (CMRI / Laptop) should be capable of being loaded with user-friendly software (MS-DOS 5.0 or higher version compatible) for reading / downloading meter data. Windows based Base Computer Software (BCS) should be provided for receiving data from CMRI / Laptop and downloading instructions from base computer software to CMRI / Laptop. The BCS should be

WIN 7/8/10 pro based and copy righted. The data stored in the meters memory should be available on the BCS. This BCS should have, amongst other requirements, features and facilities described later in this specification, the facility to convert meter reading data into user definable ASCII file format so that it may be possible for the user to integrate the same with the user's billing data and process the selected data in desired manner. All the data available in the meter including energy, MD, and history data should be convertible to user defined ASCII file format for integration with third party software. The vendor should supply necessary base computer software for reading / viewing of meter data and converting to user defined ASCII files formats. The user should have the flexibility to select the parameters to be converted into ASCII file. The vendor should also supply the necessary CMRI / Laptop software. The supported parameters must be downloaded from the meter itself. This functionality must be implemented in single software; no separate executable will be used for different types of meters which supports DLMS. Mapping of OBIS code as per DLMS protocol for instantaneous / billing / event / transaction parameters will be checked through third party DLMS conformity testing tool. Test for automated Meter reading will be conducted by downloading Meter data through Modem at our system through third party software also. The bidder has to supply also the Meter Reading protocol and API (if required) free of cost. The protocol should not be complicated & should be easily understandable to introduce compatibility between meters, BCS and CMRI of other makes. The bidder shall indicate the relevant standard to which the protocol complies. The compatibility of transferring data from the meter to CMRI & then to the BCS should be easily established. Any change or up gradation of CMRI software or BCS in future, required for any reason, has to be done by the supplier at his own cost. BCS supplied by the manufacturer should be compatible with meters to be supplied against this tender as well as with previous supplied meters. Optical Port of manufacturer cord should have either magnetic locking or Click slip (latch) fitting. It should not be possible to change/alter date and time in the meter by sending commands from the CMRI or directly through Laptop. For alteration of RTC time, MD resetting, change of TOD timing, it should be possible to be done only through authenticated commands from BCS after scheduling of CMRI/Laptop for a particular meter at the time of reading the meter. No alternation/change on the above points should be possible through authenticated commands from BCS without scheduling of CMRI/Laptop for meters. Moreover, no alternation/change should be possible using CMRI only, i.e. the control has to be with the BCS.

Billing parameters (KWH, KVAH, MD in KW & KVA, TOD wise KWH, Average P.F, and Average L.F).

If any OBIS code is not available for single phase then consider the OBIS code of three phase meter and for current use red phase current OBIS code. Only one BCS should be provided for programming and reading.

TS.5.20. DISPLAY POWER UP IN ABSENCE OF MAINS SUPPLY: The meter should have the provision of providing the display of billing parameters (Auto Display) in absence of main supply. Press of push button should activate the display to

facilitate hands free meter reading with auto-off provision. Meter may be Power on after 2 years, battery backup Power must be stable on that condition. Battery for RTC should not be less than 350mAh (±10%). It should be possible to read the meter using CMRI / PC during power-off condition using this facility. Battery for downloading and Display power up purpose should not be less than 650 mAh (±10%) and it should be chargeable. The meter must be capable of down loading data through optical port during Power Off condition.

TS.5.21. MARKING OF THE METER: The marking on the meter should be in accordance with relevant clauses of IS 13779. Colour of the Name Plate will be Light Grey. The basic marking on the meter nameplate should be as follows (all other markings as per IS 15959A2_R1 clause E - 10.1 should also be there):

TS.5.21.1. Manufacturer's name & trade mark
TS.5.21.2. Type Designation
TS.5.21.3. No. of phases & wires
TS.5.21.4. Serial number (Size not less than 5mm)
TS.5.21.5. Month & Year of manufacture
TS.5.21.6. Reference Voltage
TS.5.21.7. Rated Current
TS.5.21.8. Operating Frequency
TS.5.21.9. Principal unit(s) of measurement
TS.5.21.10. Meter Constant (imp/kwh)
TS.5.21.11. Class index of meter
TS.5.21.12. "Property of WBSEDCL"
TS.5.21.13. Purchase Order No. & Date
TS.5.21.14. BIS marking
TS.5.21.15. Place of manufacture
TS.5.21.16. Bar coded Serial no. of the meter along with manufacturing year & month.
TS.5.21.17. Firmware Version
TS.5.21.18. Communication Tech with carrier frequency.

TS.5.22. CONNECTION DIAGRAM & TERMINAL MARKINGS: The connection diagram of the meter should be clearly shown on terminal cover.

TS.5.23. OUTPUT DEVICE: The meter should have a test output accessible from the front and capable of being monitored with suitable testing equipment while in operation at site. The test output device should be provided in the form of LED output. There should be adequate clearance of the test output from other outputs so that there is no interference of other outputs while performing accuracy test with standard scanners. The relation between test output and the indication on display should comply with the marking on the name plate (imp per KWh). Two extra LED for KVArh impulse and Load control Status to be incorporated as display in meter body.

TS.5.24. ELECTRO-MAGNETIC-COMPATIBILITY & INTERFERENCE REQUIREMENT: The meter should meet EMI / EMC requirements as specified

in the relevant standards described in Clause 2.0 of this specification.

TS.5.25. SEALING ARRANGEMENT: All meters shall be sealed by the manufacturer at its works with 2 (two) nos. Polycarbonate seals with manufacturer's logo and sequential numbers. A Tracking and recording software (25 nos. or more as per our requirement) for all new seals shall be provided by the manufacturer of the meter so as to track total movements of the seals starting from manufacturing, procurement, storage, record keeping, installation, series of inspections, removal & disposal. Seal tracking software should be submitted and installed at PC/Laptop of the purchaser before commencement of supply of meters.

TS.5.26. Repeater: The repeater enclosure, Fixing arrangement and power supply must be similar to DCU/Gateway enclosure and IP certified. The repeater is basically a RF trans-Receiver in the 865-867 MHz free licensed band and WPC certified as mentioned for the module inside the energy meter.

TS.5.27. Load Control Switch: Meter shall be remotely settable to support double pole Relay for connection/disconnection; all Phase relay Disconnection on the following conditions:

TS.5.27.1. Over current
TS.5.27.2. Load Control Limit
TS.5.27.3. Pre-programmed Tamper conditions (Meter Cover open detection, Neutral disturbance, Magnetic Interference & 35KVESD with logging & communication to HES).
TS.5.27.4. 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 is as follows:
TS.5.27.5. The switch re-connection shall be decided by meter locally. It will try to re-connect the load up to 3times, with 5 minutes interval (not in case of Prepaid meter with limiting balance).
TS.5.27.6. If the consumption is still more than the programmed limits, it will lock out and wait for 30 minutes (lock out period).
TS.5.27.7. If the consumption is still above the limit, the procedure as defined above shall be repeated.
TS.5.27.8. The brief technical particulars of this Disconnector / load switch are furnished below:

TS.5.27.8.1. Disconnector's Specification:

S.No	DESCRIPTION	Requirement
1	Operating Voltage range	v ref (-30% to +20%)
2	Operating Current range	As per IS16444
3	Maximum switching power	22 kVA per phase/ per IS 15884 Annex G
4	No. of poles	Double pole in a single relay , f
5	Operation of switches	Simultaneous

6	Utilization Categories	UC2 or better
7	Min. number of operations	3000 (close, open each)

TS.5.27.8.2. Reconnection mechanism: Reconnection shall normally be done from MDAS/HES. In case of failure of communication, reconnection shall be possible through HHU locally and the same shall be **password protected**. For reconnection mechanism a local reset button shall also be provided on the Smart Meter.

TS.5.27.9. Indication of status of relay i.e. Connected / Disconnected should be available on display as well as through communication. Connection and Disconnection should also be logged as events.

TS.5.27.10. In prepaid mode the relay will be automatically be connected from HES when recharged data is available to HES.

TS.5.28. FRP Board: The FRP (Fibre-Reinforced Plastic) board to be supplied and delivered with each and every meter. The FRP board has to be fixed on the wall of consumer premises where the meter has to be installed. The smart energy meter will then be hanged and fixed on the FRP board firmly. The FRP board must be of electrical Shock proof and fire proof material. The FRP board must be type tested as per relevant IS and the type test report has to be produced before Testing and inspection from WBSEDCL.

TS.5.29. SMART PREPAID FEATURES:

TS.5.29.1. The meter shall have a non-volatile memory to retain the vital information in Case of power outages so that data will not lose.

TS.5.29.2. The credit shall be debited by the meter based on the electricity consumption according to the rate including the fixed charges, minimum charges etc, as defined in tariff configuration.

TS.5.29.3. The Meter shall be able to deduct fixed charges as a whole for the full month as per the tariff applicable.

TS.5.29.4. Visible low credit warning shall be provided with bi-colour LED / LCD indication (preferably Green for healthy zone, else change from green to flickering Red colour) when the credit falls below defined alarm limit.

TS.5.29.5. An audible sound alarm to be provided inside the meter to alert for any prepaid feature alarm. The alarm can be kept off or on from remote HES or through Optical port locally and must be password protected. Also, an alarm facility in consumer app is also preferable.

TS.5.29.6. When the credit reaches to Zero/ Allowable negative balance, the meter shall disconnect the output supply except emergency credit limit of one working Day from 17:30 hours of previous working day / second Saturdays

& Sundays, National Holidays, state fixed holidays & next day till 10:00 hrs). It shall give alarm when the credit balance is Rs one hundred (Rs 100.00).

TS.5.29.7. Meter shall Disconnect the output supply and Restore only when meter balance reach to the amount additional than zero.

TS.5.29.8. The meter shall disconnect supply after end of such holiday hours. When meter is recharged with new credit, it shall adjust the debited amount first then normal operation shall go on.

TS.5.29.9. Relay shall be provided in all phases in the meter to let alone fraud and single wire tamper. It shall be bi-stable type latching switch designed and manufactured in accordance for disconnection/ reconnection of all three phases with international standard of IEC and DIN EN 61810 part 1 / VDE 0435 part 201 as well as they meet overload and short circuit requirement of IEC and DIN EN 61036 / 61037 & ANSI C12.

TS.5.29.10. The meter shall have a data downloading facility with smart prepaid meter events like transactions (including the debit / credit balance, consumption particulars details and also Fixed charges, Unit charges, etc. as are applicable for post paid meter connections), alarm, overload, tamper, load survey, etc, through optical port provided with the help of HHU on which the data downloading software is available. The required software shall be supplied by the vendor free of cost.

TS.5.29.11. The Load survey Data including voltage, current, KWh, KVAh, KVARH Lag, KVARH Lead, Demand(KW/KVA) & P.F. shall be for last 45 days and Historical Data for last twelve months.

TS.5.29.12. The Tamper Data.

TS.5.30. LOAD SURVEY: The meter should be capable of recording load survey for the following parameters for a period of minimum 45 days with 15 minutes integration period:

TS.5.30.1. Demand in KW,
TS.5.30.2. Demand in KVA
TS.5.30.3. Current - phase-wise
TS.5.30.4. Voltage - Average Voltage
TS.5.30.5. Energy in KWH, KVAh, KVArh (inductive), KVArh (capacitive).

The NVM shall not require any additional battery backup to retain the data in case of power failure, for upto 10 years and the data storage shall be independent of battery backup unit. The life of the RTC battery in circuit condition should be minimum 5 years in case of power failure. It should be possible to transfer this data to base computer software through MRI. So, the obtained should be displayed in both graphical & numeric form in the BCS. The BCS with all details is to be provided by the supplier at no extra cost.

TS.5.31. The following provisions are mandatory for an AIA:

TS.5.31.1. NABL calibration of all the instruments used for testing with sealing of above instruments from NABL authority. Certificates with NABL Logo must be presented at the time of inspection.

TS.5.31.2. Automatic meter test bench is mandatory with NABL certification as mentioned in 1 above with at least 10 no. meter testing facility at a time with optical scanner.

TS.5.31.3. BIS certificate to be provided as per clause **IB.3.12. (10).**

TS.5.31.4. All other type test, GOI or manufacturer certificates related to components, EMC/EMI, WPC etc. are to be submitted before offer for testing.

TS.5.31.5. The test procedure for accuracy of meter, Checking of Downloaded Data through BCS and to compare it with MDAS data, Test on Tamper, Test on Ultrasonic welding of Meter, Component verification by breaking a meter, Physical Checking of meter are to be followed as per the Annexe-I.

TS.5.31.6. The list of test cases to be done in time of testing:

TS.5.31.6.1. Linking of DCU/Gateway and HES
TS.5.31.6.2. Capture of Instantaneous Parameters of meter
TS.5.31.6.3. Capture of billing data from meter
TS.5.31.6.4. Remote Connect/Disconnect of relay switch of meters
TS.5.31.6.5. Last Gasp/First Breadth as Alert/Event.

TS.5.31.7. A demonstration on **TS.5.31.6** above with meter is to be done at the time of qualifying the bidder technically. If it passes all the criteria at this demonstration then the price BID will be opened.

TS.5.32. The following additional tests shall be carried out in addition to the acceptance tests specified in IS 13779 / 1999 (amended up to date):

TS.5.32.1. Acceptance Tests for smart prepaid features:

TS.5.32.1.1. Test of credit balance & debit
TS.5.32.1.2. Test of friendly credit hours, start & end time there of
TS.5.32.1.3. Test of disconnect the output supply when credit reach to Zero.
TS.5.32.1.4. Test of reconnect the output supply on providing credit limit.
TS.5.32.1.5. Test of disconnect output supply if load / current exceeded the preset value in the meter.
TS.5.32.1.6. Test of reconnect output supply if load / current falls below the preset value in the meter.
TS.5.32.1.7. Test of visible & audible low credit warning.
TS.5.32.1.8. Test of application of tariff and TOU.
TS.5.32.1.9. Samples picked up by the inspecting officer for acceptance tests shall be first subjected to 'soaking' at 70 +/- 2 Deg. C for four hours. After

normalizing the acceptance tests as stipulated in CBIP (with latest amendments) and IS shall be carried out by the supplier in presence of purchaser's representative. Also the following additional tests are carried out on mutually agreed quantity of meters from each lot offered for inspection.

a. Shock Test.
b. Vibration Test.
c. Magnetic induction of external origin (AC&DC).
d. Tamper & Fraud protection as per TS.5.12.

TS.5.32.2. Transportation Test: At least 50% of the samples of the meter shall be tested for error at Imax, Ib and 5% Ib at unity power factor and 50% Imax and 10% Ib at 0.5 lagging power factor besides checking them for starting current. The meter shall be tested with meter cover duly tightened and sealed properly. After recording these errors, the meter be put in their normal packing and transported for at least 50 km in any transport vehicle such as pick up van, Jeep, etc, on even rural roads and then re tested at all these loads after the transportation. The variation in errors recorded before and after transportation shall not exceed 1% at higher loads and 1.5% at low loads.

TS.5.32.3. Other Acceptance Tests:

TS.5.32.3.1. The meter shall withstand continuously for a period of at least 5 minutes at a voltage of 440V between phase & neutral without damage / problems.

TS.5.32.3.2. Tamper conditions as stated in this specification.

TS.5.32.3.3. Glow wire testing for polycarbonate material

TS.5.32.3.4. Power consumption tests

TS.5.32.3.5. Limits of Error: Limits of variation in percentage error due to change in voltage shall not exceed the values given below:

Sl. No.	Influence quantities	Value of current	Power Factor	Limits of variation in % error for class meter
A	Voltage Variation -15% to + 10%	Ib Ib	1.0 0.5	0.7 1.0
B	Voltage variation -40% & +20%	Ib Ib	1.0 0.5	1.1 1.5

TS.5.32.3.6. The meter shall be tested at - 15% and at - 40% of reference voltage as well as + 10% and + 20% of reference voltage and shall record energy within limits of variation indicated above. However the meter shall continue to register energy up to 50% of the rated voltage.

TS.5.32.3.7. For other influence quantities like frequency variation, the limits of variation in percentage error will be as per IS 13779 / 1999 (amended up to date).

TS.5.32.3.8. The meter shall comply all the tests for external AC / DC (except 0.2 T AC magnet) magnetic field as per CBIP Tech-Report 88 with latest amendments. Moreover the magnetic influence test for permanent magnet of 0.5 T for minimum period of 15 minutes shall be carried out, by putting the magnet on the meter body. If the accuracy of the meter gets affected during the test, then the same shall be recorded as magnetic tamper event with date & time stamping and the meter shall record energy considering Imax and reference voltage at unity power factor. After removal of magnet meter shall be subject to accuracy test as per IS 13779 / 1999 (amended up to date). No deviation in error is allowed in the accuracy as per specifications.

TS.5.32.3.9. Test on Ultrasonic welding to be done for 2 no. meters as a destructive test. The meter cover will be forcibly opened by breakthrough with knife, Screwdriver or similar tools. If the cover detached with cracks at both cover and base then it will be treated as passed. Otherwise it will be declared as failed.

TS.5.32.3.10. The meter shall withstand impulse voltage at 10 KV.

ANNEX-I

TS.5.33. TESTS:

TS.5.33.1. Type Testing of Meter: The offered meters should be type tested at any NABL accredited laboratory in accordance with IS 13779 with latest amendments, CBIP Report 325 with latest amendments. The type test report should not be more than 3 (three) years old. A copy of the Type Test results should be enclosed with the offer. If there is any modification in the design/parameters of the specifications or use of constituent materials in the offered meters submitted with the offer, from the meter which was submitted type tested, which may affect the characteristics as well as parameters of the meter, revised type test certificates as per the design, parameters and constituent material used in the offered meter, shall have to be submitted failing which the offer may be liable to be rejected.

Type Test Certificate from any NABL accredited Lab. shall only be considered**.**

Type test certificate should contain the following information clearly: 1) Class of accuracy. 2) Meter constant**.**

TS.5.33.2. Acceptance tests: The acceptance tests as stipulated in CBIP / IS (with latest amendments) and shall be carried out by the supplier in presence of purchaser's representative. Lot size, sampling and procedure to be followed for acceptance test will be as stated below.

The following tests shall be carried out on all the meters thus selected at random. The WBSEDCL's Engineers will witness the various quality control

measures adopted for verification of different components of meters and satisfy themselves about the same. They will also inspect the protocol for maintaining the accuracy of the meter testing equipment with reference to the standard at manufacturer's meters testing station.

TS.5.33.2.1. Physical examination of the meters.

TS.5.33.2.2. Non-registration with Voltage along at 70% V ref and at 120% Vref.

TS.5.33.2.3. Starting current at 0.2% I basic Upf.

TS.5.33.2.4. High voltage test.

TS.5.33.2.5. Insulation resistance test.

TS.5.33.2.6. Test of protection for withstanding 433 volt between phase & neutral for a period of at least 10 minutes without any load.

TS.5.33.2.7. Test of endurance up to 120% I max for 1 meter or all the meters.

Limits of error on all the sample meters at:
1% I basic 1.0 pf. (±2% is preferable but should not exceed ±3%) balance load
2% I basic 1.0 pf. Balance load
5% I basic 1.0 pf., 0.5 pf. Lag for balance and unbalance load
Accuracy for Reactive energy from 5% to Imax at (1.0 & 0.5 lag p.f)
10% I basic 1.0 pf., 0.5 pf. Lag for balance and unbalance load
50% I basic 1.0 pf., 0.5 pf. Lag for balance and unbalance load
100% I basic 1.0 pf., 0.5 pf. Lag for balance and unbalance load
200% I basic 1.0 pf., 0.5 pf. Lag & 0.8 lead for balance and unbalance load
600% I basic 1.0 pf., 0.5 pf. Lag & 0.8 lead for balance and unbalance load

Test of meter constant and meter dial for one unit at 200% I basic, 0.866 pf. Lag. Dial test for both lead and lag p.f for three phase.

Power loss on voltage & current circuit.
Repeatability of error test at 5% I basic Upf & 100% I basic Upf.
The maximum divergent should be less than 0.1(Utility specific requirement)
If anyone of the meter fails on any of the above tests, the lot will be rejected. Further testing for 1 No. sample meter will be carried as follows:
Magnetic induction of external origin (AC & DC).

i. Electro Static Spark Discharge of 35KVp
ii. Tamper and Fraud protection as per Clause 12 (Anti--heat test as per clause 12.6.1 of IS: 13779/99.

At least one sample selected from first lot of the meters offered for inspection will be sealed by us and handed over to the supplier for dry heat testing at NABL accredited laboratory, cost to be borne by the bidder. Presence of purchaser's representative during dry heat test at NABL accredited laboratory is not required. But in the test report meter Sl. No. & meter body seal nos. is to be mentioned.
Shunt test by applying 100 Amps continuous load for minimum two hours after removing it from the meter for verification and conformation for quality of shunt & its E-beam welding.
Physical verification of internal components as per given ***component list***.

If the meter fails on any of the above test, the lot will be rejected. Facilities/arrangement for conducting ageing test should be available with the manufacturer.

TS.5.33.3. Retesting after delivery: WBSEDCL will carry out re-testing of the supplied meters at their laboratory. Re-testing of the supplied meters will be conducted on sample meters collected from different stores of the consignees as per the procedure followed for acceptance test (except dry heat test & shunt test) during inspection & testing of the supplied meters at manufacturer's works. Re-testing of the supplied meters will be completed within one month from the date of receipt of meters at different stores. Date of re-testing of meters will be intimated to the supplier for witnessing testing of the meters. In case the meters are not in order as per our observation during inspection and testing of the supplied meters, the lot will be declared defective and in that event meters supplied are to be replaced by the manufacturers free of cost including free transportation from the site to their works and back. The replaced meters are to be offered for inspection & testing and Acceptance test of will have to be carried out by the supplier in presence of purchaser's representative.

TS.5.33.4. Routine Tests: Each and every meter of the offered lot shall undergo the routine tests as well as functional tests as per IS: 13779/1999, CBIP Report-325 and after sealing of the meters, the manufacturers will submit the routine test report of all the meters as well as a statement showing seal Sl. Nos. against each meter, Sl. No. of offered lot in soft copy (MS WORD or EXCEL format), to the Chief Engineer, DTD, along with offer letter for acceptance test.

TS.5.33.5. TEST FACILITIES: The tests for equipment / instrument shall be carried out as per relevant Standards and test certificates shall be furnished for scrutiny. The Bidder shall indicate the details of the equipment available with him for carrying out the various tests as per relevant Standards. The bidder shall indicate the sources of all equipments/ instruments.

NOTE: The standard meters used for conducting tests shall be calibrated periodically at any NABL Accredited Test Laboratories and test certificates shall be available at Works for verification by purchaser's representative. The manufacturer shall have the following testing facilities to ensure accurate calibration :

TS.5.33.5.1. AC high voltage test
TS.5.33.5.2. Insulation test
TS.5.33.5.3. Test of no load condition
TS.5.33.5.4. Test of Starting condition
TS.5.33.5.5. Test on Limits of error
TS.5.33.5.6. Power loss in voltage and current circuit
TS.5.33.5.7. Test of Repeatability of error
TS.5.33.5.8. Test of meter constant
TS.5.33.5.9. Test of magnetic influence.

TS.5.33.6. Component Specification: The meters shall be designed and manufactured using SMT (Surface Mount Technology) components, except for power supply components, LED / LCD etc., which are PTH type. All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed makes so as to ensure higher reliability, longer life and sustained accuracy.

Sl. no.	Component Function / Feature	Requirement	Make / origin
1	Current Element	E-beam /spot welded shunts shall be provided in the phase element and C.T. in the neutral. Alternatively, both the current elements (phase & neutral) shall have Shunts with proper isolation	Any make or origin conforming to IS-2705
2	Measurement / computing chips	The Measurement / computing chips used in the meter should be with the Surface mount type along with the ASICs.	USA :Analog Devices, AMS, Cyrus Logic, Atmel, SAMES, Texas Instruments, Teridian, Japan: NEC, Freescale, Renesas, Holland: Phillps
3	Memory chips	The memory computing chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	USA: National Semi Conductor, Atmel, SAMES, Texas Instruments,Teridian, ST, Microchip, Japan: Hitachi, OKI, Renesas, Freescale, Holland / Korea: Phillps
4	Display modules	The display modules should be well protected from the external UV radiations. The display should be clearly visible over an angle of at least a cone of 70o.The construction of the modules should be such that the displayed quantity should not disturbed with the life of display. The display should be TN type industrial grade with extended temperature range. Singapore	Singapore: Bonafied Technologies, Korea: Advantek, Japan : Hitachi, SONY, Hijing, Truly Semiconductor. Chaina: Tianma
5	Communication modules	As per clause no 1.2 (b) of IS 16444. Meter should have provision of communication	Any national or international make with proven in any project in India.

		module compatible with both the variant mentioned in IS 16444. This module should be able to get connected to the NAN / WAN network of service provider (RF/ 4G) of CED. Meter should be able to provide required power supply to NIC card provided by communication provider shall be approved by CED.	
6	Optical port	Optical port should be used to transfer the meter data to meter reading instrument. The mechanical construction of the port should be such to facilitate the data transfer easily.	USA: National Semiconductors, Texas Instruments, HP, Agilent, Avago Japan: Hitachi, , Germany /USA :Osram Germany: Siemens, Holland / Korea: Philips, Taiwan: Everlight,
7	Power Supply	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections	As Specified
8	Electronic components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes.	USA: Atmel, Philips, ST, National Semiconductors, Onsemi, Texas Instrument, Japan: Toshiba, Fairchild, Murata, Hitachi.EPSON. Ligitec, Panasonic OKI, EPCOS, Rohm, Freescale Germany: Siemens. Korea: Samsung.
9	Mechanical parts	The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. The other mechanical components should be protected from rust, corrosion etc. by suitable plating /	

		painting methods.	
10	Battery	Lithium / Lithium-ion /Ni-Mh with guaranteed life of 10 years	Renata, NationalPanasonic Varta, Tedrium, Sanyo, Tekcell, Tadiran, Duracell, Mitsubishi, Sony, Maxell, Elegance.
11	RTC / Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Dallas, Atmel, Motorola, NEC, Renesas, Texas Instruments, ST, Microchips, Epson Holland / Korea: Philips, Japan: NEC, OKI, Hitachi, Mitsubishi, Freescale

TS.6. TECHNICAL SPECIFICATION FOR PILFER PROOF METER BOX (SINGLE DOOR TYPE & WITHOUT CUT OUT) SUITABLE FOR 3 PHASE WHOLE CURRENT ENERGY METER:

TS.6.1. SCOPE:

TS.6.1.1. This scope covers the manufacture and supply of Pilfer Proof Moulded Meter Box suitable to house 3-Phase Static Energy Meters. The Meter Box shall be suitable for wall mounted type.

TS.6.1.2. Technical requirement and standard:- The meter box shall be made out of hot pressed moulded, unbreakable, high grade, fire retardant thermosetting plastic e.g. glass fibre reinforced polyester SMC (Sheet Moulding Compound) as per S1 grade of IS) 13410, or Glass Reinforced Polyester Dough Moulding Compounds as per Grade D1 of IS 13411, with flame retardant properties having good di-electric & mechanical strength. The Top cover of the Meter Box shall be as per enclosed drawing with provision of separate window arrangement as shown. The material must be U.V. stabilized to ensure that the Meter Box shall not change in colour, shape, size, dimension when subjected to 200 hrs. of U.V. Ageing Test. The Meter Box shall have top tapered surface / round corners to prevent stay of rain water at the top of the Meter Box.

TS.6.1.3. The Meter Box shall be capable of withstanding the mechanical, electrical and thermal stress as well as the effects of humidity which are likely to be encountered in service. At the same time the same shall ensure the desired degree of safety. The plastic 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 fibers shall be visible at any place. The Box shall comply in all respect with the requirement of latest Amendments of I.S. 13410-1992 Specification for "General, requirements for enclosures for accessories for fixing electric

installations." Applicable degree of protection shall be I.P. 42 or better. The SMC material which will be used by bidder for this moulded Meter Box conforms to Relevant IS/13410-1992 with latest amendment.

TS.6.1.4. 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. Soft neoprene/nitrile rubber gaskets shall be provided all round wherever required for protection against entry of dust and water. The gasket shall confirm to Type-III as per IS-11149. The enclosure shall comply with IP-54 degree of protection. The Enclosures shall be off- white/admiral grey/Ivory or as specified by the owner.

TS.6.2. GENERAL CONSTRUCTIONAL REQUIREMENT:

TS.6.2.1. Dimension: Meter box dimension will be Length - 400 mm, Breadth - 300 mm, Height - 200 mm or any suitable size but acceptance subject to approval of the sample Thickness of the enclosure shall not be less than 2 mm on all sides including door. The enclosure shall have 4 mm thickness of the tongue and groove area. There shall be a minimum 30mm clearance on all sides from the meter surface (projected) except the bottom side which shall be minimum 75 mm from the lower edge of terminal block. Meter mountings inside the meter box will be such that the meter base support inside box shall be preferably raised by about 10 +/- 2 mm for each items for each of working. Fixing arrangement of meters and other equipment to the base of the meter box shall be as per provision of the drawing and as per the specification.

TS.6.2.2. Viewing Window: A viewing window (175 x 85 mm with tolerance of 5 mm or as per requirement of the owner) made up of scratch and break resistant, UV resistant, transparent Polycarbonate / toughened glass shall be provided on the door for reading the meter without inconvenience. The minimum thickness of the viewing window shall be 4.0 mm. 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 meter box.

TS.6.2.3. Hinges: A minimum of 2 nos. brass/stainless steel hinges on each 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.

TS.6.2.4. Locking Arrangement: The cover shall be fitted with base and shall be of concealed hinges. It shall have some knobs provided with covers. The covers are to be fixed on the base of Meter Box in such a way that any access from outside is not possible. There shall be provision of padlock simultaneously with holes for sealing arrangement covering the top of the

Meter Box. The door shall be provided with SS latch or U clamp similar cable entry holes shall be provided in the bottom of the Meter Box as per the drawing enclosed and the intermediate partition plates.

TS.6.2.5. Sealing Arrangement: The meter box shall have provision for minimum 2 nos. seals to make it fully tamper proof.

TS.6.2.6. Arrangement for Inlet & Outlet Cable Entry: Two (2) nos. circular holes having 40 mm dia shall be provided at the bottom of the Meter Box for inlet and outlet of armoured aluminium cables. High grade double compression MS cable glands fixed on both sides by check nuts are to be provided for securely fixing the cable at the bottom of meter box. A suitable arrangement like clamping nut may be provided with the gland so that opening dia can be reduced to the size of Cable.

TS.6.2.7. Base and cover details: The cover shall be made overlapping type having collars on all 4(four) sides. The cover of the Meter Box shall be provided with Gasket of sufficient size to completely fit in the grooves of the base. The gasket shall be made of high quality neoprene rubber. The base of the Meter Box must have a groove to hold the Gasket and the overlap of the top cover with base must be minimum 6 mm.

TS.6.2.8. Fixing arrangement of Meter Box: For fixing the Meter Box to wall or wooden board, 4 no. holes (two top side holes to be keyholes) of minimum 4 mm dia shall be provided at the four corners of meter cup-board. The meter is to be installed in the Meter Box and the Box in assembled condition shall have provision to fix it on wall. The 4 no. self threaded screws of min. size of 4 mm dia and 25 mm long shall be provided with each Meter Box.

TS.6.2.9. Marking / Embossing: The following information shall be clearly & indelibly embossed on the cover and base of the Meter Box or printed on metallic plate and duly revetted on the box cover. The top & bottom corner of Meter Box Sl.No. shall be same for the particular Meter Box.

TS.6.2.9.1. Property of WBSEDCL
TS.6.2.9.2. Name / Brand name of Manufacturer
TS.6.2.9.3. Meter Box Sl. No. (Embossed on both the base & covers of Meter Box)
TS.6.2.9.4. Sign of danger.

TS.6.2.10. Drawing: Detailed dimensional drawing showing clearly the dimensions & material for Meter Box and its constructional features have been furnished with the tender specification which is binding on the part of the manufacturer.

TS.6.3. SUBMISSION OF SAMPLE:

TS.6.3.1. Bidder shall submit a sample Meter Box as per our specification (or, as available with Bidder, however in the event of order it will be as per Specification before first inspection) along with the sample meter to the office of the Chief Engineer, (DTD), Abhikshan Bhavan, Sector-V, Salt Lake, Kolkata-91 before the last day of submission of bid.

TS.6.3.2. Submission of sample meter box as per size available with the bidder but conforming to our specification towards its quality is acceptable. 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. 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.

TS.6.4. TESTING:

TS.6.4.1. Type Test: The Meter Box offered shall be type tested as per relevant I.S. standards and the Technical Specification stated below : 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 shall not be more than 5 (five) years old.

TS.6.4.2. Acceptance Test: The acceptance test as indicated in the enclosed table (TS.6.5.1) shall be carried out at the time of inspection of the offered material.

TS.6.4.3. Routine Test: The routine tests as indicated in the enclosed table (TS.6.5.1) shall be carried out and routine test certificates / reports shall be submitted to the purchaser's inspection office at the time of inspection of the offered material enclosed table (TS.6.5.1) shall be carried out at the time of inspection of the offered material.

TS.6.4.4. Test Table:

TS.6.4.4.1. Sample selected from first lot shall be tested at Govt. approved independent test house for compliance of performance parameters as given in GTP including material identification to be carried out by CIPET/IR Spectrometry.

TS.6.4.4.2. The test report shall be submitted to WBSEDCL before completion of order.

TS.6.4.4.3. Inspection of each lot, sampling plans for test: 1 nos. selected randomly from lot for testing at works.

Sl. no.	Test Requirement for moulded meter box	Reference Standards
(a)	Marking	IS:14772
(b)	Dimensions & construction	IS:14772
(c)	Heat Deflection Temperature (Min. 150°C)	IS:13411
(d)	Spirit Burner Test (Self Extinguishing)	IS:4249
(e)	Melting Point (Does Not Melt up to 400 deg. C.)	IS:13360

TS.6.4.5. Replacement of defective Meter Box: The Meter Box declared defective by the WBSEDCL shall be replaced by the supplier up to the full satisfaction of the WBSEDCL at the cost of supplier within 30 days from date of defective declaration. Failure to do so within the time limit prescribed shall lead to imposition of penalty of twice the cost of meter box. In this connection the decision of WBSEDCL shall be final.

TS.6.4.6. INSPECTION: The inspection will be carried out by WBSEDCL if required and successful bidder shall facilitate the pre-dispatch inspection at their works site. If found unsatisfactory as to workmanship or material, the same is liable to rejection.

TS.6.5. GUARANTEED TECHNICAL PARTICULARS: The bidder shall furnish all the necessary information as per 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.

TS.6.5.1. GUARANTEED TECHNICAL PARTICULARS OF THREE PHASE METER BOX:

Sl. No.	Item Description	Manufacturer's Particular
1	Name & address of manufacturer	
2	Material	Thermosetting Plastic
3	Grade of Material	SMC / DMC Ref. Standard IS : 13410 – 1992
4	Properties of material for meter box	
f)	Heat Deflection Temperature (Ref. Std. IS: 13411)	150 deg C (minimum)
g)	Exposure to flame (Ref. Std..IS:	Self-extinguishing
h)	Melting Point (Ref. Std. IS:13360)	Shall not melt above 180° C
i)	Tensile Strength (MPa)	50 Mpa (minimum)
j)	Flexural Strength (MPa)	90 Mpa (minimum)
k)	Modulus of Elasticity (MPa)	2000 Mpa (minimum)
l)	IZod impact strength notched 230 °	8 KJ/Sq M (minimum)
5	Constructional features of the box	
(a)	Clear inside dimensions of Meter Box	Refer Drawing

		Height	400 mm
		Width	300mm
		Depth	200 mm
		Rust & Vermin proofing	Neoprene Rubber Gasket NRG
(b)		Material of transparent cover	Toughened Glass / transparent polycarbonate with Rubber gasket
		Size of opening/viewing	175mm x 85 mm with tolerance of 5 mm
		Min. thickness of cover	2 mm
		Fixing method	Fixed from inside with rubber gasket
(c)	Sealing Arrangement		Holes for wire seal (2 Nos.)
(d)	Wire entry		MS / Aluminum glands fixed on both side / bottom side by check nuts to be provided.
(e)	Colour of Meter Box		Grey / Off-White
(f)	Meter mounting arrangement		Suitable for mounting of any make of meter (broadly as per the drawing)
(g)	Box mounting arrangement		4 nos. holes
(h)	Hinges		2 nos. Concealed hinges or better
(i)	Incoming & outgoing cable holes		2 Nos, holes having 40mm dia and bottom entry. High grade double compression MS / Aluminium Cable glands fixed on both sides by check nuts to be provided.

TS.7. Technical Specification for AC 3 Phase 4 Wire LT CT -/5A operated Static DLMS compliant Category-A Energy Meter of 0.5S Class Accuracy

TS.7.1. SCOPE: This scope covers design, engineering, manufacture, inspection, testing & integrated bi-directional communication module (plug in type NIC card) with all integral along with the meter housing and supply of AC 3 Phase 4 Wire LT CT -/5A operated DLMS compliant four quadrant Static Energy Meter of 0.5S Class accuracy with backlit LCD display used for balanced/unbalanced load. The meter shall be capable of recording and displaying energy in kWh & demand in kVA, power factor having the range of zero lag-unity-zero lead. Meter shall have facility / capability of recording tamper information & load survey of active energy, apparent energy, reactive energy, phase currents, Phase Voltages & Other parameters in non-volatile memory and communicate through network.

TS.7.1.1. It is not the intent to specify completely herein all the details of the design and construction of meter. However, the meter shall conform in all respect to high standards of engineering, design and workmanship and shall be capable of performing commercial operation continuously in a manner acceptable to WBSEDCL, who will interpret the meanings of drawings & specification and shall have the right to reject any work or material which in its judgment is not in accordance herewith. The meter shall be complete with all components, accessories necessary for their effective and trouble free operation for the purpose mentioned above. Such components shall be deemed to be within the scope of bidder's supply irrespective of

whether those are specifically mentioned or not in this specification or in the commercial order.

TS.7.2. STANDARDS APPLICABLE: Unless specified elsewhere in this specification, the performance & testing of the meters shall conform to the following Indian / International standards, to be read with up-to-date and latest amendments / revisions thereof as on 90 days prior to floating of tender.

Sl. No.	Standard No.	Title
1	IS 14697 (1999):	ac Static Transformer Operated Watt hour and Var-hour Meters
2	CBIP Report No. 325 & its latest amendments, if any	Specification for AC Static Electrical Energy Meters
3	IS-16444(Part2)	A.C. Static transformer operated watt hour and var-hour smart meters
4	**IS-16444(2015)**	**Communication part**
5	IS 15959: 2011 read with latest amendments	Data Exchange for Electricity Meter - Reading Tariff and Load Control - Companion Specification
6	IS 12346 :1988	Specification for testing equipment for AC Static Electrical Energy Meter (latest amendment)
7	IEC687 – 1992	Specification of AC Static Watt Hour meters for active energy (Class 1.0)
7	CBIP Technical Report III	Specification for Common Meter Reading Instrument

TS.7.3. CLIMATIC CONDITIONS: The meters to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions. Meters shall be capable of maintaining required accuracy under hot, tropical and dusty climatic conditions. The meters shall be suitably designed and treated for normal life and satisfactory operation under hot and hazardous tropical climatic conditions and shall be dust and vermin proof. All the parts and surface, which are subject to corrosion, shall either be made of such material or shall be provided with such protective finish which provides suitable protection to them from any injurious effect of excessive humidity.

TS.7.3.1. Maximum Ambient Air Temperature in shade: 550 C

TS.7.3.2. Minimum Ambient Air Temperature: (-)100 C

TS.7.3.3. Maximum Relative Humidity: 95%(non-condensing)

TS.7.3.4. Minimum Relative Humidity: 10%

TS.7.3.5. Height above mean sea level: Up to 3000 meters

TS.7.3.6. Average number of tropical monsoons per annum: 5 months

TS.7.3.7. Annual Rainfall: 100 mm to 1500 mm

TS.7.3.8. Maximum Wind Pressure: 150 Kg/Sqm.

TS.7.4. SUPPLY SYSTEM:

System	3 Phase 4 Wire
Rated voltage (V_{ref})	415 V : Phase to Phase, 240 V : Phase to Neutral
Rated Current	-/5 Amp, balanced and unbalanced load, Maximum current 10 Amps (I_{max})
Rated Frequency	50 Hz

TS.7.5. POWER FACTOR RANGE: The meter shall be suitable for full power factor range from zero (lagging) through unity to zero (leading).

TS.7.6. POWER SUPPLY VARIATION: The meter shall be suitable for working with following supply system variations.

System	3 Phase 4 Wire
Specified range of operation	70% to 120% of reference Voltage
Frequency	50Hz $\pm$5%

TS.7.7. ACCURACY:

TS.7.7.1. Class of accuracy of the meter shall be 0.5S.

TS.7.7.2. Maximum error limit at 1% Ib and UPF shall not exceed +2%.

TS.7.7.3. There shall be no drift in accuracy, at least for a period of ten years from the date of supply. In case any drift is noticed which is beyond the permissible limits, the bidder shall have to replace the meter with a new one free of cost.

TS.7.8. POWER CONSUMPTION:

TS.7.8.1. Voltage Circuit: The active and apparent power consumption in the voltage circuit/phase at reference voltage, reference temperature and reference frequency shall be less than 1.5W / 10 VA as per IS 14697.

TS.7.8.2. Current Circuit: The apparent power taken by current circuit/phase at basic current, reference frequency and reference temperature shall be less than 1.0 VA as per IS 14697.

TS.7.9. STARTING CURRENT & RUNNING AT NO LOAD:

TS.7.9.1. The meter shall start registering energy at 0.1% of basic current at unity power factor and shall be fully functional within five seconds after the rated voltage is applied.

TS.7.9.2. Running at no load: When 70% & 120% voltage is applied and no current flows in the current circuit, the test output of the meter shall not produce more than one pulse.

TS.7.10. MAXIMUM CONTINUOUS CURRENT: The maximum continuous current in meters shall be the current at which the meter purports to meet the accuracy requirement of the specification. The same is indicated in table in Supply System Clause of this specification.

TS.7.11. CONSTRUCTION:

TS.7.11.1. The case, winding, voltage circuit, sealing arrangements, registers, terminal block, terminal cover & name plate etc. shall be in accordance with the relevant standards. The meter shall be compact & reliable in design, easy to transport & immune to vibration & shock involved in the transportation & handling. The construction of the meter shall ensure consistence performance under all conditions especially during heavy rains / very hot weathers. The insulating materials used in the meter shall be non-hygroscopic, non-ageing & have tested quality. The meter shall be sealed in such a way that the internal parts of the meter becomes inaccessible and attempts to open the meter shall result in viable damage to the meter cover i.e. break to open type. This is to be achieved by using continuous Ultrasonic welding on all the four sides of the Meter base and cover or any other technology which is either equally or more efficacious.

TS.7.11.2. The meter shall comply latest technology such as Microcircuit or Application Specific Integrated Circuit (ASIC) to ensure reliable performance. The mounting of the components on the PCB shall compulsorily be Surface Mounted Technology (SMT) type. Power supply component may be of PTH type. The electronic components used in the meter shall be of high quality and there shall be no drift in the accuracy of the meter for at least ten years. The circuitry of the meter shall be compatible with 16 Bit (or better) ASIC with compatible processor and meter shall be based on Digital measuring and sampling technique.

TS.7.11.3. The meter shall be housed in a safe, high grade, unbreakable, fire resistant, UV stabilized, virgin Polycarbonate casing of projection mounting type. The meter cover shall be transparent / translucent. But the viewing portion shall be transparent for easy reading of displayed parameters, and observation of operation indicators. The meter base may not be transparent, but it shall not be black in colour. The meter casing shall not change in shape, colour, size and dimensions when subjected to 72 hrs on UV test as per ASTMD 53. It shall withstand 650 deg. C. glow wire test and heat deflection test as per ISO 75 or as per IEC 60068 -2-5.

TS.7.11.4. In addition to the above, the meter cover shall be sealable to the meter base with at least 2 nos. bar coded seals bearing the identification marks of the Manufacturer. Suitable arrangement shall be made for fitting/fixing

of utility seal at two sides of meter terminal cover in such a manner that any access to the terminal cannot be made possible without removing the seal. There shall also be provision for sealing at the optical port and Plug in type NIC card should have proper sealing arrangement.

TS.7.11.5. The polycarbonate material of only the following manufacturers shall be used:

TS.7.11.5.1. G.E. PLASTIC: LEXAN 943A or equivalent like 943, 123R, 143 for meter cover & terminal cover / LEXAN 503R or equivalent like 500, 143R, 500R for meter base and terminal block.
TS.7.11.5.2. BAYER: Grade corresponding to above
TS.7.11.5.3. DOW Chemical: --do--
TS.7.11.5.4. MITSUBISHI: --do--
TS.7.11.5.5. TEJIN: --do--
TS.7.11.5.6. DUPONT: --do-

TS.7.12. METER CASE AND COVER:

TS.7.12.1. In case, ultrasonic welding using plate / strip is used, the material of plate / strip shall be same as that of cover and base and the strip. The manufacturer's logo shall be embossed on the strip / plate. The material of the meter body (case and cover) shall be of Engineering Plastic.

TS.7.12.2. The meter cover shall be fixed to the meter base (case) with Unidirectional Screws, so that the same cannot be opened by use of screwdrivers. These unidirectional screws shall be covered with transparent caps (not required for screw less design), ultrasonically welded with the meter body and the screw covers shall be embedded in the meter body in a groove. The meter shall withstand external magnetic influence as per latest amendments of CBIP Technical Report No.325 including 0.2T AC Magnet, 0.5T Permanent magnet.

TS.7.13. TERMINAL BLOCK AND COVER:

TS.7.13.1. The terminals may be grouped in a terminal block having adequate insulating properties and mechanical strength. The terminal block shall be made from best quality non-hygroscopic, flame retardant material (capable of passing the flammability tests) with nickel plated brass inserts / alloy inserts for connecting terminals. It shall be rigidly fixed to the base of the meter so that it cannot be separated from the meter base without breaking either the meter base or the terminal block and this fixing arrangement shall be in parallel to the meter base in such a way that it cannot be viewed or approached from any part of the meter without breaking the meter.

TS.7.13.2. The terminals in the terminal block shall be of adequate length in order to have proper grip of conductor. The screws shall have thread size not less than M4 and head having 6 mm. Diameters. The screws shall not have pointed ends at the end of threads. All terminals and connecting screws and washers shall be of tinned / nickel plated brass material. The terminal shall withstand glow wire test at 960 + 15 ^{o}C and the terminal shall withstand at least 135 ^{o}C as per IS.

TS.7.13.3. The internal diameter of terminal hole shall be minimum 5.5 mm and center to center distance is 13 mm. The holes in the insulating material shall be of sufficient size to accommodate the insulation of conductor also.

TS.7.13.4. The terminal cover shall be transparent re-enforced Polycarbonate, Engineering Plastic with minimum thickness 2.0 mm and the terminal cover shall be of extended type completely covering the terminal block and fixing holes. The space inside the terminal cover shall be sufficient to accommodate adequate length of external cables.

TS.7.13.5. The terminals and all connecting screws will be of suitable material capable of withstanding a current of 150% of I_{max} for two hours, continuously and the meter shall be capable of providing phase to neutral protection up to 63.5 V for 1(one) hours.

TS.7.14. MARKING OF THE METER: The marking on the meter shall be in accordance with relevant clauses of IS 14697. The basic marking on the meter nameplate shall be as follows. All other markings as per IS shall also be there.

TS.7.14.1. Manufacturer's name & trade mark
TS.7.14.2. Type Designation
TS.7.14.3. No. of phases & wires
TS.7.14.4. Serial number (Size not less than 5mm)
TS.7.14.5. Month & year of manufacture
TS.7.14.6. Reference Voltage
TS.7.14.7. Rated Secondary Current
TS.7.14.8. Rated Maximum Current
TS.7.14.9. CT Ratio
TS.7.14.10. Operating Frequency
TS.7.14.11. Principal unit(s) of measurement
TS.7.14.12. Meter Constant (imp/kWh)
TS.7.14.13. Class index of meter
TS.7.14.14. "Property of WBSEDCL"
TS.7.14.15. Purchase Order No. & Date
TS.7.14.16. Guarantee (Guaranteed for a period of 5 ½ years from the date of delivery)
TS.7.14.17. BIS marking
TS.7.14.18. Place of manufacture

TS.7.14.19. Barcode for meter serial no. in alpha numeric form, date of manufacture, current rating of the meter and PO reference, readable by single layer barcode reader.

TS.7.14.20. The reference temperature if different from 27 0C.

TS.7.14.21. The sign of Double Square for insulating encased meters.

TS.7.14.22. Firmware version

TS.7.14.23. Communication Tech with carrier frequency.

TS.7.15. CONNECTION DIAGRAM AND TERMINAL MARKING: Every meter shall be indelibly marked with a diagram of connection. For this poly phase meters, this diagram shall also show the phase sequence for which the meter is intended. It is permissible to indicate the connection diagram by an identification figure in accordance with relevant standards. The marking of meter terminals shall appear on this diagram.

TS.7.16. DISPLAY OF MEASURED VALUES:

TS.7.16.1. The meter shall have alphanumeric display with at least 7 full digit with LCD backlit display, having minimum character height of 10 mm. The data shall be stored in nonvolatile memory. The non-volatile memory shall retain data for a period of not less than 10 years under unpowered condition. Battery back-up memory will not be considered as NVM.

TS.7.16.2. It shall be possible to easily identify the single or multiple displayed parameters through symbols / legend on the meter display itself or through display annunciation which shall be self explanatory and symmetric.

TS.7.16.3. In addition to provide Serial Number of the meter on the display plate, the meter serial no. shall also be programmed into meter memory for identification through communication port for CMRI / laptop / meter reading printout.

TS.7.16.4. Visibility of display in poor light conditions is an important criterion. STN or TN or any better type of advanced LCD to be used. Proper legends for the displayed parameters to be provided (Factory programmable). Back lit provided for clear visibility shall be uniform throughout all part of the LCD.

TS.7.16.5. The meters shall have auto-display mode for pre-selected parameters. Push-Button mode of display shall display all parameters and it shall have priority over auto mode. The meter shall give clear message on display to indicate that the meter has experienced tampers and the nature of tamper with date and time of first occurrence, last occurrence and last restoration, if the Last tamper status is not restored, then meter will indicate first occurrence, last restoration and last occurrence.

TS.7.16.6. Connection check, Phase sequence and self diagnostic shall give clear message on display. The meter shall have a test output (blinking LED) accessible from the front and be capable of being monitored with suitable

testing equipment. The operation indicator must be visible from the front. Test output device shall be provided in the form of one common LED for active and reactive energy with the provision of selecting the parameter being tested (separate LED may also be used with proper separation).

TS.7.16.7. The meter shall be provided with meter to NIC connectivity LED and Network Status LED.

TS.7.17. DISPLAY SEQUENCE: The meter shall display the required parameters in two different modes as follows. Display sequence for both auto and Push button must be maintained, no interchange in sequence or display parameter will be accepted. All the display shall have proper legend to identify the same.

TS.7.17.1. Auto Display Mode: The following parameters shall be displayed in auto cycle mode, in the following sequence**.**

TS.7.17.1.1. LCD test
TS.7.17.1.2. Meter serial number
TS.7.17.1.3. Real Date (dd mm yy)
TS.7.17.1.4. Real Time (hh mm ss)
TS.7.17.1.5. Cumulative Active Energy
TS.7.17.1.6. Cumulative Apparent Energy
TS.7.17.1.7. Maximum Demand in Active
TS.7.17.1.8. Instantaneous Average Power Factor
TS.7.17.1.9. TOD Active Energy
TS.7.17.1.10. TOD Apparent Energy
TS.7.17.1.11. R Phase to Neutral Voltage
TS.7.17.1.12. Y Phase to Neutral Voltage
TS.7.17.1.13. B Phase to Neutral Voltage
TS.7.17.1.14. R Phase Current
TS.7.17.1.15. Y Phase Current
TS.7.17.1.16. B Phase Current
TS.7.17.1.17. Cumulative Tamper Count
TS.7.17.1.18. Cumulative Power OFF Hours
TS.7.17.1.19. Power OFF Hours of present month
TS.7.17.1.20. Cumulative Billing Count
TS.7.17.1.21. NIC card Status.

TS.7.17.2. Push Button mode: The following parameters shall be displayed on pressing the push button. The meter display should return to Auto Display mode (mentioned above) if the 'push button' is not operated approx. more than 6 seconds.

TS.7.17.2.1. LCD test
TS.7.17.2.2. Meter serial number
TS.7.17.2.3. Real Date (dd mm yy)
TS.7.17.2.4. Real Time (hh mm ss)
TS.7.17.2.5. History 1 TOD wise Active energy

TS.7.17.2.6. History 1 TOD wise Apparent Energy
TS.7.17.2.7. History 1 TOD wise Maximum Demand in Apparent
TS.7.17.2.8. History 1 Maximum demand in Apparent Occurrence Time and Date
TS.7.17.2.9. History 1 Maximum demand in Active
TS.7.17.2.10. History 1 Maximum demand in Active Occurrence Time and Date
TS.7.17.2.11. History 1 Reactive energy
TS.7.17.2.12. Cumulative Active Energy
TS.7.17.2.13. Cumulative Apparent Energy
TS.7.17.2.14. Maximum Demand in Active
TS.7.17.2.15. Maximum Apparent Demand
TS.7.17.2.16. Cumulative Reactive Energy
TS.7.17.2.17. Instantaneous Average Power Factor
TS.7.17.2.18. TOD Active Energy
TS.7.17.2.19. TOD Apparent Energy
TS.7.17.2.20. TOD Reactive Energy
TS.7.17.2.21. R Phase to Neutral Voltage
TS.7.17.2.22. Y Phase to Neutral Voltage
TS.7.17.2.23. B Phase to Neutral Voltage
TS.7.17.2.24. R Phase Current
TS.7.17.2.25. Y Phase Current
TS.7.17.2.26. B Phase Current
TS.7.17.2.27. Cumulative Tamper Count
TS.7.17.2.28. Cover Open Information with date and time
TS.7.17.2.29. Cumulative Power OFF Hours in hour: minute from the date of manufacturing.
TS.7.17.2.30. Power OFF Hours of present month
TS.7.17.2.31. Inst. Power Factor - Phase Wise
TS.7.17.2.32. Average Power Factor (Previous Month)
TS.7.17.2.33. Avg. Load Factor (Previous Month)
TS.7.17.2.34. Instantaneous Active Power
TS.7.17.2.35. Instantaneous Apparent Power
TS.7.17.2.36. Instantaneous Frequency
TS.7.17.2.37. Present Tamper Status
TS.7.17.2.38. First Occurrence with Date & Time
TS.7.17.2.39. Last Occurrence with Date & Time
TS.7.17.2.40. Last Restoration with Date & time
TS.7.17.2.41. High resolution display for kWh, kVArh (Lag + Lead) and kVAh (minimum 2+4)
TS.7.17.2.42. High resolution display for kWh, Phase wise (minimum 2+4)
TS.7.17.2.43. Phase Sequence
TS.7.17.2.44. Connection check (when all phase are forward or reverse)
TS.7.17.2.45. Self Diagnosis
TS.7.17.2.46. Battery Status
TS.7.17.2.47. NIC card Status.

TS.7.17.3. Power OFF Mode Display:

TS.7.17.3.1. Meter Serial No.
TS.7.17.3.2. Real Time

TS.7.17.3.3. Date
TS.7.17.3.4. History 1 TOD wise Active energy
TS.7.17.3.5. History 1 TOD wise Apparent Energy
TS.7.17.3.6. History 1 TOD wise Maximum Demand in Apparent
TS.7.17.3.7. Cumulative Billing Count
TS.7.17.3.8. Cumulative Tamper Count
TS.7.17.3.9. Cumulative Active Energy.

TS.7.17.4. Display for Auto and manual mode must be listed by two headers:

TS.7.17.4.1. "Auto Display Mode"
TS.7.17.4.2. "Push Button Mode"

TS.7.17.5. Display: Other requirements:

TS.7.17.5.1. Each parameter shall be on meter display for 10 sec and the time gap between two auto display cycles shall be 120 sec.

TS.7.17.5.2. The register shall be able to record and display starting from zero, for a minimum of 1500 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.

TS.7.17.5.3. High resolution display can be given in separate mode.

TS.7.17.5.4. No decimal is required for main kWh, kVAh, kVarh (lag & lead) display.

TS.7.17.5.5. Push button mechanism shall be of high quality and shall provide trouble free service for a long span of time.

TS.7.17.5.6. Up and Down scrolling facility shall be there for Push Button Mode.

TS.7.18. ANTI TAMPER FEATURES: The meter shall have the following anti-tamper features:

TS.7.18.1. The meter shall work correctly irrespective of phase sequence of supply. (There must be an indication in display & down loaded data).

TS.7.18.2. The meter shall work correctly even in absence of neutral. For reference voltage Vref between 70% to 120 %, accuracy must be maintained as specified in relevant IS.

TS.7.18.3. Meter shall record energy within maximum error of ± 4% on injection of DC, pulsating DC (7-10 Hz), chopped AC in Neutral along with logging of ND tamper. In case tamper event is not logged, i.e, meters are immune to neutral disturbance, accuracy of the meters must not be affected. Maximum chopping for AC injection will be 25% to 30% at peak end.

TS.7.18.4. The registration shall not be affected more than + 4% if high frequency (55Hz to 100Hz) or low frequency (45Hz to 30 Hz) AC signal w.r.t. earth is applied to the meter neutral. Meters which are immune or will maintain better accuracy, will be preferred.

TS.7.18.5. The meter shall be immune to Electro Static Discharge or Sparks of 35 KV (approx) induced by using frequency-generating devices having very high output voltage.

Tests in this respect will be conducted by using commonly available devices and during spark discharge test, spark will be applied directly at all vulnerable points of the meter for a period of 10 minutes (at an interval of 1minute (approx) between two consecutive strokes) and meter shall maintain accuracy after the test under this condition. Accuracy will be checked during and after application of spark discharge Test. Meter shall record correctly within the specified limits of errors. Beyond 35 KV the meter shall record tamper if not immune.

TS.7.18.6. The meter shall be capable of recording occurrence and restoration with date and time in respect to the following tamper events:

TS.7.18.6.1. Power failure (Tamper count not to be increased) - as per tamper logic
TS.7.18.6.2. Invalid Voltage - as per tamper logic
TS.7.18.6.3. Missing Potential (phase wise) -as per tamper logic
TS.7.18.6.4. High Voltage - as per tamper logic
TS.7.18.6.5. Voltage Unbalance - as per tamper logic
TS.7.18.6.6. CT Open - as per tamper logic
TS.7.18.6.7. CT Bypass/ CT Short - as per tamper logic
TS.7.18.6.8. Over Current - as per tamper logic
TS.7.18.6.9. Neutral Disturbances (If it is logged) - as per tamper logic
TS.7.18.6.10. Magnetic Disturbances - as per tamper logic.

TS.7.18.7. Threshold Values of all above occurrence and restoration are attached herewith. Snapshot values of Phase Voltage, Phase Current & Phase wise Power Factor, Active Energy value during occurrence & restoration to be provided in all the above mentioned tamper conditions in BCS with date and time. (In Event logging Snapshots shall be considered when the actual phenomenon occurred). The logging time for recording occurrence and restoration of all tamper events except Magnetic & Neutral Disturbance tamper, shall be 5 min. Magnetic tamper shall appear instantaneously, Neutral Disturbance within 3 min.

TS.7.18.8. The meter shall be reprogrammable at site through CMRI or remotely with adequate security level. All transactions with meter shall be date and time logged, in the downloaded data (Last 12 month's transactions).

TS.7.18.9. Properly designed meter tamper logic shall be provided and clearly explained in the bid. The tamper logic shall be capable of discriminating the system abnormalities from source side and load side and it shall not log/record tamper due to any source side abnormalities. More than one tamper shall not be logged at a time. A minimum of 300 events (one event means either occurrence or restoration) of all types of tamper with date & time stamping shall be available in meter memory compartment wise. The logging will be on FIFO basis. The events will be divided into three compartments like CT related (148 Events), PT related (88 Events) and others (64 Events).

TS.7.18.10. Meter shall have a continuous and clear indication in its display if top cover is removed / opened and even re-fixed (non-rollover) and only cover open must be logged in BCS and remote host without any restoration. COVER OPEN tamper is to be displayed after every parameter displayed in Auto Display Mode.

TS.7.18.11. Minimum 04 DI & 02 DO is required (Extendable up to 08 each type for future requirement) to communicate with DT/Breaker/Isolators/FPI, sensors etc.

TS.7.18.12. Measurement of Harmonics: The meter shall be capable of measuring fundamental energy as well total energy i.e., fundamental plus harmonics energy. Total energy shall be made available on meter display and the same shall be used for billing purpose. Provision for measuring fundamental energy shall be kept for utilization in future. The total energy and fundamental energy shall be logged in the meter memory and be capable of downloading to remote and also to the BCS through the CMRI and be available for viewing at the BCS end separately.

TS.7.19. RESETTING OF MAX. DEMAND:

TS.7.19.1. The meter shall be capable of recording the Apparent MD with integration period of 15 minutes (programmable). MD reset shall be through each of the three means:

TS.7.19.1.1. Automatic resetting at preset date & time (at present it will be at 00.00 hrs of the first day of the month)

TS.7.19.1.2. Manually i.e., by push button.

TS.7.19.1.3. Through authenticated command from MRI or through Remote Communication.

TS.7.19.2. The means by which the reset has been done shall be made available to downloaded data. Facility to invoke any of the above through authenticated MRI command shall be provided at BCS. MD reset button shall have proper sealing arrangement.

TS.7.19.3. There shall be separate Push button for scrolling display (up and down) and MD reset. If only two Push buttons are used minimum 180sec pressing is required for MD reset.

TS.7.20. LOAD SURVEY: The meter shall be capable of recording load survey for the following parameters for a period of minimum 45 days - subject to availability of all parameters listed below with 15 minutes integration period.

TS.7.20.1. Energy in kWh & kVAh,
TS.7.20.2. Demand in kVA and kW,
TS.7.20.3. Current - phase-wise
TS.7.20.4. Voltage - phase-wise

TS.7.21. The NVM shall not require any additional battery backup to retain the data in case of power failure, for up to 10 years and the data storage shall be independent of battery backup unit. The life of the RTC battery in circuit condition shall be minimum 10 years in case of power failure. It shall be possible to transfer this data to base computer software through MRI/Laptop or RMR. The data so obtained shall be displayed in both graphical & numeric form in the BCS. The BCS with all details is to be provided by the supplier at no extra cost.

TS.7.22. TIME OF DAY FACILITIES: The meter shall have facilities to record Active, Apparent Energies and MD in at least 8 zones. **The time zones shall be user programmable through authenticated BCS using Laptop and in one to one /broadcast mode over the air from remote**. Necessary software for the same is to be provided by the bidder. At present TOD timings will be programmable as follows:

TS.7.22.1. TOD 1: 06:00 Hrs to 17:00 Hrs.
TS.7.22.2. TOD 2: 17:00 Hrs to 23:00 Hrs.
TS.7.22.3. TOD 3: 23:00 Hrs to 06:00 Hrs.

TS.7.23. METER READING DURING POWER OFF: It shall be possible to read the meter-display visually and with MRI/Lap top in absence of input voltages with the help of internal battery backup. In case of external battery, the arrangements shall be such that hands-free operation is possible. In case of external battery 10 years guarantee must be given for external battery/power pack. Separate battery shall be used for this purpose (Not RTC or processor battery). In case of Lithium battery rating shall be more than 500mAh.

TS.7.24. SELF DIAGNOSTIC FEATURES: The meter shall be capable of performing complete self-diagnostic check to monitor the circuits for any malfunctioning to ensure integrity of data memory location all the time. If possible, the details of malfunctioning shall be recorded in the meter memory. The bidder shall furnish the details of self-diagnostic capability feature, viz Memory status (NVM) and Battery status, RTC Status, NIC card status etc. and it shall be in display.

TS.7.25. IMMUNITY TO ELECTRO MAGNETIC DISTURBANCE: The meter shall be designed in such a way so that external electromagnetic field or electrostatic discharges do not influence the performance of the meter as per IS 14697. **Communication network should be immune with any external Magnetic field/ESD/Jammer/HV voltage influence such that it shall not affect the normal overall functionality.**

TS.7.26. TECHNICAL SUPPORT, MANUALS & TRAINING: Extensive technical support, detailed technical literature (shall supply with each meter at the time of packing) & training is to be provided by the manufacturer. Supply of External Battery Packs if required to be provided by the manufacturer and shall be clearly offered in their bids.

TS.7.27. INFLUENCE QUANTITIES: The meter shall work satisfactory with guaranteed accuracy as per limit provided in IS: 14697 (clause No.9.2.1 and 11.2) under presence of the following quantities:

TS.7.27.1. Electromagnetic field
TS.7.27.2. External magnetic field
TS.7.27.3. Radio frequency interference
TS.7.27.4. Vibration
TS.7.27.5. Voltage variation (70% - 120% of Vref.) in 0.5 lag and upf both in 5% and 100% of Ib
TS.7.27.6. Frequency variation (+/-) 5% of 50 Hz in 0.5 lag and upf both in 5% and 100% of Ib

TS.7.28. COMMUNICATION CAPABILITY:

TS.7.28.1. The main communication protocol of the meter will be through integrated NIC card of RF/ GPRS/ 3G/ 4G/ LTE/ NBIoT (As per site requirement) with proper security. The RF module will communicate in 865-867 MHz free license Band certified from WPC, Ministry of Communication, GOI. For cellular fallback, the modem / Module should have backward compatibility.

TS.7.28.2. Tow way communication between smart meter and HES will be:

TS.7.28.2.1. Through DCU: Smart meter to DCU via RF communication and DCU to HES via Fiber/ Ethernet/ GPRS/ 3G/ 4G/ LTE or any suitable mode.

TS.7.28.2.2. For GPRS/ 3G/4G enabled smart meter, meter will directly communicate to HES.

TS.7.28.3. Bidder should make necessary arrangements for WBSEDCL approval of dimensions / Specifications of the NIC card module which need to be used in meter for integration.

TS.7.28.4. Integration of meter software's with HES / MDMS for seamless transfer of data will be in scope of bidder till the expiry of warranty of the meters.

Bidder should provide software for changing firmware of meters in mass and should support integration of this software with HES.

TS.7.28.5. The Bidder's supplied meter with third party communication module should have suitable hand-shaking features to allow a third-party MDMS to configure, command, read and control smart meters installed at site. The Bidder shall extend all necessary assistance in developing the adaptor software through a third-party for facilitating the above.

TS.7.28.6. Meter once powered up with NIC card should be self-detected by RF network and its basic name plate details & current readings should be transferred to HES.

TS.7.28.7. Last mile mesh network must support auto-registration and self-healing feature to continue operation using easiest possible available route in case of failure of any communication device in the mesh.

TS.7.28.8. For purpose of exercising control, like outage management, the meter should send abnormalities like Power failure (Last Gasp), Power Restoration (First Breath), CT secondary current is >90%, missing potential and unbalancing of CT secondary current among three phases CTs is > 50%. These values should be configurable through remote in single/broadcast mode. Additional exceptional events should also be communicated to HES by meter immediately after the occurrence. It should also indicate the restoration of the same event. List of events to be reported should be configurable over the air (OTA). The meter should have "Last Gasp" and "First Breath" feature to facilitate sending alerts to the HES during fully powered off / On condition.

TS.7.28.9. The meter shall have a galvanic isolated Optical Port as per IEC 1107/ANSI/PACT so that it can be easily connected to a handheld Common Meter Reading Instrument (CMRI)/Laptop/PC for data transfer. The optical port shall not be affected by any type of injection /unauthenticated signal and having proper sealing arrangement so that its cover can't be opened without breaking its seal.

TS.7.28.10. The complete data shall be downloaded within 2 minutes.

TS.7.28.11. A Serial Port (RS232 or RJ11) shall also be provided inside the terminal cover to enable automatic meter reading through Modem, if required in future. The Serial Port shall be housed inside the meter terminal cover so that it can't be accessed without opening the sealed terminal cover.

TS.7.28.12. The stored data in the meter shall be available through CMRI even when the display of the meter is not available.

TS.7.28.13. Date in the meter shall be reset only through commands from the CMRI or Laptop. Correction of RTC time, change of TOD timings etc. shall be done through proper authentication process locally through CMRI and

remotely over the air (OTA). Necessary keys if required for performing this reconfiguration operation should also be provided along with supply of meter lot & training to WBSEDCL staff on how to use it free of cost. Bidder will have to provide this support on a later stage also on the request of WBSEDCL without any cost implication.

TS.7.28.14. The BCS shall have multi-level password for data protection & security.

TS.7.28.15. If there are 2 requests given for communication one from HES and other from local device, request from local device should supersede.

TS.7.28.16. Bidder has to submit CMRI software (.exe format) also at the time of sample meter testing.

TS.7.28.17. Infrared communication port is not acceptable.

TS.7.29. BASE COMPUTER SYSTEM & SOFTWARE REQUIREMENTS:

TS.7.29.1. The Common Meter Reading Instrument (CMRI) shall be loaded with user-friendly software (MS-DOS 5.0 or higher version compatible) for reading and/or downloading meter data.

TS.7.29.2. Windows (Windows 7.0 or higher version) based Base Computer Software (BCS) shall be provided for receiving data from CMRI and downloading instructions from BCS to CMRI.

TS.7.29.3. The data stored in the meter's memory including defrauded energy shall be available on the BCS.

TS.7.29.4. Only one BCS shall be provided for downloading data and authenticated command from CMRI/ Laptop.

TS.7.29.5. The BCS shall have facility to convert meter reading data into user definable ASCII file format so that it can be integrated with the billing system or any other third party software. The user shall have the flexibility to select the parameters to be converted into ASCII file.

TS.7.29.6. All the data available in the meter including energy, MD etc with date and time stamp, new TOD time zones and historical data shall be available in BCS after down loading.

TS.7.29.7. The bidder shall supply the necessary CMRI software during sample meter testing.

TS.7.29.8. The bidder has to supply the meter reading protocol and API free of cost. The bidder shall indicate the relevant standard to which the protocol is compliant.

TS.7.29.9. Transfer of data from the meter to CMRI & then to the BCS shall be easily executed.

TS.7.29.10. Any change or up gradation of CMRI software or BCS in future, required for any reason, has to be done by the supplier at his own cost.

TS.7.29.11. The same software shall be capable of preparing CMRI to read the meter information or to reconfigure the meter for change of TOD timings and / or time setting of the meter etc. The exhaustive online help shall be available with the software so that user can use all the features of the software by just reading the help contents.

TS.7.29.12. In BCS twelve months' data for kWh, kVAh, MD & kVA (total & TOD wise), average load factor, average power factor must be available.

TS.7.30. GENERAL REQUIREMENTS:

TS.7.30.1. 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.7.30.2. TECHNICAL DEVIATIONS: Any deviation in Technical Specification as specified in the Specification shall be specifically and clearly indicated in the Schedule of deviation format.

TS.7.30.3. Inspection & Testing:

TS.7.30.3.1. The meters manufactured as per requisite technical specification along with accepted changes recorded in minutes of pre-bid meeting, shall be subject to tests as per relevant Indian Standards.

TS.7.30.3.2. No change/ deviation/ modification in the technical specification of the meters offered for inspection & testing in respect to the approved sample meters shall be entertained.

TS.7.30.3.3. BCS and CMRI software version shall be the same as accepted during approval of the related sample meter. In case any change in BCS and/or CMRI software is felt necessary by the supplier, the Chief Engineer(DTD) shall have to be approached in writing for his approval elaborately clarifying the necessity prior to commencement of inspection. The deviation(s) shall be accepted if and only if the Chief Engineer(DTD) approves the proposed deviation(s).

TS.7.30.3.4. Stage Inspection: Stage Inspection, if required may be conducted at manufacturers' works. For this, the supplier must give prior intimation at least 15(fifteen) days before final calibration (with RTC reset). The supplier shall extend all facilities for such inspection and testing for which no extra cost shall be charged and the physical inspection report, containing observation against components, raw

materials, display modules, push button, nameplate etc. shall have to be signed jointly. Otherwise offer for final inspection will not be accepted.

TS.7.30.3.5. Routine Test: Routine Tests as per relevant Indian Standards and requisite technical specification shall be conducted for each & every meter after its production**.**

TS.7.30.3.6. Lot Acceptance Test:

(a) The supplier shall give prior intimation about the readiness of the meters at the works for inspection and testing at least 15 (fifteen) days before their proposed inspection schedule. The supplier shall extend all facilities for such inspection and testing for which no extra cost shall be charged and the inspection report shall have to be signed jointly. Otherwise the offered lot(s) shall be treated as cancelled.

(b) Generation of token through WBSEDCL web vending system, will be tested during inspection of 1st lot as per delivery schedule of the order. To achieve this, after placement of LOA, manufacturer shall submit a detail plan with schedule of activity for proper integration and testing of the system as per web service format finalized in the NIT. If needed, for development of the token generation system through web vending system of WBSEDCL the supplier shall interact with IT&C Cell through P&C dept. However, the 1st inspection offer will be accepted only after getting confirmation from the supplier regarding readiness of the system in all aspect through web vending system of WBSEDCL.

(c) While offering inspection and testing, one hard copy & one soft copy of the test reports indicating test results of each meter of the offered lot containing its sequential meter serial no. and the serial no. of the two no. of body seals shall be submitted to the Office of the Chief Engineer (DTD), WBSEDCL, Abhikshan, Sector - V, Salt Lake City, Kolkata - 700091 with copies to the Office of the Chief Engineer (P&C), WBSEDCL. Otherwise inspection offer will not be considered.

(d) However, WBSEDCL reserves the right to depute their Engineers for carrying out inspection and testing on the offered lot as per relevant Indian Standards and requisite technical specification, already notified and also reserves the right to reject either raw materials or finished products found to be not conforming to the requisite technical specifications and/or relevant Indian Standards.

(e) The Engineers of WBSEDCL shall witness the various quality control measures adopted in production line and satisfy themselves about the same. They shall also inspect the protocol for maintaining the accuracy of the meter testing equipment at the testing laboratory of the manufacturer with reference to the standard. The instruments and equipment required for

inspection & testing shall have valid calibration certificates as specified in relevant clause of this order.

(f) Physical examination of the meters on minimum 5% of offered quantity will be carried out. If during physical inspection anomaly is found in more than 2% of the offered quantity, no further test will be carried out and offered quantity will be rejected.

(g) After satisfactory result in physical examination, lot acceptance tests shall be carried out by the representatives of WBSEDCL at the works of the manufacturer as stated hereunder:

(i) The maximum no. of meters in each lot: 1000

(ii) No. of meters to be selected at random from the lot: 32.

(h) After selection of sample meters, the following tests shall be carried out on all the 32 no. of meters selected at random.

(i) High Voltage test
(ii) Insulation Resistance test
(iii) Test of Protection for withstanding 433V between Phase & Neutral for 1(one) hour
(iv) Test of Endurance at 150% of Imax for 2(two) hours
(v) Test of Starting Current at 0.1% Ib at UPF
(vi) Test of No-Load condition: At 70% and 120% of Vref at no load for a period, 5 times of that of actual time of Starting Current test. The Meter shall not emit more than one output pulse during such test.

(i) In the above tests, if the number of defective meters is at most one, the lot shall be considered conforming to the tests.

(j) If the number of defective meters is more than three, the lot shall be outright rejected.

(k) However, if the number of defective meters is within three, while the lot shall be considered not conforming to the tests, further sampling from the lot at random shall be made. If the number of defective meters from two such samples (i.e. from 64 meters) is less than four only then the lot shall be considered as conforming to the test.

(l) Further testing for 8 number of meters, selected from 32 number of sample meters will be carried out as follows:

(i) Limits of error on all the same 8 nos. sample meters for active energy (both Phase & Neutral) at:

1% I basic	1.0 pf.
2% I basic	1.0 pf. , 0.5 pf. lag

5% I basic	1.0 pf., 0.5 pf. lag & 0.8 lead
10% I basic	1.0 pf., 0.5 pf. lag & 0.8 lead
50% I basic	1.0 pf., 0.5 pf. lag & 0.8 lead
100% I basic	1.0 pf., 0.5 pf. lag & 0.8 lead
120% I basic	1.0 pf., 0.5 pf. lag & 0.8 lead
200% I basic	1.0 pf., 0.5 pf. lag
600% I basic	1.0 pf., 0.5 pf. lag

(ii) Test of the Meter Constant and Meter Dial as per technical specification at 200% I basic, 0.866 pf. (lag).

(iii) Power consumption on Voltage Circuit (through power analyzer) and Current Circuit.

(m) Further testing of 3 number of sample meters will be carried out as follows:

(i) Repeatability of Error Test at 5% I basic at upf & 100% I basic at upf: Six error tests to be successively carried out in the above load condition at intervals of 5 min. The variation in error as expressed by the difference between the maximum and the minimum of the errors so obtained, shall not exceed the value corresponding to 1/10th of the limits of error at the test points as per clause No. 4.6.2.2 of CBIP 304.

(ii) If any of the meters fails on any of the above tests, the lot will be rejected.

(n) Further testing for 1 number of sample meter will be carried out as follows:
(i) Tamper & Fraud protection (Anti-tamper feature) as per relevant clause of the specification.
(ii) Shunt Test by applying 100 Amps continuous load for minimum two hours after removing it from the meter for verification and conformation for quality of shunt & its E-beam welding.
(iii) Functionality testing for load switching for zero balance after entry of amount through token, checking of low credit alarm, loading of emergency credit amount and any other related feasible testing, if required.
(iv) Physical verification of internal components.

(o) If the meter fails on any of the above tests, the lot will be rejected.

(p) Few mention-worthy relevant points regarding tamper testing:

(i) AC Chopped signal may be generated through Regulator or Dimmer
(ii) In Discharge Test, meter performance will be checked applying 35 KV spark
(iii) Provision must be there for tamper logging in BCS in case the spark exceeds 35 KV

(iv) In BCS, average PF & LF, kWh, kVAh, MD in kW & kVA, TOD-wise kWh and kVAh must be made available for last twelve (12) months

(v) In Magnetic Tamper Test, magnetic influence shall be checked at 10mT AC, 0.27T DC, 0.2T AC and 0.5T Permanent Magnet. Facility to measure the capacity of these magnetic fields must be available at manufacturers' premises and must be calibrated from any NABL accredited laboratory.

TS.7.30.3.7. Dry Heat Test:

(a) Facilities or arrangement for conducting ageing test shall be available with the manufacturer.

(b) Dry heat test as per clause 12.6.1 of IS: 13779 / 99. - At least one sample selected from any lot of the meters offered for first inspection will be sealed by the inspecting authority of WBSEDCL and handed over to the supplier for testing at NABL accredited laboratory. In the test report, meter serial no. & meter body seal nos. are to be mentioned.

(c) Test result must be submitted within 30 days after selecting the meter at the manufacturer's works. If not submitted within the stipulated time frame, no further offer for inspection will be accepted.

(d) If the meter fails at dry heat tests, the particularly delivered lot will not be accepted and the delivered meters are to be taken back by the supplier at their own cost from different site offices within 30 days from the date of receipt of intimation in this regard. Only after withdrawal of the delivered meters, further inspection shall be conducted against subsequent offered lot of meters.

(e) If the meter, selected during inspection at first lot of meters, fails in dry heat test, the same test is to be conducted for the consecutive offered lots of meters following the above procedure, unless satisfactory performance on above test is observed.

TS.7.30.3.8. Special Test: The bidder shall demonstrate the communication capability of the meter through communication modes as defined in the specification before conducting acceptance tests. **The list of test cases to be done in time of testing:**

(a) Linking of DCU/Gateway and HES
(b) Capture of Instantaneous Parameters of meter
(c) Capture of Load survey data from meter
(d) Last Gasp/First Breadth as Alert/Event.

TS.7.30.4. <u>Reoffer for Inspection:</u>

TS.7.30.4.1. Materials shall have to be reoffered for the following cases:

(a) Failure to present the offered materials during inspection & testing, i.e, in case of fake offer.
(b) Failure of any particular lot of offered materials in two consecutive inspections.
(c) Inspected materials not delivered within one month after the stipulated period specified in the order without any valid reason. [The dispatch clearance already issued against the said lot shall be considered to be withdrawn]
(d) The date of reoffer shall be the date of submission of reoffer along with WTC & copy of DCR.

TS.7.30.5. <u>Retesting Charge:</u> Retesting fee for carrying out inspection of the lot of materials after reoffer shall be charged as per existing rate.

TS.7.30.6. Test Facilities: The tests for equipment / instrument shall be carried out as per relevant Standards and test certificates shall be furnished for scrutiny. The Bidder shall indicate the details of the equipment available with him for carrying out the various tests as per relevant Standards. The bidder shall indicate the sources of all equipments / instruments.

TS.7.30.7. The standard meters used for conducting tests shall be calibrated periodically at any NABL Accredited Test Laboratories and test certificates shall be available at Works for verification by purchasers' representative.

TS.7.30.8. The manufacturer shall have at least the following testing facilities to ensure accurate calibration: -

TS.7.30.8.1. AC high voltage test
TS.7.30.8.2. Insulation test
TS.7.30.8.3. Test of no load condition
TS.7.30.8.4. Test of Starting condition
TS.7.30.8.5. Test on Limits of error (Automatic Testing facility with ICT)
TS.7.30.8.6. Power consumption in voltage and current circuit
TS.7.30.8.7. Test of Repeatability of error
TS.7.30.8.8. Test of meter constant
TS.7.30.8.9. Test of magnetic influence (As per CBIP 325 & Permanent Magnet)
TS.7.30.8.10. Tamper Test.

TS.7.31. SUBMISSION OF SAMPLE METER:

TS.7.31.1. The bidder will submit his sample Meters in sealed casing / cartoon along with relevant Meter documents (As per Annex-IV), on any working day, from 11.00 A.M. to 04.00 P.M. on weeks days & from 11.00 A.M. to 01.00 P.M. on Saturday within the specified period of submission latest by 01.00 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.

TS.7.31.1.1. While submitting the samples and required documents as per Annex-IV, the bidder shall submit three numbers of sealed meters as per the specifications stated herein before, 2 nos ultrasonic welded and 1 no without welding and another dummy meter case (for checking ultrasonic welding).

TS.7.31.1.2. They shall also submit one prototype of meter base and cover (with body screw caps) properly welded.

TS.7.31.1.3. The date of testing of sample meters will be intimated to the bidders by CE (DTD) and during such test other bidders will also be allowed to witness the testing. Sample submission and Test procedure may be changed due to emergency requirement. On the date of testing of sample meters of a particular bidder, he shall come prepared with the following.

(a) BCS (as per specification)
(b) CMRI compatible with BCS and loaded with CMRI software and laptop compatible with BCS.
(c) A prototype HES with all the software, DCU, Repeater, SIM card, HHU to check all the possible communications to report to HES for the meter parameters specified in special test.
(d) Any other accessories required for observing the performance and capabilities of the meters.

TS.7.32. 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.

TS.7.32.1. The factory shall be completely dust proof.
TS.7.32.2. The test rooms shall be temperature and humidity controlled as per relevant standards.
TS.7.32.3. The test and calibrating equipments shall be automatic and all test equipment shall have their valid calibration certificates.
TS.7.32.4. Meter will be tested (in case of lot test) in fully automatic test bench with ICT. No. human intervention will be allowed during test.
TS.7.32.5. Power supplies used in test equipment shall be distortion free with sinusoidal wave forms and maintaining constant voltage, current and frequency as per the relevant standards.

TS.7.33. THE CHECKS TO BE CARRIED OUT DURING MANUFACTURING OF THE METERS:

TS.7.33.1. Meter frame dimensions tolerances shall be minimal.
TS.7.33.2. The assembly of parts shall be done with the help of jigs and fixtures so that human errors are eliminated.
TS.7.33.3. The meters shall be batch tested on automatic, computerized test bench and the results shall be printed directly without any human errors.

TS.7.34. LAB FACILITY: The laboratory of manufacturer 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).

TS.7.35. MANUFACTURING ACTIVITIES:

TS.7.35.1. All the materials, electronics and power components, ICs used in the manufacture of the meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy. The manufacturer shall use Application Specific Integrated Circuit (ASIC) or Micro controller for metering functions.

TS.7.35.2. The electronic components shall be mounted on the printed circuit board using latest Surface Mounted Technology (SMT) except power components by deploying automatic SMT pick and place machine and re flow solder process. The electronic components used in the meter shall be of high quality and there shall be no drift in the accuracy of the meter at least up to 10 years.

TS.7.35.3. Further, the Bidder shall own or have assured access (through hire, lease or sub-contract) of the mentioned facilities. The PCB material shall be of glass epoxy FR-4 grade conforming to relevant standards.

TS.7.35.4. All insulating materials used in the construction of meters shall be non-hygroscopic, non-ageing and tested quality. All parts that likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating. Quality shall be ensured at the following stages.

TS.7.35.4.1. At PCB manufacturing stage, each board shall be subjected to bare board testing.

TS.7.35.4.2. At insertion stage, all components shall undergo testing for conforming to design parameters and orientation. Complete assembled and soldered PCB shall undergo functional testing using test equipments (testing jig).

TS.7.35.5. Prior to final testing and calibration, all meters shall be subjected to accelerated ageing test to eliminate infant mortality, i.e., meters are to be kept in ovens for 72 hours at 55 deg Centigrade temperature & atmospheric humid condition. After 72 hours meters shall work correctly. Facilities / arrangement for conducting ageing test shall be available with the manufacturer.

TS.7.35.6. The calibration of meters shall be done in-house.

TS.7.36. DOCUMENTATION:

TS.7.36.1. Twenty sets of operating manuals shall be supplied to the office of the CE (DTD) for distribution at sites.

TS.7.36.2. One set of routine test certificates shall accompany each dispatch consignment.

TS.7.36.3. The acceptance test certificates in case pre-dispatch inspection or a routine test certificate in cases where inspection is waived shall be approved by the purchaser.

TS.7.37. GUARANTEE:

TS.7.37.1. The Meters shall be guaranteed arising out of faulty design, materials, bad workmanship for a period of **10 years** from the date of supply.

TS.7.38. REPLACEMENT OF DEFECTIVE METERS: The meters declared defective within the above guarantee period by the WBSEDCL shall be replaced by the supplier up to the full satisfaction of the WBSEDCL at the cost of supplier within one month on receipt of intimation. Failure to do so within the time limit prescribed shall lead to imposition of penalty of twice the cost of meter. The same may lead to black listing even, as decided by WBSEDCL. In this connection the decision of WBSEDCL shall be final.

TS.7.39. PACKING & FORWARDING:

TS.7.39.1. The energy meters shall have to be securely packed in transportable lots. If the energy meters & pilfer proof meter boxes are found acceptable after inspection and testing, the same shall have to be suitably sealed by the Inspecting Officer. Due care shall have to be ensured during transportation to keep the packing and seals intact for acceptance by consignee stores.

TS.7.39.2. The equipment shall be packed in cartons / crates suitable for vertical / horizontal transport as the Case may be, and suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbol. Wherever necessary, proper arrangement for lifting, such as lifting hooks etc., shall be provided. Supplier without any extra cost shall supply any material found short inside the packing cases immediately.

TS.7.39.3. The packing shall be done as per the standard practice as mentioned in IS 15707: 2006. Each package shall clearly indicate the marking details (for e.g, manufacturer's name, Sl. Nos. of meters in the package, quantity of meter, and other details as per supply order). However, the supplier shall ensure the packing is such that, the material shall not get damaged during transit.

TS.7.40. Delivery:

TS.7.40.1. Delivery of the meters shall be made only after receipt of the Dispatch Instruction (DI) to be issued by the Chief Engineer (DTD) upon approval of the supplier's test reports. The supplier shall send intimation regarding dispatch of the meters to the Offices of the Chief Engineer (P&C) and Chief Engineer (DTD), WBSEDCL immediately after dispatch of the consignment. Prior to dispatch of the consignment the supplier shall intimate the consignee duly so that consignee can acknowledge receipt of information.

TS.7.40.2. The equipment/materials are to be delivered as per "Delivery Schedule" clause given hereunder. Allotment of serial number of meters and its boxes will be available from the Distribution Testing Department, Abhikshan, WBSEDCL, Salt Lake, Kolkata-91, on any working day after issuance of this order upon receipt of written requisition for the same.

TS.7.40.3. The materials shall reach the destination stores within 21 (twenty one) working days from the date of issue of the Dispatch Instruction (DI). Failure to do so for reasons, solely attributable to the supplier, shall attract LD as per relevant clause of this order.

TS.7.40.4. Delay in offer beyond the Delivery Schedule for reasons solely attributable to the supplier shall attract imposition of LD as per relevant clause of this order.

TS.7.40.5. In case the inspected materials are not delivered within one month after the stipulated period specified in the order without any valid reason the Dispatch Instruction (DI) already issued against the said lot shall be considered to be withdrawn.

TS.7.40.6. Delivery of the meters shall be made only after receipt of the Dispatch Instruction (DI) to be issued by the Chief Engineer (DTD) upon approval of the supplier's test reports. The supplier shall send intimation regarding dispatch of the meters to the Offices of the Chief Engineer (P&C) and Chief Engineer (DTD), WBSEDCL immediately after dispatch of the consignment. Prior to dispatch of the consignment the supplier shall intimate the consignee duly so that consignee can acknowledge receipt of information.

TS.7.40.7. 100 no. of "Meter to PC" cords (having USB port with MOXA converter) shall be supplied to the Office of the Chief Engineer (DTD).

TS.7.41. Delivery Schedule:

Lot No.	Lot Size (in No.)	Schedule
1st	Would be specified in LOA	Within 45 days from the next date of placement of order
Subsequent lots	Would be specified in LOA	Within 1 month of scheduled delivery of previous lot
Final	Would be specified in LOA	Within 1 month of scheduled delivery of

		previous lot

TS.7.42. Checking of Materials/Equipment after delivery: The materials delivered to the consignee stores will be subjected to re-inspection/re-testing in presence of authorized representative of suppliers for which due notice in advance will be furnished by the Chief Engineer (DTD). If any discrepancy/dispute in quality arises in any sample selected from a lot, the supplier shall have to replace the entire lot at the supplier's cost and WBSEDCL reserves the right to take any penal action whatsoever without any further reference.

TS.7.43. Inspection after receipt at stores:

TS.7.43.1. WBSEDCL shall carry out acceptance testing of the supplied meters (collected from consignee stores) at their laboratory against DI of inspected lot. Advance intimation will be given to local representatives of the supplier over telephone. Such testing of the meters will be commenced within 10 days and completed within 20 days from the date of receipt of meters at consignee stores.

TS.7.43.2. Acceptance Test as per "Inspection & Testing" clause of this order except dry heat test & shunt test will be conducted at the laboratory of Distribution Testing Department or any Zonal Testing Unit on sample meters selected from meters delivered at consignee stores. Sampling procedure will be followed as per relevant Indian Standards. Date of testing will be intimated to the suppliers and testing can be witnessed by authorized representatives of the suppliers. In case, the authorized representatives are not present, WBSEDCL shall test the meters unilaterally and the results obtained during testing will be binding on the suppliers.

TS.7.43.3. In case the meters are found "Not In Order" as per observation during inspection and testing of the offered lot, the lot will be declared defective and in that event meters supplied are to be replaced by the manufacturers free of cost including free transportation from the site to their works and back. Before delivery of the replaced meters Acceptance Test shall be conducted by the supplier as per "Inspection and Testing" clause of this order in presence of WBSEDCL- representatives. Only if the test results are found to be satisfactory, replaced meters shall be allowed to be delivered.

Submission of report against defective meters:

TS.7.43.4. After delivery of the meters, if any defect is detected by the Testing Engineer / Site Office Personnel, the same will be intimated to the supplier. After getting intimation, the supplier shall send their competent personnel to the consignee store to set right the problem with an intimation to Distribution Testing Department (DTD) and to the Consignee. In case of minor defect, which can be set right at site, the same shall be taken up by the supplier without affecting the movement of the consignee

store, failing which the meters are to be lifted from the consignee store for necessary rectification. If the detected defect is beyond repair, the meters are to be replaced by newly tested meters and the defective meters will be handed over to the supplier by the consignee store. The replaced meters are to be sent to concerned Zonal Testing unit or DTD, Abhikshan for further testing.

TS.7.43.5. The meter serial numbers for the meters, replaced against defective meters, shall bear numbers from the rolling stock serial numbers allotted by DTD against this order.

TS.7.43.6. Regarding these defective meters, the supplier shall submit a report to DTD mentioning nature of defects (like, fault at current element / potential divider / SMPS / Computing Chip / Communication Module/ Display Module / NVM Module / Battery) against meter serial number. A format in this regard shall be provided by DTD duly.

TS.7.44. Consignee: To be intimated by the Chief Engineer (DTD), Abhikshan, WBSEDCL, Kolkata - 700091 through the Dispatch Instructions (DI).

TS.7.45. Calibration of measuring Instruments/Equipment used during inspection & testing: The instruments/equipment required for Inspection & Testing shall have valid calibration as per following guideline:

TS.7.45.1. Calibration Certificate issued by Laboratory accredited by NABL, may be accepted unconditionally provided the certificate bears an accreditation body logo. For testing equipment, where NABL accreditation is not available, calibration certificate from Educational Institutions like IITs, NITs, JU, CU, BHU only can be accepted provided traceability can be ascertained.

TS.7.45.2. Necessary confirmation regarding above is to be given along with inspection offer failing which the inspection offer will not be accepted.

TS.7.45.3. If during inspection & testing the supplier fails to produce Calibration Certificate as indicated above the offered lot may be rejected.

TS.7.46. COMPONENT SPECIFICATIONS: The meters shall be designed and manufactured using SMT (Surface Mount Technology) components, except for power supply components, LED / LCD etc., which are PTH type. All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed makes so as to ensure higher reliability, longer life and sustained accuracy. The Components used for manufacture of meter shall be of high quality and the bidders shall confirm component specification as specified below in Annex-III Bidders shall compulsorily fill Annex-I, Annex-II & Annex-III for technical qualification.

Sl. no.	Component Function / Feature	Requirement	Make / origin
1	Current Element	E-beam /spot welded CT shall be provided in the phase element and in the neutral with proper isolation.	Any make or origin conforming to IS-2705
2	Measurement / computing chips	The Measurement / computing chips used in the meter shall be with the Surface mount type along with the ASICs.	Analog Devices, AMS, Cyrus Logic, Atmel, SAMES, Texas Instruments, Teridian, NEC, Freescale, Renesas, Phillps, Maxim, Infineon
3	Memory chips	The memory computing chips shall not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	National Semi Conductor, Atmel, SAMES, Texas Instruments, Teridian, ST, Microchip, Hitachi, OKI, Freescale, Renesas, Phillps
4	Display modules	The display modules shall be well protected from the external UV radiations. The display shall be clearly visible over an angle of at least a cone of 70o.The construction of the modules shall be such that the displayed quantity shall not disturbed with the life of display. The display shall be TN type industrial grade with extended temperature range	Bonafied Technologies, Advantek , Hitachi, SONY, Hijing, Truly Semiconductor, Tianma,
5	Communication modules	As per clause no 1.2 (b) of IS 16444. Meter should have provision of communication module compatible with both the variant mentioned in IS 16444. This module should be able to get connected to the NAN / WAN network of service provider (RF/ 4G). Meter should be able to provide required power supply to NIC card provided by communication provider shall be approved by WBSEDCL.	Any national or international make with proven track record in any project in India.
6	Optical port	Optical port shall be used to transfer the meter data to meter reading instrument. The mechanical construction of the port shall be such to facilitate the data transfer easily.	National Semiconductors, Texas Instruments, HP, Agilent, Avago (Broadcom Inc.) , Osram, Hitachi , Siemens, Philips, Everlight, EG&G Vactec (Perkin Elmer Optoelectronics)

Sl. no.	Component Function / Feature	Requirement	Make / origin
7	Power Supply	The power supply shall be with the capabilities as per the relevant standards. The power supply unit of the meter shall not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections.	As specified.
8	Electronic components	The active & passive components shall be of the surface mount type & are to be handled & soldered by the state of art assembly processes.	National Semiconductors, Atmel, Phillips, Texas Instruments, ST, Onsemi, Hitachi, Oki, Toshiba. Freescale, Samsung.
9	Mechanical parts	The internal electrical components shall be of electrolytic copper & shall be protected from corrosion, rust etc. The other mechanical components shall be protected from rust, corrosion etc. by suitable plating / painting methods.	N.A.
10	Battery	Lithium-ion with guaranteed life of 10 years	Renata, Panasonic, Varta, , Sanyo, National, Tadiran, Sony, Duracell, Tekcell, Mitsubishi, EVE, SAFT , XENO, Maxell, Vitzrocell
11	RTC / Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	Dallas, Atmel, Motorola, NEC, Teridian Renesas, Texas Instruments, ST, Micro chips, Epson, Philips, NEC, OKI,Hitachi, Mitsubishi, Freescale, Intersil

Annex-I

GTP for Meter

Sl.No.	Item Description	Manufacturer's Particulars
1.	Maker's name and country	To be specified by the Bidder
2.	Type of meter/model	To be specified by the Bidder
3.	Standard Applicable	IS 14697, IS 15959, CBIP 325, IS16444(Part 2)
4.	Accuracy/Interface class	0.5S
5.	Parameters displayed	As per Specification

Sl.No.	Item Description	Manufacturer's Particulars
6.	P.F. Range	Zero lag – unity – Zero Lead
7.	Basic Current (Ib) (-/5A)	-/5A
8.	Maximum Current (Imax)	10A
9.	Minimum starting current	0.1% of I-basic
10.	Rated Voltage	415 V : Phase to Phase, 240 V : Phase to Neutral
11.	Meter Constant	To be specified by the Bidder
12.	Variation of voltage at which meter functions normally	70% to 120% of reference Voltage
13.	Rated Frequency	50Hz±5%
14.	Power Loss in Voltage circuit (VA & watt) & Current circuits (VA)	Voltage Circuit :- Will not exceed 1.5W and 10VA per phase Current Circuit:- Will not exceed 1.0 VA per phase
15.	Dynamic range	As per IS 14697
16.	MD reset Provisions	Possible to reset MD by any of the following options:- 1. Remote MD reset 2. Manual MD reset 3. MD reset by HHU 4. Auto Monthly Reset
17.	Display: a) Type of register b) No. of digit of display and height of character c) Auto display mode & scroll mode d) Type of push button for scroll mode	Display will be a) LCD b) 7 digit 7 segment, height- 10x5mm c) As per approved sample d) Spring loaded push button
18.	Non-volatile memory	To be provided as per Specification
19.	Details of provision for taking reading during power off condition	Through internal non-rechargeable battery
20.	Principle of operation	As per technical Specification
21.	MD integration period	15 minutes
22.	Weight of meter	To be specified by the Bidder
23.	Dimensions	To be specified by the Bidder
24.	Warranty	**10 years from the date of supply**
25.	Outline drawings & leaflets	To be provided by the Bidder
26.	**a) Remote Communication (Bi-directional)**	**NIC Card**
	b) Communication protocol used	DLMS
	c) Sealing provision for meter & optical port	To be provided as per Specification
	d) Baud rate of data transmission	9600 bps
	e) Required software to be resident in CMRI and BCS	To be provided by the Bidder
	f) Ultrasonic welding of body or any other technology which is equally or more efficacious	To be provided

Sl.No.	Item Description	Manufacturer's Particulars
	g) Manufacture Seal	To be provided
27.	Base Computer software	Compatible with windows 7 or above.
28.	Type test certificates	To be provided by the Bidder
29.	Time of day zones (selectable)	3 TOD Zones to be provided with a provision for 8 TOD Zones
30.	Whether meter measures both fundamental & harmonic energy	As per Specification
31.	Real time clock accuracy	Maximum drift ± 5 Minutes per annum.
32.	Battery for real time clock	It shall be Lithium-ion / Lithium battery having at least 10 years of life
33.	Anti tamper features	As per Tamper logic provided by WBSEDCL.
34.	Effect of accuracy under tamper conditions	As per technical specification
35.	Drift in accuracy of measurement with time	As per IS: 14697 & CBIP 325.
36.	Name plate details	As per specification
37.	Type of calibration	Software calibrated
38.	Type of mounting	Projection mounting
39.	Testing facility	Shall be available with manufacturer, details to be provided
40.	Data retention by NVM without battery backup and un-powered condition	As per specification
41.	Type of material used:	
a.	Base	As per specification
b.	Cover	As per specification
c.	Terminal block	As per specification
d.	Terminal cover	As per specification
42.	Screw	
	i. Material	As per specification
	ii. Size	As per specification
43.	Internal diameter of terminal hole	5.5mm
44.	Centre to centre clearances between adjacent terminals	As per IS: 14697

Annex - II
Pre-Qualification Conditions for Three Phase Meters

Sl. No.	Particulars	Remarks
1	Bidders must have valid BIS certification for the offered meter.	Yes / No
2	Bidder preferably posses ISO 9001 certification	Yes / No
3	Bidder shall be manufacturers of static meters having supplied Static 1-ph or 3-phase meters with memory and LCD display to Electricity Boards / Utilities in the past 2 years	Yes / No

4	Bidder has Type Test certificate for the Type of offered meter not more than 3 (three) years old	Yes / No
5	Bidders shall have dust free, static protected environment for manufacture, assembly and Testing.	Yes / No
6	Bidder shall have automatic computerized test bench for lot testing of meters.	Yes / No
7	Bidder has facilities of Oven for ageing test.	Yes / No
8	Bidder shall submit certificate for immunity against magnetic influence of 0.2 T AC. & 0.5 T DC. from a NABL accredited Laboratory, for the same type of meter as offered.	Yes / No

Annex – III

Sl. No.	**Component Function / Feature**	**As per Requirement**	**Make / origin**
1	Current Element		
2	Measurement / Computing chips		
3	Memory chips		
4	Display modules		
5	Communication modules		
6	Optical port		
7	Power Supply		
8	Electronic components		
9	Mechanical parts		
10	Battery		
11	RTC / Micro controller		

ANNEX – IV

Sl. No.	*LIST OF DOCUMENTS TO BE SUBMITTED DURING SAMPLE SUBMISSION*			
1	*Attested copy of type test reports from NABL accredited laboratory*			
2	*Attested copy of BIS certificates of the same type of meter submitted as sample*			
3	*Attested certificates as regards material used for meter case, cover & terminal block.*			
4	*Annexure – II as per tender documents*			
5	*Annexure – III as per tender documents*			
6	*Operating manual of the meter submitted*			

TS.8. Technical Specification For LT Current Transformer And CT Busbar Chamber For Distribution Transformer Metering:

TS.8.1. TECHNICAL SPECIFICATION FOR RESIN CAST L.T. CURRENT TRANSFORMER

A set of 4 nos. Resin Cast LT Current Transformers (CT) of Accuracy Class 0.5 for low tension energy metering shall be supplied with each meter. The CTs are to be housed in the Bus-Bar chamber as per specification enclosed.

TS.8.1.1. Reference Standard: As per IS:2705, 1992 (Part 1 & Part 2) or latest version thereof.

TS.8.1.2. General Technical Requirement:

1	Type of Current Transformer	Ring type for CT ratio 600/5, 400/5,200/5A, 100/5
2	Rated Voltage	240 Volts (Phase to Neutral), 433V (Ph-Ph)
3	Supply System Variation	Voltage Vref + 20% to -40%
4	Rated Current (I Basic)	5 Amps balanced & Unbalanced load
5	Rated Frequency	50 Hz.
6	Accuracy Class	0.5
7	Power Factor	Unity to Zero (all power factor lag/ or lead)
8	Max/Min Ambient Temperature	+ 55 ° C / - 10 °C
9	Supply System Variation Frequency	50 Hz ± 5 %
10	Highest System Voltage	600V
11	Current Transformer Ratio	600/5A, & 200/5A
12	ISF	Less than 5
13	Rated Output Burden	5 VA at 0.8 pf (lag)
14	Rated Continuous thermal Temperature rise over Ambient temperature	Maximum temp. rise limit of 50deg C at 1.2 times rated primary current
15	One minute withstand of Power Frequency Voltage	3 KV
16	Between primary and secondary Insulation level voltage (HV Test)	3 KV
17	Short time current rating (STC)	5 KA for 1 second (HV test and accuracy test to be performed after 24 hours of carrying out STC test.)
18	Dynamic peak current	2.5 times STC
19	Power frequency withstand voltage (Primary to Secondary)	3 KV for 1 min., 50 Hz shall be carried out on unit after submerging unit in salty water for 6-8 hours

TS.8.1.3. Constructional Requirement:

TS.8.1.3.1. Secondary Termination: The CT Secondary terminals shall be of studded type so that lead wires can be connected for metering purpose.

TS.8.1.3.2. Rating Plate: Primary & Secondary terminal identification scheme shall be embossed on the CT. Beside this there shall be self adhesive laminated paper rating plate suitable for outdoor installations. Rating plate to be secured on the body such that it is retained for outdoor applications and it should not come out easily. The rating plate shall carry following information:

(a) Type, Ratio, Burden & Accuracy Class
(b) Applicable Standard
(c) I.L
(d) STC Rating
(e) ISF
(f) Continuous thermal current
(g) Caution against open secondary.
(h) Batch No.
(i) Manufacturer's Name
(j) Manufacturing month and year
(k) Serial No.

TS.8.1.4. Tests:

TS.8.1.4.1. Type Test: The offered CTs should be type tested at any NABL accredited / Govt. approved laboratory in accordance with IS:2705, 1992 (Part 1 & Part 2) or latest version thereof. The type test report should not be more than 5 (Five) years old. A copy of the Type Test results should be enclosed with the offer. If there is any modification in the design/parameters of the specifications or use of constituent materials in the offered CTs which may affect the characteristics as well as parameters of the CTs from the CTs which was type tested, revised type test certificates as per the design, parameters and constituent material used in the offered CTs shall have to be submitted failing which the offer may be liable to be rejected.

(a) Schedule of type tests for CT (As per Reference Standard) to be conducted are as below:

(i) Verification of terminal marking and polarity.
(ii) High voltage power frequency test.
(iii) Over voltage inter turn test.
(iv) Determination of error according to the requirement of appropriate accuracy class at 5%, 20%, 100% and 120% with full and quarter burden.
(v) Short Time current test and peak dynamic current test.
(vi) Temperature rise test.
(vii) ISF test.

(b) **Beside this the following tests shall also be conducted**:
(i) Extended Life Cycle test.

(ii) Ingress protection.

TS.8.1.4.2. Routine and Acceptance Test: Schedule of Routine & Acceptance test for CT:

(a) Verification of terminal marking and polarity.
(b) Determination of error according to the requirement of appropriate accuracy class at 5%, 20%, 100% and 120% with full and quarter burden.
(c) ISF test.

TS.8.1.4.3. Test Facilities: The tests for CTs shall be carried out as per relevant Standards and test certificates shall be furnished for scrutiny. The Bidder shall indicate the details of the instruments available with him for carrying out the various tests as per relevant Standards. The bidder shall indicate the sources of all equipments/ instruments.
The standard instruments used for conducting tests shall be calibrated periodically at any NABL Accredited / Govt. approved Test Laboratories and valid calibration test certificates shall be available at Works for verification by purchasers representative.

TS.8.1.4.4. Retesting After Delivery: WBSEDCL may carry out re-testing of the supplied CTs at their laboratory. Re-testing of the supplied CTs will be conducted on sample CTs collected from different stores of the consignees as per the procedure followed for acceptance test during inspection & testing of the supplied CTs at manufacturer's works. Re-testing of the supplied CTs will be completed within one month from the date of receipt of CTs at different stores.
In case the CTs are not in order as per our observation during inspection and testing of the supplied CTs, the lot will be declared defective and in that event CTs supplied are to be replaced by the manufacturers free of cost including free transportation from the site to their works and back. The replaced CTs are to be offered for inspection & testing and Acceptance test of will have to be carried out by the supplier in presence of purchaser's representative.

TS.8.1.4.5. Submission Of Sample CT: One no. sample CT for ratio 200 /5 A and One no. sample CT for ratio 600 /5 A are to be submitted in sealed casing/cartoon to the Office of the Chief Engineer (DTD), Abhikshan, Sector-V, Salt Lake, Kolkata-91 as per dates mentioned in NIT.

TS.8.1.4.6. Guarantee: The CTs should be guaranteed against any manufacturing defects arising out of faulty design or bad workmanship or component failure for a period of 5 years from the date of supply.
The CTs found defective within the above guarantee period shall be replaced by the supplier free of cost within 60 days of the receipt of intimation of failure / defect.

The CTs declared defective by the WBSEDCL shall be replaced by the supplier up to the full satisfaction of the WBSEDCL at the cost of supplier. Failure to do so within the time limit prescribed shall lead to imposition of penalty of twice the cost of CTs. The same may lead to black listing even, as decided by WBSEDCL. In this connection the decision of WBSEDCL shall be final.

TS.8.1.4.7. Packing and Forwarding: The equipment shall be packed in crates suitable for vertical/horizontal transport as the case may be and suitable for handling during transport and outdoor storage in transit. The easily damageable materials shall be packed carefully and marked with appropriate caution symbol. Any material found short inside the packing cases, supplier shall provide short material without any extra cost.

TS.8.1.4.8. GUARANTEED TECHNICAL PARTICULARS FOR RESIN CAST LT CURRENT TRANSFORMER:

Sl. No	Items	Requirement as per Specification	Bidders to specify
1.	Manufacturer's name, address,		
2.	Class of Accuracy	0.5 (As per I.S.)	
3.	Type of CT	Ring type for CT ratio 600/5A, 400/5, 200/5A & 100/5	
4.	Rated voltage & Frequency	433 Volts (phase to phase), 50 Hz ± 5%	
5.	Maximum system voltage	600V	
6.	No. of phases	Single	
7.	Current transformer ratio (Rated primary current)	• 100 A • 200 A • 400A • 600A	
8.	Rated secondary current	5 Amps(Balance and unbalance load)	
9.	Supply frequency	50 Hz ± 5%	
10.	Temperature	Ref. Temp. 27 deg C	
11.	Supply system variation	V ref. +20% to –40%	
12.	Highest system voltage	600V	
13.	ISF	Less than 5	

Sl. No	Items	Requirement as per Specification	Bidders to specify
14.	Number of secondary winding	One	
15.	Rated output burden	5VA at 0.8 p.f. (Lag)	
16.	Rated continuous thermal current temperature rise over	1.2 times rated primary current with maximum temp. rise limit of 50 deg C.	
17.	One minute withstand of power frequency voltage between	3 KV	
18.	Insulation level voltage (HV test)	3 KV	
19.	Material of core	Low loss CRGO high grade Cor	
20.	Short time current rating	5KA for 1 second	
21.	Dynamic peak current	2.5 times STC	
22.	Primary frequency withstand voltage	3KV for 1 min. , 50 Hz.	
23.	Material of conductor	Super enameled copper wire as per IS 4800 Part IX/ IEC 317	
24.	Material of insulation	Class of insulation “F” for outdoor application. Provide details on properties of material.	
25.	Secondary termination	Stud type terminal.	
26.	Polarity marking	Indelibly marked/ coded for primary and secondary.	
27.	Internal Diameter of CT	For 200/5Amp--- 40mm For 600/5Amp--- 55mm	
28.	Weight	To be furnished	
29.	Outline drawing/ leaflet	To be furnished	
30.	Type test certificate	To be furnished	
31.	Guarantee	5 years from the date of supply	

TS.8.2. TECHNICAL SPECIFICATION FOR METALLIC ENCLOSURE FOR HOUSING BUS-BAR AND L.T. CURRENT TRANSFORMERS:

The Metallic Enclosure should be designed suitable for housing Bus-bar and 4 nos. L.T C.Ts of appropriate ratings in accordance with the rating of the transformers.

TS.8.2.1. Construction:

TS.8.2.1.1. Enclosure should be designed suitably for housing ring type CTs of ratio 200/5A & 600/5A. The enclosure shall be suitable for outdoor installation & pole mounted type and shall have ability to offer protection of electrical equipment against harsh weather. For pole mounting type the enclosure shall have 4 nos. of mounting brackets made out of same material as of enclosure with provision of suitable size holes and nuts, bolts & washers for mounting the enclosure. Suitable nuts, bolts & washers are to be provided for mounting the meter box. The enclosure should be made of M.S/CRCA sheet metal of 18 SWG. The roof of the enclosure should be tapered at both sides from the middle

TS.8.2.1.2. In case of Ring type CTs, four nos. Bus-bar for phase & neutral made of copper/aluminium of appropriate sizes matching with current carrying capacity and thermal capacity in accordance with the rating of the transformers should be provided. Arrangement for firm fixing of CTs inside the enclosure should be provided. Necessary arrangement for connecting 2.5Sq.mm wire on the busbars is to be provided.

TS.8.2.1.3. The Bus bars should be placed on porcelain/epoxy/resin insulators of appropriate size and clearances. The fixing of the Bus-bars to the porcelain insulators should be made with non- corrosive nuts and bolts of appropriate material, size and ratings. Insulating sleeves are to be provided on the busbars.

TS.8.2.1.4. Both ends of the busbars should be extended outside the enclosure sufficiently so that incoming and outgoing cables can be connected properly to the busbars. For extension of the busbar outside the enclosure, proper sealing of the enclosure against ingress of moisture & rain water should be made. On the extended portion of busbars suitable holes of proper size subject to CT ratio and suitable nut & bolts are to be provided for connecting the cable.

TS.8.2.1.5. All the surfaces of the enclosure shall be sand blasted etc. to produce a smooth clean surface free of any scale, grease and rust. The surface should be given a coat of high quality Red-Oxide or steel chromate primer and then shall be finished with super enamel paint.

TS.8.2.1.6. Earthing arrangement with markings on either side is to be provided. Two nos. GI Earthing Bolts with 2 nos. nuts and washers are to be provided for earthing. Size of Earthing bolt should be M6x40 mm.

TS.8.2.1.7. A metal plate with marking of the name of the supplier, CT ratio, Box Serial number and also with marking of "PROPERTY OF WBSEDCL" along with Purchase Order No. & date with year of manufacturing shall be fixed with rivet on the front of the enclosure at a suitable portion. A Danger Plate 3"x2" should be provided at a visible location of the enclosure.

TS.8.2.1.8. The door of the enclosure should be fitted with the base of the enclosure by using 2 nos. non- corrosive & non-detachable type internal hinges in such a manner that the door opens by minimum 1200. Neoprene rubber gasket should be provided at door of the enclosure for protection against entry of moisture & rain water.

TS.8.2.1.9. Two numbers of holes with suitable single compression MS glands are to be provided on the enclosure for cable entry. Dimension of the holes should be such that holes are suitable forentry of one 2.5Sq.mm 12 core control cable and other for 2.5Sq.mm 4 core cable to be used for wiring of CT secondary and busbar voltage to meter.

TS.8.2.1.10. Suitable handle/knob and locking arrangement should be provided for opening of the enclosure door.

TS.8.2.1.11. Necessary arrangements for sealing of the door at two points are also to be provided.

TS.8.2.1.12. Colour of the enclosure should be admiral gray/off white/ivory.

TS.8.2.1.13. The CT ratio should be paint marked at the bottom of the enclosure.

TS.8.2.1.14. The enclosure should comply with IP54 or better degree of protection.

However for 200/5 C.T., fixing at lower Chamber inside the Meter Box is preferable, where no busbar are required. Instead of C.T. fitted with busbar, only C.T. will be fitted inside the Chamber/ Box. In this case 4 nos piercing screw will be given for Potential Terminal Connection.

TS.8.2.2. Submission of Sample: The bidder shall submit samples for enclosure mounted with 600/5A & 200/5A CTs & busbars as per our specification to the office of the Chief Engineer, (DTD), Abhikshan Bhavan, Sector-V, Salt Lake, Kolkata-91 before the last day of submission of bid**.**

TS.8.2.3. Guarantee: The enclosure should be guaranteed against any manufacturing defects arising out of faulty design or bad workmanship or component failure for a period of 5 years from the date of supply.
The enclosure found defective within the above guarantee period should be replaced by the supplier free of cost within one month of the receipt of intimation of failure/defect. Defective enclosure are to be replaced by new one with new sl. nos. as allotted by Chief Engineer (DTD).

TS.8.2.4. Replacement of defective Meter Box: The Meter Box declared defective by the WBSEDCL shall be replaced by the supplier up to the full satisfaction of the WBSEDCL at the cost of supplier. Failure to do so within the time limit prescribed shall lead to imposition of penalty of twice the cost of meter box. The same may lead to black listing even, as decided by WBSEDCL. In this connection the decision of WBSEDCL shall be final.

TS.8.2.5. Submission of Drawing: Three copies of the drawings as per specified constructional features showing details of the dimensions of the enclosure along with the fixing arrangements of bus-bar, CT etc. are to be submitted at the time of submission of tender.
Three (3) copies of drawing complete in all respect should be submitted to the Chief Engineer (DTD) under intimation to the Chief Engineer (Procurement & Contracts) for accordance of approval immediately after placement of order. Sufficient copies of approved drawing are to be submitted for distribution to sites.

TS.8.2.6. Inspection: The inspection will be carried out as per inspection & testing clause of General Conditions of Contract (GCC).

TS.8.2.7. Guaranteed Technical Particulars: The tenderer shall furnish all the necessary information as per Annex-I – Guaranteed Technical Particulars. If the tenderer desire to furnish any other information in addition to the details as asked for, the same may be furnished.

TS.8.3. **ANNEX- I**

GUARANTEED TECHNICAL PARTICULARS FOR ENCLOSURE FOR HOUSING BUS-BAR AND L.T. CURRENT TRANSFORMERS

Sl. No	Item	Requirement as per Specification	Bidders to specify
1.	Manufacturer's name, address, country of origin.	To be furnished	
2.	Enclosure :		

Sl. No	Item	Requirement as per Specification	Bidders to specify
a)	Material used for enclosure.	MS/CRCA	
b)	Dimension of enclosure (Height x Width x Depth)	To be specified	
c)	Thickness of sheet metal.	18 SWG	
d)	i) Colour of enclosure ii) Type of paint used.	i) Admiral gray/off white/ ivory ii) To be specified	
e)	Whether suitable for outdoor installation	To be specified	
f)	i) Whether gasket provided for door ii) Type of gasket used	i) To be provided ii) Neoprene Rubber Gasket	
g)	Whether mounting brackets provided.	4 nos. mounting brackets with holes, bolts, nut & washers	
h)	Hinges	2 nos. internal hinges	
i)	Cable entry	2 nos. holes with single compression MS gland	
3.	CT mounting arrangement	To be furnished	
4.	Busbar :		
a)	Material used for Busbar.	Copper/ Aluminium	
b)	Dimension of different size Busbars used for different CT ratio (600/5A, & 200/5A,100/5A, 50/5A)	To be specified	
c)	Current carrying capacity & thermal capacity for of different	To be specified	
d)	Length of extended portion of Busbars outside the enclosure	To be specified	
e)	Size of holes on the extended portion	To be specified	
f)	Whether arrangement for connecting voltage wires at	To be provided	

Sl. No	Item	Requirement as per Specification	Bidders to specify
5.	i) Earthing arrangement ii) Size of Earthing Bolt	i) 2 nos. GI Bolt with 2nos. nuts & washers. ii) M6x40 mm	
6.	Name Plate & Danger Plate details	As per specification	
7.	Handle/Knob	2 nos. holes with MS gland	
8.	Locking arrangement	To be provided	
9.	Sealing arrangement	To be provided	
10.	Degree of protection	IP54 or better	
11.	Guarantee	5 years from the date of supply	
12	Drawing	To be furnished	

TS.9. Data Concentrator Unit (DCU) / Gateway for mesh connected nodes: The Data Concentrator Unit is a gateway for communication of data between the Smart Meters and the HES. The Data Concentrator Unit/Gateway receives information from the Smart Meter on a scheduled / need basis and stores the data, which can be accessed by HES for onward transfer to MDM at the AMI Control Centre. The DCU/Gateway provides the central link between Smart Meters and HES, enabling meter read and control. DCU/Gateway shall exchange data from meters on any proven communication technology and with HES on GPRS/GSM/OFC communication.

TS.9.1. Hardware & Power Supply:

TS.9.1.1. Enclosure/box of DCU/Gateway shall be IP55 compliant. The installation of DCU/Gateway shall be suitable for clamp mounting on poles as well as DIN rail mounting on distribution panels.

TS.9.1.2. Power supply shall be suitable for 3-phase, 3x240V phase to neutral, -40% +20%, 50 Hz AC, so that even in case of outage in one or two phases, DCU/Gateway can be powered through the healthy phase. Capable of withstanding surges & voltage spikes of 6KV as per IEC 61000-4-5 standards. Power supply shall be terminated on suitable sized MCB to facilitate isolation during site maintenance.

TS.9.1.3. DCU/Gateway shall consume minimum power for its operation. It shall also have rechargeable battery with backup for 1 hour for normal meter reading and to push tamper event and carry out on demand reading and the network health status / connectivity continuity & check. DCU should

have feature to send power outage and restoration message to the MDM. The battery shall have a guaranteed life of 10 years.

TS.9.1.4. Battery backup. The battery shall have a guaranteed life of 10 years. It shall have self diagnostic feature for RTC, memory, battery, communication module, etc.

TS.9.2. Configuration, Functionality of DCU shall have following configuration functionalities:

TS.9.2.1. It shall be able to configure the communication with underlying nodes/meters.

TS.9.2.2. It shall pull data from the field devices and push the data at configured intervals to the HES. It should also support the MDM in pulling data from the DCU. The data acquisition (Push/Pull) frequency shall be programmable. DCU shall be capable to prioritize control commands.

TS.9.2.3. DCU shall support DLMS/COSEM protocol for transfer of DLMS /COSEM data to MDM and ensure secure communication to MDM. The Gateway may be having IPV-6 which transfers the data to HES where it will be converted to DLMS/COSEM protocol.

TS.9.2.4. DCU/Gateway may have internal memory for storing interval data but proper security mechanism should be there against data theft/ temper.

TS.9.2.5. DCU/Gateway shall support on demand read and ping of individual/group of meters.

TS.9.2.6. DCU/Gateway shall push events like tamper, power off etc. to HES/MDM immediately on occurrence/receipt from field devices/meters.

TS.9.3. Communication:

TS.9.3.1. The DCU/Gateway also shall have Wide Area Network (WAN) connectivity to the HES/MDM through digital cellular GPRS/GSM/3G/4G or MPLS or any other Secure mode of communication.

TS.9.3.2. DCU/Gateway shall be able to communicate with meters on demand.

TS.9.3.3. DCU/Gateway shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads.

TS.9.3.4. After Power Interruption, on restoration of power supply DCU/Gateway shall establish communication with underlying devices as well as upstream application (HES/MDM) automatically.

TS.9.3.5. The retry attempts for meter data acquisition shall be configurable globally or individual meter.

TS.9.3.6. DCU/Gateway shall keep record of:

TS.9.3.6.1. No of packet failures
TS.9.3.6.2. Retry attempts
TS.9.3.6.3. Missed periodic reading
TS.9.3.6.4. Failure to connect
TS.9.3.6.5. For each meter up to a period of 3 days and update the same to MDM periodically.

TS.9.3.7. DCU shall be capable to handle data of minimum 50 nos of any type of smart meter. DCU shall be able to acquire and send data to HES for full capacity. (No. of meters/field devices it is designed for) within a period of 3 minutes.

TS.9.3.8. Full capacity of DCU/Gateway is required to be indicated in the offer.

TS.9.3.9. DCU/Gateway shall be able to communicate with the nearest meters at a distance of at least 50 m, depending on topographical features. For further communication among the meters distance of the other meters with the DCU/Gateway shall not be a constraint as communication of the nearest meters shall be established with other meters through appropriate formation.

TS.9.3.10. Remote Firmware Upgrade: The DCU/Gateway shall support remote firmware upgrades as well as remote configuration in order to add new features and functions to DCU/Gateway remotely from the control centre.

TS.9.4. Testing of the DCU/Gateway: DCU/Gateway shall be tested for EMC and EMI capability as per IEC 61000 for following:

TS.9.4.1. Fast transient burst test
TS.9.4.2. Test of immunity to electrostatic discharges
TS.9.4.3. Test of immunity to electromagnetic HF field
TS.9.4.4. The contractor shall provide IP 55 compliance test certificate.
TS.9.4.5. DCU/Gateway functionalities shall ensure AMI/PLM system to achieve performance criteria as specified during performance testing of MDM.

TS.10. Communication Infrastructure: The communication infrastructure should either be based on RF mesh network / PLC / LoRA or cellular network or a combination of these. The communication network shall be based on suitable standards from ITU/IEC/IEEE/CEN/ CENELEC/ ETSI for NAN and WAN network. Communication network shall provide reliable medium for two-way communication between various nodes (smart meter) & HES to MDM. **RF based network should use license free frequency band available in India**. The engagement of network service provider would be in the scope of AMI Implementing Agency to meet the performance level as given in the document.

TS.10.1. General Requirement: The AMI Implementing Agency (AIA) shall design a reliable, interference free & robust communication network keeping in view the site conditions. It shall be flexible in terms of providing communication in

variable terrain & urban density. The AIA shall design the network architecture keeping in view the existing and planned infrastructure of the utility. During designing, suitable consideration shall be kept for future expansion as per requirement of Utility. Before designing the communication network, the AMI Implementing Agency (AIA) shall do the site survey and would provide the most efficient communication infrastructure. The entire infrastructure & associated civil works required for installation & commissioning of equipment/devices like DCUs, repeaters, routers & access points etc. shall be in the scope of AMI Implementing Agency (AIA). The operational testing of all the network elements has to be demonstrated by the bidder. The network solution offered by the bidder should have disaster recovery mechanism in place. The redundancy mechanism of HES and MDM and their disaster recovery plan shall also be described by the Bidder. The quality of installation of the various equipment & power supply wiring to all field equipment shall be as per standards/ regulations/prevailing practices of the utility. A suitable network management system (NMS) shall be provided to monitor the performance of the communication network round the clock. The NMS shall provide viewing of all the networking elements deployed at site and enable configuration & parameterization of the networking devices and the nodes.

TS.10.2. Network Security: The Network shall have adequate cyber security measures not limited to the measures as described below. The network security would be extended to all the interfaces also.

TS.10.3. Secure Access Controls: The system shall include mechanisms for defining and controlling user access to the operating system environment and applications. Best practices from enterprise security including password strength, password aging, password history, reuse prevention etc. must be followed for access control.

TS.10.4. 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.

TS.10.5. 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.

TS.10.6. 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.

TS.10.7. Malicious Software Prevention: Implementation of anti-virus software and other malicious software prevention tools shall be supported for all applications, servers, data bases etc.

TS.10.8. NETWORK MANAGEMENT SYSTEM (NMS): Suitable Network Management System (NMS) shall be deployed to monitor the network's status from end-to-end and the status of each and every device (RF/ GPRS signal strength, dynamic status of links with colour-codes, throughput, available bandwidth etc. in the network in real-time, and provide performance and activity statistics. The network management software shall be based on the latest secured version of Simple Network Management Protocol ver. 3.0 (SNMPv3). The NMS system shall have a simple browser-based user interface to provide all the pertinent information about the system. The NMS shall not impact the availability and performance of AMI applications and shall load not more than 3% of any host CPU, 1% of network bandwidth and shall have secure communication. The proposed network management system shall facilitate following functionalities:

TS.10.8.1. Viewing of all network elements deployed and administer configuration changes of the network devices and nodes through toolkits to automate the tasks like:

TS.10.8.1.1. Capture running configuration, Capture start-up configuration, Upload configuration, Compare configuration

TS.10.8.1.2. Real-time or scheduled capture of device configurations

TS.10.8.1.3. Store historical device configurations captured and enable comparison of current device configuration against a previously captured configuration.

TS.10.8.2. Apart from real-time monitoring of critical network devices, the above information shall be collected and stored at user configurable periodicities i.e. 5 minutes to 60 minutes. The Network Management System (NMS) shall be capable of storing the above data for a period of one (1) year at an interval of 5 minutes.

TS.10.8.3. It shall maintain a graphical display for connectivity and status of servers and peripheral devices in local area network. The monitored devices shall be configured to send SNMP notifications, and the graphical element representing the device shall change to a different colour depending on the severity of the notification received.

TS.10.8.4. It shall issue alarms when error conditions or resource usage problems occur.

TS.10.8.5. In case more than one technology of AMI (example PLC and RF between Smart Meter & DCU) deployed in the field. It shall maintain statistics on

the performance and availability of data being delivered per AMI technology.

TS.10.8.6. This module shall provide real time information about the network and its associated devices and generates compiled reports on a monthly basis with instances from the NMS system. System performance is to be monitored independently by the vendor and a monthly report mentioning Service up time etc. is to be submitted to Utility. The report shall include:

TS.10.8.6.1. Network Performance Management including bandwidth availability and Bandwidth utilization
TS.10.8.6.2. Network uptime, Link uptime
TS.10.8.6.3. Network equipment health check report
TS.10.8.6.4. Resource utilization and Faults in network
TS.10.8.6.5. Link wise Latency report (both one way and round trip) times.
TS.10.8.6.6. Historical reporting for generation of on-demand and scheduled reports of any other reports/format other than the above-mentioned reports required by utility.

TS.10.9. Communication Specification:

RF Standard	IEEE 802.15.4g
Output Power	Max output power: As per WPC recommendations (Wireless Planning & Coordination of India)
IPv6 - 6LoWPAN	IPv6 support for all IP traffic between the Server and each Gateway (Backward compatible with IPv4 infrastructure as well) 6LoWPAN support for all IP traffic over radio Mesh networks Open standard: RF944 and associated
COAP	Support for COAP as application layer protocol Open standard: RFC 7252
TLS	DTLS for security Open standard: RFC 4347 and associated
RPL	RPL for mesh routing Open standard: RFC 6550 and associated
GPRS/3G	GPRS connectivity
LTE	LTE-4G for WAN connectivity

TS.11. Head End System (HES): The main objective of HES is to acquire meter data automatically avoiding any human intervention and monitor parameters acquired from meters. HES also shall serve as the control and monitoring hub for sending commands to end points individually/ in defined groups or across the entire network. The HES shall provide the means to monitor the network's status from end-to-end and the status of each and every device (signal strength, dynamic status of links with colour-codes, throughput, available bandwidth etc.) in the network in real-time, and provide performance and activity statistics.

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

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

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

TS.11.1. Functional Requirement:

TS.11.1.1. Two way communication with meter/ DCU and to communicate with MDM on other side. The HES must report real time data reading, calculated consumption and events to the MDM system.

TS.11.1.2. The head end system shall support centralized remote management, monitoring and control of all communication network and communication equipment, including the tracking of necessary system component.

TS.11.1.3. The head-end system shall support **self-discovery** and **self-registry** functionality to detect and register meters within 60 minutes of meter connection. Devices shall register themselves in head-end application upon its deployment and establishment of communication.

TS.11.1.4. Maintain time sync with DCU / meter.

TS.11.1.5. The head end system shall support on-request reading of any available information by meter/customer or batch of meters/customers.

TS.11.1.6. The head end system shall provide outage detection notification and power restoration notification information in support of enhanced outage management and improved customer satisfaction.

TS.11.1.7. Handling of Control signals / event messages on priority.

TS.11.1.8. Setting of Smart meter configurable parameters

TS.11.1.9. Signals for connect & disconnect of switches present in end points like meter

TS.11.1.10. The head end system should support the load limiting functionality.

TS.11.1.11. This shall enable the utility to upgrade Firmware in the communication devices/meters over the air (OTA) in batch mode in bulk.

TS.11.1.12. The HES must be able to communicate with the access point / router/DCU which support communication protocol of RF, PLC and cellular.

TS.11.1.13. Audit trail and Event & Alarm Logging.

TS.11.1.14. Store raw data for defined duration (minimum 3 days).

TS.11.1.15. The head end system should provide web-based user interfaces.

TS.11.1.16. The head end system should support pre-payment capabilities and net metering capabilities.

TS.11.1.17. 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.

TS.11.1.18. Critical and non-critical reporting functionality. The suggestive critical events may be:

TS.11.1.18.1. Alarms and event log for meter events like tamper/power failures etc.

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

TS.11.1.18.2. While non critical events may be:

i. Retry attempts on communication failure
ii. Periodic reading missing
iii. Failure to connect etc

TS.11.2. Reporting: The system shall provide daily, weekly and monthly performance reports tracking equipment failures, communications failures, and data latency for all customer and equipment classes. HES shall have dynamic dashboard to indicate following:

TS.11.2.1. Total number of network Meters,
TS.11.2.2. Number of live Meters,
TS.11.2.3. Number of disconnected Meters,
TS.11.2.4. Meters type categorization,
TS.11.2.5. Firmware version wise categorization
TS.11.2.6. Total number of filed device connected,
TS.11.2.7. data availability & data non-availability
TS.11.2.8. Device type and status wise categorization
TS.11.2.9. Real time and historical information
TS.11.2.10. Other exception reports.

TS.11.3. Cyber Security: The head end system should support:

TS.11.3.1. Encryption of data for secure communication.

TS.11.3.2. 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.

TS.11.3.3. 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.

TS.11.3.4. 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.

TS.11.3.5. 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.

TS.11.3.6. Implementation of anti-virus software and other malicious software prevention tools shall be supported.

TS.11.4. 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.11.5. Configuration: HES shall facilitate programming of following meter parameters:

TS.11.5.1. Load profile capture period
TS.11.5.2. Demand integration period
TS.11.5.3. Setting of parameters for time of day (TOD/TOU) billing
TS.11.5.4. Prepaid function
TS.11.5.5. Net metering
TS.11.5.6. Billing date
TS.11.5.7. Clock setting/time synchronizations
TS.11.5.8. Load curtailment limit
TS.11.5.9. Event setting for connect/disconnect
TS.11.5.10. Number of auto reconnection attempt
TS.11.5.11. Time interval between auto reconnection attempt
TS.11.5.12. Lock out period for relay

TS.11.5.13. Remote firmware upgrade
TS.11.5.14. Password setting
TS.11.5.15. Push schedule
TS.11.5.16. Setting threshold limits for monitored parameters
TS.11.5.17. Provision for adding more programming features in future

(The bidder may suggest more parameters as per the requirement)

TS.11.6. Data Validation and Exception Handling:

TS.11.6.1. The system shall detect and prevent logical data errors when the data is input either by user entry or from other systems.

TS.11.6.2. Any data error shall not affect system functions that are not directly associated with it.

TS.11.6.3. 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.12. Meter Data Management System (MDM): The Meter Data Management System shall support storage, archiving, retrieval & analysis of meter data and various other MIS along with validation & verification algorithms. It shall act as a central data repository. MDM shall have capability to import raw or validated data in defined formats and export the processed and validated data to various other systems sources and services in the agreed format. It shall provide validated data for upstream systems such as billing, consumer Information system, customer care, analytics, reporting, Network planning & analysis, load analysis/forecasting, Peak Load Management, Outage management etc.

The contractor shall specify and deliver an initial system that supports the collection and storage of data for meeting the performance level for 10 lakh smart meters with facility of future expansion.

The MDM shall have the ability to selectively choose which data to be maintained and which to be purged or archived.

TS.12.1. Asset Management: The MDM shall maintain information and relationships between the current installed meter location (apartment, shop, industry/ address etc.), Consumer information (Name etc.), Consumer ID no, Meter No, Type of Meter (type of consumer, 1 phase/ 3phase, with or without relay, etc.), Meter configuration (Demand integration period, Load profile capture period etc.), GIS supplied information (longitude, latitude, connection with feeder/ transformer/ pole etc.) etc. The software should support tracking the status of meters and communication equipment from the date when they are installed in the field. The history of in-service asset location is maintained throughout the device life with start and end dates associated with each in-service location reference. Ability to report and log any damage / deterioration in the meter attributable to consumer /utility.

TS.12.2. AMI Installation Support: The MDM shall also support device lifecycle management from device registration, installation, provisioning, operations and maintenance to decommissioning etc. The MDM shall generate exceptions for meter or modules not delivering the correct meter data after installation. The MDM shall provide a reconciliation report that identifies the meters that have been installed but not communicating for a designated (configurable) period. MDM shall generate reports on the number of meters installed in comparison to the number of meters successfully communicating.

TS.12.3. Meter Data:

TS.12.3.1. The MDM shall accept input, process, store, and analyze Meter data from HES and meter data collected through hand held meter reading instruments and manual meter reads. In case of manual reads, provision should be there to insert associated notes like assessed energy, etc.

TS.12.3.2. The MDM should accept input, process, store, and analyze non-billing meter data such voltage and power quality data (like under/over voltage etc) as they are available from AMI Head End Systems. The MDM should also support schedule and on-demand meter reads and pinging of meter energized states by authorized users and by other utility systems.

TS.12.3.3. The MDM shall provide storage of all collected Meter Data, events and alarm. It shall have capacity of storing 10 years data or more via archiving. Correctly track & resolve energy usage across meter changes with no loss of individual meter data. Provide complete history and audit trail for all data collected from meters including commands sent to meters and other devices for 30 days (configurable period). As per recent archiving policy of WBSEDCL data has to be preserved for the current financial year and two years preceding the current financial year. For rest of the period data should be archived.

TS.12.3.4. Execute on-demand read processes.

TS.12.3.5. Handle special metering configurations like net metering/multiple meters at same premises.

TS.12.3.6. The MDM shall have the ability to manage at a minimum 15 minute interval data.

TS.12.4. Data Validation, Estimation and Editing (VEE):

TS.12.4.1. The validation and estimation of metered data shall be based on standard estimation methods (Like max/avg. of past three days, max/avg. of past X number of similar week days, max/avg. of similar blocks of past X numbers of similar week days etc.). The MDM should also support and maintain following data:

TS.12.4.1.1. Registered Read Data including register reads, daily billing cycle, as well as derived billing determinants like TOU;

TS.12.4.1.2. Interval Data channels with variable intervals and variable units of measure;

TS.12.4.1.3. Calculated Data that is derived or computed such as billing determinants and aggregated loads;

TS.12.4.1.4. Event data storage of all collected event and alarm data from meters, network equipment, and MDMS itself;

TS.12.4.2. MDM shall flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in the cumulative ("CUM") register reads:

TS.12.4.2.1. CUM Decrements within a billing cycle (except net-metering);

TS.12.4.2.2. CUM reads increments more than configurable threshold;

TS.12.4.2.3. Future or old read dates;

TS.12.4.2.4. Number of digits exceeds number of meter dials;

TS.12.4.3. MDM shall detect, flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in Time of Use (TOU) register reads:

TS.12.4.3.1. Register Decrements (except net-metering);

TS.12.4.3.2. Resets (to zero) (except net-metering);

TS.12.4.3.3. CUM reads increments more than configurable threshold;

TS.12.4.3.4. Future or old read dates;

TS.12.4.3.5. Erratic compared to CUM read (sum of TOU reads minus CUM read);

TS.12.4.4. MDM shall detect, flag, alarm and trigger an estimating process including but not limited to when the following anomalies occur in Demand register reads:

TS.12.4.4.1. Do not reset on cycle;

TS.12.4.4.2. Do not reset coincident with customer move-out or move-in;

TS.12.4.4.3. Reset off cycle inappropriately;

TS.12.4.4.4. Too high;

TS.12.4.5. All data shall be transferred to billing system after meter data validation and estimation including transformer / feeder station wise energy audit.

TS.12.4.6. MDM shall estimate usage for non-metered service points such as street lights, farm lights, traffic signals, etc.

TS.12.4.7. The MDM shall maintain both the original received raw data in a non-manipulated state, in addition to VEE data.

TS.12.4.8. Notwithstanding the latency of data collection via the AMI system, once the MDM receives meter read data, the VEE process occurs in real-time and the post-VEE data is then immediately available to user or external systems.

TS.12.4.9. The MDM shall be able to automatically flag data changes from manual edits, VEE (Validating, Editing and Estimating) rules and data source corrections and electronically generate audit trail with timestamps and user-ids.

TS.12.5. Billing Determinates Calculation: MDM should allow configuring multiple TOU/TOD options (e.g. the number and duration of TOU rate periods) by customer type, tariffs and day type (weekend, weekdays, and holidays) and by season. Shall support the processing of interval data into billing determinants to include the following at a minimum:

TS.12.5.1. Total Consumption.
TS.12.5.2. Consumption in different time blocks for TOD billing.
TS.12.5.3. Maximum Demand (in kW and kVA).
TS.12.5.4. Number of tamper counts.
TS.12.5.5. Average power factor.
TS.12.5.6. Shall process interval data and frame it into the appropriate TOU periods for consumption and demand; for example, roll up 15/30 minute data intervals into hourly data.
TS.12.5.7. Shall have the ability to properly account for special metering situations such as check metering, sub metering, prepaid metering and net metering when calculating billing determinants and sending them to billing and other systems.
TS.12.5.8. Shall have the ability to properly account for special situations including, but not limited to, curtailment requests, demand response scenarios when calculating billing determinants and sending them to billing software.

TS.12.6. Exception Management:

TS.12.6.1. Ability to capture and log data exceptions, problems and failures and to generate management reports, provide trend analysis, automate generation of service requests and track corrective actions.

TS.12.6.2. Ability to group, prioritize, filter and send system generated alarms and events to predetermined email addresses, cellular text messages to phone numbers/SMS/customer care etc.

TS.12.6.3. MDM shall generate exceptions based on configurable business rules including but not limited to the following:

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

TS.12.7. Service Order:

TS.12.7.1. The MDM shall generate service orders based on configurable rules for various events and alarms such as stop meter, tampers, problem in communication networks, AMI host server, etc.

TS.12.7.2. MDM shall send service orders via SMS, email, etc. with the email addresses / phone numbers being configurable. MDM shall receive feedback on action taken on the service order and track the status of service orders.

TS.12.8. Customer Service Support:

TS.12.8.1. The solution shall provide customers with access to current and historical consumption and interval data, outage flags, voltage and power quality indications. The data shall be displayed in graphical and tabular form depending on user choice. The Customer may also access data through customer portal. The solution shall integrate via a user friendly graphical interface.

TS.12.8.2. MDM shall support email/SMS notification of configured alarms & events to users without any extra charges.

TS.12.8.3. The MDM shall support the web portal or shall have the ability to interface with the 3rd party portal/utility portal to provide the consumer near real time online views of both usage and cost and helping consumers to understand electricity usage and cost information, alerts and notifications and energy savings tips with different levels of detail. The portal should support the view for past electricity usage, last week's, yesterdays, current days or other period etc. as per selection. The portal should provide user friendly access to consumer for their data via colourful graphs and charts and can download the data into a spreadsheet.

TS.12.8.4. Shall support mobile app through which consumer shall be able to log in through android/iOS/Window based mobile app to see information related to his energy consumption. App shall also provide platform for

implementation of peak load management functionality by providing existing tariff & incentives rates, participation options etc.

TS.12.9. Analysis: The MDM shall have analysis capability based on configurable business rules including but not limited to the following:

TS.12.9.1. Display consumption/load profiles by configurable period (15/30 min, hour, day, month, year etc.) day type (weekday, weekend, holiday, festival wise etc.) and by tariff, customer type, or any user specified collection of meters.

TS.12.9.2. Generate peak & off-peak load patterns by aggregating all loads of DT/Feeder/consumer group.

TS.12.9.3. Ability to provide the data to load forecasting, load research or demand response applications and perform error management like: Missed reads and Intermittent meter reads before taking into forecasting, load research or demand response.

TS.12.9.4. Ability to configure the system to effectively visualize consumption trends, identify unusual patterns, and visualize load analysis to understand which assets are being over utilized.

TS.12.9.5. Analyzing data to identify new patterns of usage, Setting fraud alert / transformer overload alerts / demand - supply gap alert etc.

TS.12.9.6. Ability to receive and store outage and restoration event data from smart meters and outage systems and to log all such events for analysis.

TS.12.10. Reporting: The MDM shall enable the Utility to deliver reports in standard digital format such as PDF, Excel, etc. All queries shall be generated through user driven drop down menu in GUI. Ability for GUI (Graphical User Interface) to set up or change report delivery to configurable email addresses, network file directories, ftp sites or printer systems without modifying source program code and without any proprietary language skills. The solution shall support users modifying standard reports to better meet specific reporting requirements. The solution shall include a list of the standard reports that are provided with the MDM including but not limited to following:

TS.12.10.1. Daily data collection report
TS.12.10.2. Usage exceptions
TS.12.10.3. VEE validation failures
TS.12.10.4. Missing interval Read date and times (on hourly, daily, weekly & monthly basis)
TS.12.10.5. Physical meter events (install, remove, connect, disconnect) & meter reset report
TS.12.10.6. Meter flags & Meter inventory
TS.12.10.7. Defective meters
TS.12.10.8. AMI performance measurements

TS.12.10.9. Threshold Exception

TS.12.10.10. Ability to provide daily & weekly interface exception reports between MDM and other subsystems e.g. billing, outage, etc.

TS.12.10.11. In case more than one technology of AMI (example PLC and RF between Smart Meter & DCU) deployed in the field The MDM shall generate report on the performance and availability of data being delivered per AMI technology.

TS.12.11. Revenue Protection Support:

TS.12.11.1. Ability to analyze meter tampering flags, power outages, usage trends and usage profiles to identify potential energy diversion situations, and produce daily reports, monthly reports and service order requests for investigation.

TS.12.11.2. The business rules for revenue protection alerts shall be configurable via a user-friendly interface.

TS.12.11.3. The MDM shall filter out revenue protection alerts that may be caused by field activities if the field activity information is provided to the MDM.

TS.12.11.4. The MDM shall support the analytics/investigation (i.e. view current and historical usage patterns) to valid suspected revenue protection issues.

TS.12.12. Net Metering: MDM flags, alarm and trigger an estimating process including but not limited to when the following anomalies occur:

TS.12.12.1. CUM decrements of forward energy within a billing cycle.

TS.12.12.2. Register decrements for Time of Use (ToU) of forward energy .

TS.12.12.3. Power generated (exported) by any net-metering consumer more than the installed capacity of solar PV rooftop system.

TS.12.12.4. Energy exported (exported) in any given day by any net-metering consumer more than the programmable threshold value.

TS.12.13. Prepaid Metering: The prepaid functionality can either be availed at smart meter level or through MDM. In case of MDM, following are the features:

TS.12.13.1. The MDM supports pre-payment metering and capability to interface with pre-payment application.

TS.12.13.2. Payment and connection parameters are stored centrally and the details are being updated to consumer portal/ app.

TS.12.13.3. The system Periodically monitors the energy consumption of prepaid consumer and decrease the available credit based on consumption.

TS.12.13.4. The system sends connect/disconnect command on the basis of available credit as per notified rules & regulations.

TS.12.13.5. System sends low-credit notifications to the consumer when their balance approaches a threshold.

TS.12.13.6. User interface for all authorized consumers have the following functionality:

(i) View metered data, initiate and view reports.
(ii) View data according to Time of Use(ToU) tariff
(iii) Can make request for connection/disconnection
(iv) User can update mobile number/email
(v) Can initiate service requests for maximum demand updating, meter checking etc.
(vi) In case on net-metering consumers, user can view data for both import & export
(vii) In case of prepaid consumers, consumers can view recharge history & present balance.
(viii) Prepaid consumers shall be provided facility to recharge their account by logging on user interface. User interface shall require consumer id., mobile number & password for secure login. This user interface shall be integrated with the present online payment gateway of utility.

TS.12.14. Utility User Interface: User interface for utility shall have ability for at least the following functionality:

TS.12.14.1. Compare total energy costs on one rate schedule vs. one or many alternative rates.
TS.12.14.2. Enable the user to see how different options within a rate affect costs.
TS.12.14.3. Display meter data at a user defined configurable cycle through a GUI that allows authorized users to view energy usage patterns and the data behind them for selected customers.
TS.12.14.4. Allow authorized users to view metered data, initiate and view reports, modify configurations, and initiate and update service requests via a GUI.
TS.12.14.5. Display via a GUI the energy usage profile for a single meter or group of meters. The load profile shall illustrate energy consumption and peak demand in user defined intervals for a user-specified time period.
TS.12.14.6. Display via a GUI the energy usage profile for a single meter or group of meters according to Time of Use (ToU) tariff.
TS.12.14.7. The GUI shall support a configurable utility dashboard for Operations and Utility Management
TS.12.14.8. Access to a minimum of 5 years of historical energy usage and meter reads through the GUI.
TS.12.14.9. GUI to clearly and visually distinguish between metered, estimated, allocated and substituted data.
TS.12.14.10. GUI to provide role-based access based on user identity and user role

TS.12.14.11. Configure the look, feel, and functionality of the MDM in accordance with business needs, business processes, and business conventions. (E.g. GUI, content, look and feel of screens, validation rules, exception handling, etc.).

TS.12.14.12. 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.12.15. Integration with other system:

TS.12.15.1. MDM supports the interface with other systems on standard interfaces and the data exchange models and interfaces shall comply with CIM / XML / IEC 61968/IS15959/ Indian Companion Specification/ any other open standard. MDM solution is adhering to Service Oriented Architecture (SOA).

TS.12.15.2. It supports integration with existing Billing system, CRM,IVRS, GIS system of utility. MDM integration with other systems shall include but not be limited to the following:

(i) Utility Administration
(ii) HES for data exchange with AMI solutions
(iii) Billing and collection system like Base Computing System (BCS)
(iv) Existing other Data Collection Systems
(v) Support of interface with HHU or manual reading system etc.
(vi) Consumer Portal

TS.12.15.3. MDM should also support the interfacing of other smart grid functionalities like Distribution Transformer Health Monitoring system, self-healing system, electric vehicle etc. as and when implemented by the utility.

TS.13. Cloud Infrastructure: 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 ISO 27001 certified** minimum Tier-3 Data Centre within INDIA and WBSEDCL officials shall have right to 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. Functional requirement of cloud service provider (CSP) is as follows:

TS.13.1. Operational Services:

TS.13.1.1. CSP should provide access of cloud virtual machines either by SSH in case of Linux and RDP in case of Windows servers.

TS.13.1.2. CSP should enable WBSEDCL to get console access of cloud virtual machine from portal and perform operations.

TS.13.1.3. CSP should upgrade its hardware time to time to recent configuration to delivery expected performance for this Project.

TS.13.1.4. CSP should Investigate outages; perform appropriate corrective action to restore the hardware, operating system, and related tools.

TS.13.1.5. CSP should manage their cloud infrastructure as per standard ITIL framework in order to delivery right services to Project.

TS.13.1.6. The CSP should allow different users with different level of access on CSP portal. For example, billing user should not be able to provision resources or delete any resources

TS.13.1.7. CSP should ensure connectivity to and from cloud resources used for this project is allowed to/ from other cloud service providers if require.

TS.13.1.8. CSP must ensure that cloud virtual machine of project is into separate network tenant and virtual LAN.

TS.13.1.9. CSP must ensure that cloud virtual machines are having private IP network assigned to cloud VM.

TS.13.1.10. CSP must ensure that all the cloud VMs are in same network segment (VLAN) even if they are spread across multi datacenters of CSP.

TS.13.1.11. CSP should ensure that cloud VM network is IPV6 compatible.

TS.13.1.12. 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.13.1.13. CSP should ensure use of appropriate load balancers for network request distribution across multiple cloud VMs.

TS.13.2. CSP specification and compliance:

TS.13.2.1. The datacenter and DR of Cloud Service Provider (CSP) must be within judicial jurisdiction of Indian Republic.

TS.13.2.2. 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.13.2.3. The datacenters of CSP should be spread across different geo location and preferably in different seismic zones.

TS.13.2.4. The CSP datacenters should have adequate physical security in place.

TS.13.2.5. WBSEDCL officials shall have right to visit this Data Centre for inspection at any time with or without prior intimation.

TS.13.2.6. CSPs are certified to be compliant to the following standards:

TS.13.2.7. ISO 27001 - Data Center and the cloud services should be certified for the latest version of the standards

TS.13.2.8. ISO/IEC 27017:2015-Code of practice for information security controls based on ISO/IEC 27002 for cloud services and Information technology

TS.13.2.9. ISO 27018 - Code of practice for protection of personally identifiable information (PII) in public clouds.

TS.13.2.10. ISO 20000-9-Guidance on the application of ISO/IEC 20000-1 to cloud services.

TS.13.3. Cloud Security Specification:

TS.13.3.1. 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.13.3.2. 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.13.3.3. CSP should have built-in user-level controls and administrator logs for transparency and audit control.

TS.13.3.4. CSP cloud platform should be protected by fully-managed Intrusion detection system using signature, protocol, and anomaly based inspection thus providing network intrusion detection monitoring.

TS.13.3.5. CSP should deploy public facing services in a zone (DMZ) different from the application services. The Database nodes (RDBMS) should be in a separate zone with higher security layer.

TS.13.3.6. CSP 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.13.3.7. The CSP undertakes to treat information passed on to them under this Agreement as classified. Such Information will not be communicated / published / advertised by the CSP to any person/organization without the express permission of the Department.

TS.13.4. System Requirement:

TS.13.4.1. CSP should ensure that any OS provisioned as part of cloud virtual machine should be patched with latest security patch.

TS.13.4.2. In case, the CSP provides some of the System Software as a Service for the project, CSP is responsible for securing, monitoring, and maintaining the System and any supporting software.

TS.13.4.3. CSP should implement industry standard storage strategies and controls for securing data in the Storage Area Network so that clients are restricted to their allocated storage.

TS.13.4.4. 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.13.4.5. CSP should provide 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.

TS.13.4.6. 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.13.4.7. CSP should be responsible for Monitoring & management of network link proposed as part of this solution like bandwidth utilization, latency, packet loss etc.

TS.13.5. Backup Services:

TS.13.5.1. Regular backup of servers as per the backup & restoration.

TS.13.5.2. Managing uptime of servers as per SLAs.

TS.13.5.3. CSP must provide backup of cloud resources. The backup tool should be accessible

TS.13.5.4. 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.13.5.5. Ensuring prompt execution of on-demand backups & restoration of volumes, files and database applications whenever required.

TS.13.5.6. 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.13.5.7. CSP should provide network information of cloud virtual resources.

TS.13.5.8. CSP must offer provision to monitor network uptime of each cloud virtual machine.

TS.13.6. Database Support Services:

TS.13.6.1. Installation, configuration, maintenance of the database (Cluster & Standalone).

TS.13.6.2. Regular health checkup of databases.

TS.13.6.3. Regular monitoring of CPU & Memory utilization of database server, Alert log monitoring & configuration of the alerts for errors.

TS.13.6.4. Space monitoring for database table space, Index fragmentation monitoring and rebuilding.

TS.13.6.5. Performance tuning of Databases.

TS.13.6.6. Partition creation & management of database objects, Archiving of database objects on need basis.

TS.13.6.7. Patching, upgrade & backup activity and restoring the database backup as per defined interval.

TS.13.6.8. Schedule/review the various backup and alert jobs.

TS.13.6.9. 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.13.6.10. Setup, maintain and monitor the 'Database replication' / Physical standby and Asses IT infrastructure up-gradation on need basis pertaining to databases.

TS.13.7. Report Services:

TS.13.7.1. Generating and sharing the backup reports with WBSEDCL on Monthly basis.

TS.13.7.2. Detailed report on network uptime, Bandwidth utilization, latency, packet loss and network health to be provided on Monthly basis.

TS.13.7.3. Report on storage status and unauthorized access attempted to be shared on quarterly basis.

TS.13.8. Disaster Recovery Management:

TS.13.8.1. 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.13.8.2. RPO should be less than 1 hours and RTO shall be less than 12 hours

TS.13.8.3. 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.13.8.4. 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.13.8.5. Whenever there is failover from primary to secondary, compute environment for the application at DR site shall be equivalent to DC

TS.13.8.6. The installed application instance and the database shall be usable and the same SLAs as DC shall be provided.

TS.13.8.7. The bandwidth at the DR shall be scaled to the level of Data center when DR is activated.

TS.13.8.8. 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.13.8.9. The CSP should offer dashboard to monitor RPO and RTO of each application and database.

TS.13.8.10. Any lag in data replication should be clearly visible in dashboard and alerts of same should be sent to respective authorities.

TS.13.9. Transitioning/Exit:

TS.13.9.1. 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.13.9.2. 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.13.9.3. 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.13.9.4. 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.13.9.5. 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.

TS.14. Installation of Advanced Metering Infrastructure (AMI): Provisions to be followed for installation of Advanced Metering Infrastructure (AMI) such as Smart meters at consumer & DT end with its accessories such as Data Concentrator Unit (DCU) and other elements used in the communication in the Utility distribution network. Installation shall be done in such a way to ensure proper two way communications, achieving maximum signal strength and coverage of adequate number of meters under a DCU, avoiding any danger in normal conditions, so as to ensure:

- ✓ personnel safety against electric shock
- ✓ personnel safety against effects of excessive temperature
- ✓ equipment safety against spread of fire
- ✓ equipment protection against solid objects, dust & water.

Contractor shall be responsible for proper storage of all the materials at their own cost, until the system is undertaken by the Employer. The Contractor shall bear the cost of any of the materials lost or damaged during storage and erection. Contractor shall setup required number of stores in consultation with Employer. During the installation of AMI System, it is advisable to the contractor to prepare a schedule of work. Same has to be submitted to the utility for approval. Request for shut down if required any shall be given well in advance**.** WBSEDCL standards/commonly prevalent industry standard and practices shall be followed during installation.

TS.14.1. Installation of Smart Meter:

TS.14.1.1. Replacement of existing energy shall be carried out by Contractor according to the following procedure.

- ✓ Remove old meter
- ✓ Record last meter reading
- ✓ Handover of attached modem, SIM (if any) to the concerned CCC of WBSEDCL.

TS.14.1.2. Employer has the practice of installing meter in meter Box. New polycarbonate meter box matching with smart meter shall be installed. Once the meter is mounted on meter board, no access to the terminals shall be possible unless the meter case or cover is broken through. The meter box door shall have two hinge on one side and sealing arrangement on other side.

TS.14.1.3. All accessories required for installation of FRP board and meter box shall be provided by the contractor.

TS.14.1.4. For new connections service cable till the meter installation point shall be provided by WBSEDCL.

TS.14.1.5. For fastening equipment and fittings to buildings only galvanized steel screws or screws made of non-corrosive material of strength shall be used.

TS.14.1.6. After meter installation customer identification no./ DTR Code, Latitude & Longitude, meter ID its hardware & software configuration, name plate details & make, type i.e. 1 phase or 3 phase, etc. shall be recorded and updated in DCU/MDAS/MDM by the Contractor. All meters falling under one DCU shall be commissioned and checked for proper communications in presence of employer.

TS.14.1.7. Location: 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.

TS.14.1.8. Civil Work: 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.

TS.14.2. Installation of Data Concentrator Unit (DCU):

TS.14.2.1. Location: Contractor shall finalize the location of DCU to meet the specified performance criteria. DCU have to be installed at certain nodes such that the reception of the signal is maximum, affirming the requirements of the specification.

TS.14.2.2. Mounting of DCU can be on wall or distribution poles, or separate supporting structure based on the requirement. Pole mounting/wall mounting is to be done with proper galvanized iron flats/strip to pole

designed for weight of DCU. It is to be locked and protected for secured access of the O&M people. DCU must be protected against ingress of water/moisture/dust/insect. Any damage or discrepancies to the DCU and its components such as sensors, displays, alarm systems, etc. have to be replaced by the Contractor.

TS.14.2.3. Installation Quality: The employer shall check on the quality of installation by checking performance of the sensors, wiring methods, alarms, communication to control centre & time lag in data acquisition & to certify for acceptance to contractor.

TS.14.3. General Rules of Installation:

TS.14.3.1. Contractor's Supervision: The Contractor shall give or provide all necessary superintendence during the installation of the Facilities, and the Construction Manager 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.

TS.14.3.2. 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.

TS.14.3.3. 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.

TS.14.3.4. 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.

TS.14.3.5. 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.

TS.14.3.6. 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.

General Conditions of Contract [GCC]

GCC.1. General Terms:

GCC.1.1. The entire work shall be divided on two parts; Commissioning of DTR smart meter is on CAPEX model and the rest commissioning of consumer smart meter and build up AMI system for installed consumer meter as well as DTR meter shall be executed on OPEX MODEL. After successful completion of the project i.e 10 years from the placement of LOA, the whole system including Consumer smart meter, pilfer proof box, communication system, HES, MDM and customized software will be handed over to WBSEDCL with a token money of Rs 1 per meter only. The vendor also hands over all the relevant documents i.e design documents, source code, integration details, component's specifications and circuit diagrams etc to WBSEDCL.

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 ±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 will have the responsibility of time to time up gradation of hardware and software to maintain the full functionality of system without any extra cost.

GCC.1.7. The contractor 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. 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.1.10. 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.2. Intellectual Property: Each Party represents warrants and agrees to the other Party that it shall:

GCC.2.1.1. Not use nor represent (in any manner whatsoever) the other Party's Intellectual Property as their own;

GCC.2.1.2. Treat the other Party's Intellectual Property as Proprietary Information, and use and disclose it only as set forth herein; and

GCC.2.1.3. 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.2.1.4. Formulate ways in which a record is maintained giving details of a Party's Intellectual Property made available to the other party.

GCC.3. 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.3.1. 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.3.2. 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.3.3. 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.3.4. The bidder shall satisfy WBSEDCL with his ability to complete the works positively within the stipulated time.

GCC.3.5. The Company reserves the right, to reject any or all the tenders, at its discretion, without assigning any reason whatsoever.

GCC.3.6. All the specifications/ documentations and manuals related to the hardware and software implementation are to be handed over to the Company including the customization manuals of APIs. Data Flow diagram, database schema and structure of database are to be provided.

GCC.4. 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.5. CONTRACT AGREEMENT: The contractor (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-XIV).** 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.6. Contract Period: Contract will be for 10 (ten) years from the date of issuance of LoA**.**

GCC.7. Contract Value:

GCC.7.1. CAPEX Contract Value: Total CAPEX cost of DT Smart meter, excluding taxes and duties.

GCC.7.2. OPEX Contract Value: The contract value of the project will be the total (value of charges per reading data per month) x 120 x (total no. of meters as per LoA) excluding taxes and duties.

GCC.8. Performance Guarantee:

GCC.8.1. For overall performance of the project: 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-XV**. The **PBG** shall be submitted to the CE, IT&C Cell, 3rd Floor, 'D' Block, Vidyut Bhawan, WBSEDCL.

GCC.8.1.1. PBG for CAPEX cost: As Performance BG of CAPEX work, 10% of CAPEX contract value to be submitted within one month from the date of issue of LOA. Validity of PBG will be 10 years from the date of LOA and claim period will be further 6 months.

GCC.8.1.2. PBG for OPEX cost: As Performance BG of OPEX work, 0.5 % of OPEX Contract Value to be submitted within one month from the date of issue of LOA. Validity of PBG will be 10 years from the date of LOA and claim period will be further 6 months.

GCC.9. Liability for Accident: If any accident occurred during the time of the execution of the work by your employee, all cost to be borne by you.

GCC.10. INDEMNITY BOND: The contractor (successful bidder) shall have to produce Indemnity Bond as per Pro forma **(ANNEXURE-XVIII)** within 30 (thirty) days from the issue of LOA to the Controlling Officer of the work.

GCC.11. Completion Time:

GCC.11.1. Completion time for execution of the project in turn-key basis shall be within 24 months as mentioned in times schedule at paragraph **IB.25.** 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.11.2. If due to any unavoidable circumstances the bidder is unable to commission AMI SYSTEM and devices for some locations and if this number is less than 10% of initial ordered quantity then the vendor may apply to ordering authority for issuance of completion certificate. The reason for non-commissioning of 10% must be submitted with necessary supporting document.

GCC.11.3. 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.12. Risk Purchase / Performance: Adherence to time schedules mentioned in the foregoing clauses shall be deemed as the essence of contract and if the vendor fail 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.13. Performance Level: These performance levels shall apply to the complete AMI system. AMI system includes the communications links provided by Network Provider /third parties such as telecommunications companies and AMI Implementing Agency (AIA) has to ensure the desired performance level. The performance levels are average

performance levels over the period of a year and exclude force majeure events. The following are the required performance levels:

GCC.13.1. Response time of Server and Performance of Application software:

GCC.13.1.1. The system shall perform within normal response time even if all the users login and using the system simultaneously.

GCC.13.1.2. The application should open and viewable with all feature maximum within 30 second.

GCC.13.1.3. Note: This is minimum requirement and considering good network connectivity. If dispute arise on question of network speed and quality then the vendor will have to demonstrate and prove it on the network arranged by them.

GCC.13.1.4. The vendor may be allowed 15 days to correct the performance issue, in case of violation of above criteria contract may be instantly terminated without further references.

GCC.13.2. Performance levels for collection of daily meter readings (as per IS 16444/15959 part 2): The following are the performance levels required for the daily collection of the previous day's interval energy data and total accumulated energy:

GCC.13.2.1. All interval data from 95% of meters within 8 hours after midnight; and
GCC.13.2.2. All interval data from 99.9% of meters within 24 hours after midnight.
GCC.13.2.3. Any defined report requires to be generated within 2 minutes.

GCC.13.3. Performance levels for remote reads of individual meters if data is not received on daily basis: The performance level of an individual read applies to the collection of seven days of interval energy data and the current total accumulated energy from a particular AMI meter whose data is not being received on daily basis. The performance level required shall be:

GCC.13.3.1. Action performed at 90% of meters within 1 Hour;
GCC.13.3.2. Action performed at 99% of meters within 2 hours; and
GCC.13.3.3. Action performed at 99.9% of meters within 6 hours.

GCC.13.4. Performance level for remote load control commands for selected consumers: The performance level required for individual meters shall be:

GCC.13.4.1. Action performed at 95% of meters within 5 minutes;
GCC.13.4.2. Action performed at 99% of meters within 10 Minutes.

GCC.13.5. Performance level for remote connect/disconnect for selected consumers: The performance level required for selected individual meters shall be:

GCC.13.5.1. Action performed at 90% of meters within 10 minutes;
GCC.13.5.2. Action performed at 99% of meters within 1 hour; and
GCC.13.5.3. Action performed 99.9% of meters within 2hours.

GCC.13.6. Performance levels for Meter loss of supply and outage detection:

GCC.13.6.1. Alarms to be received within 5 minutes for 90% of meters.

GCC.13.7. Performance levels for remotely altering settings in meter/ firmware upgrade: The performance level required for individual meters shall be:

GCC.13.7.1. Action performed at 99% of meters within 24 hours; and
GCC.13.7.2. Action performed at 99.9% of meters within 36 hours.

GCC.13.8. Performance levels to remotely read events logs: To read the event logs pertaining to all meters:

GCC.13.8.1. The data pertaining to 99.5% of meters with in 1 day.

GCC.13.9. Performance levels for updating of data on consumer portal/ app and for billing system: The performance level of updating of individual consumer data on portal/ app and for billing system, after receiving the data in MDM shall be:

GCC.13.9.1. Action performed for 90% of consumers within 1 hour after receiving the data in MDM;
GCC.13.9.2. Action performed at 99.5% of meters within 6 hours after receiving the data in MDM.

GCC.14. Force Majeure:

GCC.14.1. WBSEDCL shall be under no liability if the vendor is prevented from carrying out any of the vendor's obligations by reason of war, Invasion, act of foreign country, hostilities, riots, civil commotion, mutiny, accident, earthquake, fires, floods, orders and / or restrictions and other cause beyond the reasonable control of the vendor. However, such force majeure circumstances are to be intimated immediately and to be established subsequently with proper documents / proofs to the entire satisfaction of WBSEDCL.

GCC.14.2. WBSEDCL will take additional liability towards enhanced taxes, duties if any. However, if any changes in tax structure occurs due to delay in completion at a fault of the vendor, then the same may not be allowable.

GCC.15. <u>Exit clause after end of contract</u>: Exit clause will be followed as per clause GCC.1.1. Also, The AIA 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.16. 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 with a token money of Rs. 1 only. Also, WBSEDCL 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.16.1. Non acceptance of LOA as per "Acceptance" clause.
GCC.16.2. Non submission of Performance BG within time.
GCC.16.3. If the vendor is found to have Conflict of Interest.
GCC.16.4. If failed to implement the project.
GCC.16.5. If annual review of performance of the system not upto the performance level defined at **GCC.13**.
GCC.16.6. In each above cases 15 days termination notice shall be issued prior to termination of LOA.

GCC.17. 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 with a token money of Rs. 1 only.

GCC.18. Arbitration & Legal Jurisdiction:

GCC.18.1. During execution of this contract, if any dispute arises thereby, shall be settled amicably between the contractual parties.

GCC.18.2. 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.18.3. 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.19. Conflict of Interest:

GCC.19.1. 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.19.2. 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.19.3. 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.19.4. 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.20. 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 as indicated in the ANNEXURE-XIV.

GCC.20.1. Calculation of LD: During the contract period deviation of any condition attracts the penalty as LD. In case, there is a delay in making 100% AMI SYSTEM installation and operational within the 2 years from the date of placement of LoA, Liquidated Damages shall be charged at a rate of 0**.**5% of the contract value for delay per week and recovered from the vendor subject to maximum of 10% of the total contract value as per LOA. 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.21. Submission of bills for payment:

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.21.1. Only successful billing data available through AMI as per clause SW.17.4. & SW.17.5., will be considered for monthly billing purpose. 1st Monthly reading Bill of newly installed device (DT and consumer smart meter) can only be submitted after availability of reading data through AMI**.**

GCC.21.2. Triplicate **monthly** bill with SLA deductions and **incentive awarded** 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.21.3. In case of first claim of Monthly Payment bill for any Device then "**Commissioning Certificates" (ANNEXURE-XVI)**, signed by the concerned site officer and supervising officer is to be submitted as per clause **SW.29.**

GCC.21.4. From the first claim of Monthly Payment bill, System generated **"Performance Certificate" (ANNEXURE-XVII)** as per **SLA and incentive** is required to be submitted on monthly basis as per clause **SW.28.**

GCC.22. Terms of Payment for DT meters:

GCC.22.1. No advance payment will be made against this order in any circumstances for turn-key implementation of entire project.

GCC.22.2. CAPEX Cost of LT CT operated Smart DT Meter:

GCC.22.2.1. On Installation: 25% of total material cost after deduction of applicable LD if any.
Enclosure: '**Installation Certificate'** duly signed by the concerned site officer and supervising officer is to be submitted.

GCC.22.2.2. On Commissioning and Integration with AMI system: 50% of the material cost.
Enclosure: '**Commissioning Certificate for DT Smart meter'** duly signed by the concerned site officer and supervising officer is to be submitted.

GCC.22.2.3. Final Payment: Balance amount will be paid after six consecutives Monthly DTR reading data through AMI.

GCC.22.3. Monthly Payment of DT meter reading data= **(**Cost per billable reading per month – Deduction as per SLA per month and applicable LD**) +** Awarded amount as per incentive scheme.

The Monthly Payment as per above formula is final and beside nothing will be Payable.

GCC.23. Terms of Payment for Consumer meters:

GCC.23.1. No advance payment will be made against this order in any circumstances for turn-key implementation of entire project.

GCC.23.2. Monthly Payment of Consumer billing data = **(**Cost per billable reading per month – Deduction as per SLA per month and applicable LD**) +** Awarded amount as per incentive scheme.

The Monthly Payment as per above formula is final and beside nothing will be Payable.

GCC.24. 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:

GCC.25.1. Incomplete or partial quotation will not be accepted and shall be liable to be rejected.

GCC.25.2. 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.26. WBSEDCL personnel for liaison:

GCC.26.1. Controlling Officer: Addl. Chief Engineer, IT & C Cell. - He would issue the successful completion certificate for the entire scope of work under the LoA.

GCC.26.2. Nodal Officer: Superintendent Engineer (E) IT & C Cell - He would supervise & monitor all the activities.

GCC.26.3. Supervising Officer: The Divisional Manager of the respective division will be the Supervising Officer and he/she will monitor the overall installation, commissioning, training and maintenance of AMI MODEMs under his/her jurisdiction.

GCC.26.4. Site Officer: SM of CCC will be the Site Officer and he/she will monitor the overall installation, commissioning, training and maintenance of AMI MODEMs under his/her jurisdiction.

GCC.26.5. Liaison Officer: AE (DCC)/DE(DCC) will monitor the overall technical matter of AMI and will coordinate with vendor, site officer and IT&C Cell Vidyut Bhavan for smooth operation of AMI.

GCC.26.6. Paying Authority: For Supply, Delivery, Installation, Commissioning and availability of billable reading: Manager (F&A), Establishment-Corporate, Bidyut Bhawan, WBSEDCL.

GCC.27. Enclosure:

Item	Description
BoQ	Item Rate BoQ
FORM-I	Declaration of Mandatory Condition
FORM-II	Checklist of Mandatory Condition

Item	Description
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 favor 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
ANNEXURE-VI	Proforma of Bank Guarantee for Bid Guarantee
ANNEXURE-VII	Service level agreement (SLA) contract format
ANNEXURE-VIII	Data Requirement Sheet
ANNEXURE-IX	Techno Commercial Deviation Sheet
ANNEXURE-X	Proposed Key Resource Format
ANNEXURE-XI	Pre bid query Format
ANNEXURE-XII	Proforma of Declaration of Black Listing
ANNEXURE-XIII	Proforma of Declaration Regarding abandonment or Rescission of Work
ANNEXURE-XIV	Format of Contract Agreement
ANNEXURE-XV	Format for Bank Guarantee for contract Performance
ANNEXURE-XVI	Format of Installation and Commissioning Confirmation Certificate
ANNEXURE-XVII	Format of the Performance Certificate
ANNEXURE-XVIII	Format of INDEMNITY BOND
ANNEXURE-XIX	Terms and Conditions of Letter of Credit

BoQ FORMAT

Item Rate BoQ

Validate | Print | Help

Tender Inviting Authority: Chief Engineer, IT& C, WBSEDCL

Name of Work: Cloud Based End to End Advanced Metering Infrastructure (AMI) Solution for all RLI connections, Consumers having connected Load 5 KVA to 50 KVA with all Distribution Transformer meters at WBSEDCL.

Tender Notice No: WBSEDCL/ IT&C/ 33.10 (iv) /1402 Dated: 20.02.2019

Bidder Name		

PRICE SCHEDULE

(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only)

NUMBER #	TEXT #	NUMBER #	TEXT #	NUMBER #	NUMBER	NUMBER	NUMBER	NUMBER #	TEXT #
Sl. No.	Item Description	Quantity	Units	Price Excluding Tax In Figures To be entered by the Bidder (In Rs.)	Amount Without Tax Col.6=(col.3 * col.5) (In Rs.)	GST rate % (To be entered by Bidder) %	GST amount Col.8=(Col. 6 X % of Col.7) (In Rs.)	TOTAL AMOUNT With Taxes Col.9=(Col.6 + Col.8)) (In Rs.)	TOTAL AMOUNT In Words
1	2	3	4	5	6	7	8	9	10
1	Supply, delivery, installation and commissioning of smart meter with NIC card at DTR along with LT CT junction box including LT control cable, sockets etc. required for connection of metering installation on CAPEX	2,60,572	Nos		0.00		0.00	0.00	INR Zero Only
2.	AMI System, Data fetching for DTR Meter per Month on OPEX	2,60,572	Nos		0.00		0.00	0.00	INR Zero Only
3.	AMI System, Data Fetching for 1-ph Consumer Meter per Month on OPEX	45,485	Nos		0.00		0.00	0.00	INR Zero Only
4	AMI System, Data Fetching for 3-ph Consumer Meter per Month on OPEX	2,16,293	Nos		0.00		0.00	0.00	INR Zero Only
5	Buy Back price of DT meter with CT	48,000	Nos		0.00		0.00	0.00	INR Zero Only
6	Buy Back price for 1-ph Consumer Meter	45,485	Nos		0.00		0.00	0.00	INR Zero Only
7	Buy Back price for 3-ph Consumer Meter	2,16,293	Nos		0.00		0.00	0.00	INR Zero Only
Total in Figures	(1 + 2+ 3+ 4) – (5+6+7)= ** For Item 4, 5 & 6 GST will be paid at actual basis.							0.00	Zero Only
Quoted Rate in Words	**INR Zero Only**								

FORM- I

DECLARATION OF MANADATORY CONDITION

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

Qualifying Requirement (QR) of Bidder				
Sl.	**Descriptio**	**Qualification Criteria**	**Evaluation/ Document Required**	**Submitted Yes/No**
1	Bidders Identity	The bidder shall be a private/public Company registered under Companies Act 1956 / 2013 proprietary firm / partnership firm.	Certificate of Incorporation and Registration.	
2	Quality Certification	c) The Bidder should be an ISO 9001:2008 certified. OR Bidder should have CMMI Level 3 (minimum) certification.	A valid ISO/CMMi certificate on or before the date of publication of the tender.	
		d) Bidder may have Smart Grid Maturity Model Experience or equivalent model (internationally accepted) experience.	Self-Certification.	
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 2011-12 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, Smart Grid Functionalities 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	c) The bidder should have average annual turnover of Rs. 235 Crores during last three financial years ending on 31- Mar-2018 (i.e. for the F.Y. 2015-16, 2016-17 & 2017-18).	Income Tax return, All enclosures forming the part of Income Tax return (as applicable) and Duly attested Audited Balance Sheet PL Account for companies registered under company Act and for others Tax Audit Report.	
		d) The bidder should have a minimum working capital of Rs.235 Crores during financial year ending on 31-Mar-2018.	Audit report for company registered under Company's Act & Tax Audit report for others to be submitted as a proof of net worth.	
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.20.**	Signed resume of employees need to be submitted as per enclosed format in A**NNEXURE-X**	
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 10 years back to back support of as per the format attached for Manufacturer's authorization form (MAF)	
7	Cloud Service Provider Partner Status	If the bidder does not have its own ISO 27001 certified Tier-3 MeitY empanelled Data Centre within INDIA then bidder should submit valid letter from the owner of such data centre confirming that such service including Hardware, Software, Database infrastructure shall be available for the next 10 (Ten) years.	Certificate from owner of data centre offer the services.	
8	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.	Self Certificate on company letterhead with company stamp and signed by authorized signatory as per **ANNEXURE-XII and ANNEXURE-XIII.**	

9	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	
10	Smart Meter Capability	The smart meters proposed should meet the relevant standards applicable in India and the meter supplier should have capabilities (both production and financial) to supply the full quantity of meters within 1 Year of the award of contract.	Self-declaration and BIS certificate (BIS Certificate should be provided within 6 months from date of issuance of LOA. But at the time of bid submission bidder must have to produce valid document that they have submitted sample meter to any NABL accredited Lab for certification).	
11	HES Interoperability	HES system should be inter-operable amongst different makes of meters (atleast 2 types from leading Meter OEM in INDIA). Bidder shall consider at-least three different makes of Meters for this project with atleast 5% of meters for each category (DT meter, 3-ph and 1-ph Consumer meter) from each manufacturer.	Agreement copy of Meter OEM and Bidder with mentioning the quantity and validity should be produced.	
12	MDM criteria	(a) The MDM solution must be named in Gartner's Magic Quadrant for Meter Data Management (MDM) Products (For the year 2016 to 2018). MDM should be capable enough to integrate at least 3 types of HES and should be scalable enough to fit for at least 20,00,000 no smart meters.	Necessary documents for Gartner's Magic Quadrant enlistment, Authorization letter from MDM solution provider for scalability, List of clients, 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 integration with 3 types HES to be submitted.	

		(b) The MDM solution must have been deployed in at least 2 number of power utilities and should be handling meter data [of at least 30-minute interval data] from at least 50,000 number of interval meters in each utility	References along with requisite contract/ PO/ WO. The references should indicate client name, scope of work, project start date and date of completion of installation. Certificate from the client on successful implementation and operation of the project.	
		(c) The MDM solution must have been integrated with SAP-ISU solution in at least 2 power utilities		
13	In case of consortium, all qualifying requirements specified, should be met by all consortium partners combinedly.			

FORM- II

Checklist of Mandatory Conditions

West Bengal State Electricity Distribution Company Limited				
Tender Notice No. WBSEDCL/IT & C /33.10 (iv) / 1402 Dt. 20.02.2019				
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	VAT 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	2015-16 (in ` crore)	2016-17(in ` crore)	2017-18(in ` crore)

12	Orders received and executed by the bidder	Organisation 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

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 Clause IB.3.4 of the RFP stipulates that the Bidders qualifying on the strength of a Bidding Consortium shall submit a legally enforceable Consortium Agreement in a format specified in the 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 RFP issued by WBSEDCL including signing and submission of the Bid and all documents related to the Bid as specified in the RFP, including but not limited to undertakings, letters, certificates, acceptances, clarifications, guarantees or any other document, which WBSEDCL may require us to submit. The aforesaid attorney is further authorized for making representations to WBSEDCL named in the RFP, and providing information / responses to WBSEDCL, representing us and the Consortium in all matters before WBSEDCL named in the RFP, and generally dealing with WBSEDCL named in the RFP in all matters in connection with our Bid, till completion of the bidding process as well as implementation of the Project, if applicable, in accordance with the RFP.

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

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

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

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

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

Accepted
…… (Signature of Attorney)
[Insert Name, designation and address of the Attorney]
Attested
……..
(Signature of the executant)
(Name, designation and address of the executant)
…….
Signature and stamp of Notary of the place of execution

Common seal of …… has been affixed in my/our presence pursuant to Board of Director's Resolution dated……
WITNESS:
1. ……. (Signature)
Name …….
Designation.....……..
2. ……. (Signature)
Name ……
Designation.....……..

Notes

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

b. In the event, power of attorney has been executed outside India, the same needs to be duly notarized by a notary public of the jurisdiction where it is executed.

c. Also, wherever required, the executant(s) should submit for verification the extract of the charter documents and documents such as a Board resolution / power of attorney, in favour of the person executing this power of attorney for delegation of power hereunder on behalf of the executant(s).

ANNEXURE-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 AMI Implementing Agency for Implementation of AMI 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 Appointment of AMI Implementing Agency for Implementation of AMI Project.
Ref: ……..[Tender Details]
Dear Sir/ Madam,

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

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

The details of contact person are furnished as under:

Name :
Designation :
Name of the Company :
Address :
Phone Nos. :
Fax Nos. :
E-mail address :

Dated the ……. day of ……. of 20……
Thanking you,
Yours faithfully,
……..
[Signature, Name, Designation of Authorized Signatory of Consortium Member and Company's Seal]

Business Address:
[Name and address of principal officer]

ANNEXURE-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 Bid Cloud based End to End Advance Metering Infrastructure (AMI) Solution for all RLI connections, Consumers having Connected Load 5 KVA to 50 KVA with all DTR Meters at WBSEDCL.

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.....2019

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: SERVICE LEVEL AGREEMENT (SLA) and INCENTIVE CONTRACT FORMAT

Service Level Agreement (SLA) & Incentive: SLA and Incentive will be calculated on average basis against all consumer meter and DT meter under scope of this project.

Sl No	SLA Parameters	SLA Deductions	Submitted Yes/No
1	**During installation and commissioning period** Upto 24 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**	
2	**After installation and commissioning period (**Beyond 24 months (T1) from the date of issuance of LoA).		
For Consumer Meter: (2.1.1 to 2.1.6)			
2.1.1	Vendor will have to ensure 100% billing data either through AMI or through CMRI uploading.	**Deduction of 2% of the billed amount will be done for every 1% non availability of billing data.** (e.g: for 98% of total billing data availability 4% deduction of bill amount will be done)	
2.1.2	Upto **90%** availability of AMI billing data and upto **10%** CMRI data.	No Deductions	
2.1.3	Then after every reduction in AMI billing data by 1%. This will continue upto **75%** of data availability	**Deduction of 3% of the billed amount will be done.** (e.g: for 80% AMI billing data availability 30% deduction of bill amount will be done)	
2.1.4	Less than **75%** availability of AMI billing data	**No amount will be paid.**	
2.1.5	Remote Re-connection and Dis-connection (within 10 minutes from action performed).		
2.1.6	Then after every failure of remote disconnection or reconnection	Rs. 100 per meter per failed reconnection/ disconnection	
For DT Meter: (2.2.1 to 2.2.4)			
2.2.1	Vendor will have to ensure 100% Consumption data either through AMI or through CMRI uploading.	**Deduction of 2% of the billed amount will be done for every 1% non availability of billing data.** (e.g: for 98% of total billing data availability 4% deduction of bill amount will be done)	
2.2.2	Upto **85%** availability of AMI consumption data and upto **15%** CMRI data.	No Deductions	
2.2.3	Then after every reduction in AMI consumption data by 1%. This will continue upto **70%** of data availability.	**Deduction of 3% of the billed amount will be done.** (e.g: for 75% AMI billing data availability 30% deduction of bill amount will be done)	
2.2.4	Less than **70%** availability of in AMI billing data	**No amount will be paid.**	

3	Availability of analytical data (**SW.17.5.1 &** Table – Sl. no: 2-6 considered as analytical data)		
3.1	85% availability of analytical data	No deduction	
3.2	Then after non availability of analytical data	Rs. 10 per meter per day	
4	Non availability of consumer portal beyond 2 days in MONTH for whatsoever reason, till the time services are restored.	1000/- per hour	
5	Non-returning of data to WBSEDCL on termination of contract or violating of exit clause.	5% of total contract value. In addition, suitable legal action.	
6	**Incentive Scheme against outstanding performance of AMI monthly data for Consumer and DT meter**		
	Incentive Parameters	**Incentive Award**	**Submitted Yes/No**
6.1	**During installation and commissioning period** Upto 24 months from the date of issuance of LoA	No incentive.	
6.2	Availability of AMI monthly billing data for consumer meter as well as DT meter greater than 93% and upto 95%.	1% of the billed amount will be awarded as incentive.	
6.3	Availability of AMI monthly billing data for consumer meter as well as DT meter greater than 95%.	2% of the billed amount will be awarded as incentive.	

ANNEXURE-VIII: Data Requirement Sheet

(A) Single Phase Whole Current Smart Meter

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
1.	Applicable Standards	The meters shall comply with IS 16444 for all requirements. Those parameters which are not covered in IS 16444 have been specifically mentioned in this specification.	
2.	Reference Voltage	As per IS 16444	
3.	Current Rating	Rating (5-30) A	
4.	Starting Current	As per IS 16444	
5.	Accuracy	Class 1.0 as per IS 16444	
6.	Limits of error	As per IS 16444	
7.	Operating Temperature range	As per IS 16444	
8.	Humidity	As per IS 16444	
9.	Frequency	As per IS 16444	
10.	Influence Quantities	As per IS 16444	
11.	Power Consumption of meter	As per IS 16444	
12.	Current and Voltage Circuit	As per IS 16444	
13.	Running at No Load	As per IS 16444	
14.	Test output device	As per IS 16444	
15.	Meter Display	As per IS 16444	
16.	Name Plate & marking Meter Display	As per TS.3.21	
17.	Parameters to be measured (For Net meter both import & export parameter)	As per IS 16444 / As per IS 15959 Part-2	
18.	Maximum Demand resetting	Meter should continuously monitor and calculate the average maximum demand for each demand interval time of 30 minutes and maximum of these in a calendar month should be stored along with date and time when it occurred. The maximum demand should automatically reset at 24:00 hrs. of the last date or 00:00 hrs. of the first date of each calendar month and the corresponding value along with date/time stamp shall be transferred to Billing (History) registers. The integration period should be set as 30 minutes/ 15	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		minutes, on real-time basis. The billing purpose parameters (active forwarded energy, maximum demand in kW) along with recharge amount Rs., Consumption amount Rs. And KWH for prepaid should be recorded and should be available in Bill (History) for a	
19.	Time of Use registers	As per TS.3.16	
20.	Power Quality Information	As per IS 15959 part 2	
21.	LED/LCD Indicators	As per IS 16444	
22.	Load	As per IS 15959 part 2	
23.	Survey/Interval Data	As per IS 16444	
24.	Tamper/ Event Recording	As per IS 15959 part 2	
25.	Measuring Elements	As per IS 16444	
26.	Alarm	As per IS 16444/ 15959 Part 2	
27.	Load Control	As per IS 16444	
28.	Connect/Disconnect and status of load switch	As per IS 16444	
29.	Programmability	As per IS 16444	
30.	Communication	As per IS 16444.	
31.	Communication Protocol	As per IS 16444	
32.	Remote Firmware upgrade	As per IS 15959 part 2	
33.	Real Time Clock (RTC)	As per IS 16444/ IS 15884 The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following: • From remote server through suitable communication network. • CMRI	
34.	Data Retention	As per TS.3.0	
35.	Battery Backup	Meter shall be supplied with separate battery backup for RTC.	
36.	First Breath (power on) and Last gasp (power off) condition detection and communication to HES	As per IS 16444	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
37.	Data Display Facility (Manual/ Automatic)	Data Display shall be in three modes- • Auto Display mode • Push Button mode • Engineering mode All display sequence as per TS.3.14 The meter should have the provision of providing the display of billing parameters (Auto Display) in absence of main supply. Press of push button should activate the display to facilitate hands free meter reading with auto-off. (As per TS.3.20)	
38.	Anti-Tamper Features	The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2. And TS.3.12	

(B) Three Phase Whole Current Smart Meter:

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
1.	Applicable Standards	The meters shall comply with IS 16444 for all requirements. Those parameters which are not covered in IS 16444 have been specifically mentioned in this specification.	
2.	Reference Voltage	As per IS 16444	
3.	Current Rating	Rating (20-100) A, (5-30) A and (10-60) A	
4.	Starting Current	As per IS 16444	
5.	Accuracy	Class 1.0 as per IS 16444	
6.	Limits of error	As per IS 16444	
7.	Operating Temperature range	As per IS 16444	
8.	Humidity	As per IS 16444	
9.	Frequency	As per IS 16444	
10.	Influence Quantities	As per IS 16444	
11.	Power Consumption of meter	As per IS 16444	
12.	Current and Voltage Circuit	As per IS 16444	
13.	Running at No Load	As per IS 16444	
14.	Test output device	As per IS 16444	
15.	Meter Display	As per IS 16444	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
16.	Name Plate & marking Meter Display	As per TS.5.21	
17.	Parameters to be measured (For Net meter both import & export parameter)	As per IS 16444 / As per IS 15959 Part-2	
18.	Maximum Demand resetting	As per TS.5.15	
19.	Time of Use registers	As per TS.5.16	
20.	Power Quality Information	As per IS 15959 part 2	
21.	LED/LCD Indicators	As per IS 16444	
22.	Load Survey/Interval Data	As per IS 15959 part 2	
23.	Tamper/ Event Recording	As per IS 15959 part 2	
24.	MeasuringElements	As per IS 16444	
25.	Alarm	As per IS 16444/ 15959 Part 2	
26.	Load Control	As per IS 16444	
27.	Connect/Disconnect and status of load switch	As per IS 16444	
28.	Programmability	As per IS 16444	
29.	Communication	As per IS 16444.	
30.	Communication Protocol	As per IS 16444	
31.	Remote Firmware upgrade	As per IS 15959 part 2	
32.	Real Time Clock (RTC)	As per IS 16444/ IS 15884 The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following: • From remote server through suitable communication network. • CMRI	
33.	Data Retention	As per TS.5.0	
34.	Battery Backup	Meter shall be supplied with separate battery backup for RTC.	
35.	First Breath (power on) and Last gasp	As per IS 16444	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	(power off) condition detection and communication to HES		
36.	Data Display Facility (Manual/ Automatic)	Data Display shall be in three modes- • Auto Display mode • Push Button mode • Engineering mode All display sequence as per TS.5.14 The meter should have the provision of providing the display of billing parameters (Auto Display) in absence of main supply. Press of push button should activate the display to facilitate hands free meter reading with auto-off. (As per TS.3.20)	
37.	Anti-Tamper Features	The meter shall continue recording energy under any tamper condition and would log the event and send alarm at Head End System after detection of the defined theft features as per IS 15959 Part 2. And TS.5.12	

(C) Three Phase CT Operated Smart Meter:

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
1.	Standard Applicable	IS 14697, IS 15959, CBIP 325, IS16444(Part 2)	
2.	Accuracy/Interface class	0.5S	
3.	Parameters displayed	As per Specification	
4.	P.F. Range	Zero lag – unity – Zero Lead	
5.	Basic Current (Ib) (-/5A)	-/5A	
6.	Maximum Current (Imax)	10A	
7.	Minimum starting current	0.1% of I-basic	
8.	Rated Voltage	415 V : Phase to Phase, 240 V : Phase to Neutral	
9.	Meter Constant	To be specified by the Bidder	
10.	Variation of voltage at which meter functions normally	70% to 120% of reference Voltage	
11.	Rated Frequency	50Hz±5%	
12.	Power Loss in Voltage circuit (VA & watt) &	Voltage Circuit :- Will not exceed 1.5W and 10VA per phase	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Current circuits (VA)	Current Circuit:- Will not exceed 1.0 VA per phase	
13.	Dynamic range	As per IS 14697	
14.	MD reset Provisions	Possible to reset MD by any of the following options:- 1. Remote MD reset 2. Manual MD reset 3. MD reset by HHU 4. Auto Monthly Reset	
15.	Display: a) Type of register b) No. of digit of display and height of character c) Auto display mode & scroll mode d) Type of push button for scroll mode	Display will be e) LCD f) 7 digit 7 segment, height- 10x5mm g) As per approved sample h) Spring loaded push button	
16.	Non-volatile memory	To be provided as per Specification	
17.	Details of provision for taking reading during power off condition	Through internal non-rechargeable battery	
18.	Principle of operation	As per technical Specification	
19.	MD integration period	15 minutes	
20.	Weight of meter	To be specified by the Bidder	
21.	Dimensions	To be specified by the Bidder	
22.	Warranty	10 years from the date of supply	
23.	Outline drawings & leaflets	To be provided by the Bidder	
24.	h) Remote Communication (Bi-directional)	NIC Card	
	i) Communication protocol used	DLMS	
	j) Sealing provision for meter & optical port	To be provided as per Specification	
	k) Baud rate of data transmission	9600 bps	
	l) Required software to be resident in CMRI and BCS	To be provided by the Bidder	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	m) Ultrasonic welding of body or any other technology which is equally or more efficacious	To be provided	
	n) Manufacture Seal	To be provided	
25.	Base Computer software	Compatible with windows 7 or above.	
26.	Type test certificates	To be provided by the Bidder	
27.	Time of day zones (selectable)	3 TOD Zones to be provided with a provision for 8 TOD Zones	
28.	Whether meter measures both fundamental & harmonic energy	As per Specification	
29.	Real time clock accuracy	Maximum drift ± 5 Minutes per annum.	
30.	RTC & time synchronization	Meter shall have RTC with 20 years calendar programmed in the memory and provision for time synchronization. The clock day/date setting and synchronization shall only be possible through password/Key code command from one of the following: • Hand Held Unit (HHU) or Meter testing work bench and this shall need password enabling for meter • From remote server through suitable communication network	
31.	Battery for real time clock	It shall be Lithium-ion / Lithium battery having at least 10 years of life	
32.	Anti tamper features	As per Tamper logic provided by WBSEDCL.	
33.	Programmability	It should be possible to program the parameters limits /values from remote through adequate security mechanism. Once programmed it will be possible for the programmed parameters to come into effect from a certain date & time. Meteorology under such condition must remain intact and shall not be upgradable from remote.	
34.	Effect of accuracy under tamper conditions	As per technical specification	
35.	Remote Firmware Upgrade	The meter shall support remote firmware	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		upgrades as well remote configuration in order to remotely add new features and functions to meters without having to send person to field in secure manner.	
36.	Drift in accuracy of measurement with time	As per IS: 14697 & CBIP 325.	
37.	Name plate details	As per specification	
38.	Type of calibration	Software calibrated	
39.	Type of mounting	Projection mounting	
40.	Testing facility	Shall be available with manufacturer, details to be provided	
41.	Data retention by NVM without battery backup and un-powered condition	As per specification	
42.	Type of material used:		
a.	Base	As per specification	
b.	Cover	As per specification	
c.	Terminal block	As per specification	
d.	Terminal cover	As per specification	
43.	Screw		
	i. Material	As per specification	
	v. Size	As per specification	
44.	Internal diameter of terminal hole	5.5mm	
45.	Centre to centre clearances between adjacent terminals	As per IS: 14697	

(D) Communication Network and Equipments:

Sl. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
1.	**General Requirements**	• The communication network shall have dynamic & self-healing capability. If one of the communication elements like router or access point fails then nodes connecting to that element shall switch to best available element for communication of data to HES. • It shall support IPv4 and IPv6 network	

Sl. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		addressing. • Each node shall keep a track of best available nearby nodes. • The communication network (in case of RF) shall use Unlicensed frequency band as permitted by WPC. • All the communication network equipment shall be certified by WPC, Government of India for operation in license free frequency band. • Suitable network management system (NMS) shall be available to monitor the performance of the communication network round the clock. The NMS shall provide viewing of all the networking elements deployed at site and enable configuration, parameterization of the networking devices and the nodes. • It shall support remote firmware 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 auditors. • The communication network shall ensure secure communication of data to HES. • The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP- 55). A suitable mounting provision shall be made for the equipment. • Enclosure: Provision for security sealing shall be provided and in case the gasket	

Sl. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material. • The list of standards followed in all the devices/equipment used in communication network shall be furnished.	

(E) Data Concentrator Unit (DCU):

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Configuration, Functionality & Interface	• It shall be able to configure the communication with underlying nodes/meters. • It shall pull data from the field devices and push the data at configured intervals to the HES. It should also support the HES in pulling data from the field devises/meters. The data acquisition (Push/Pull) frequency shall be programmable. DCU shall be capable to prioritize control commands. • DCU shall ensure a secure communication to HES and shall have internal memory for storing interval data for at least 5 days. • DCU shall support on demand read and ping of individual/group of meters. • It shall support IPv4 and IPv6 network addressing. • DCU shall push events like tamper, power off etc. to HES immediately on occurrence/receipt from field devices/meters. • The equipment shall be weatherproof, dustproof and constructed for outdoor installation on poles (minimum rating: IP- 55). A suitable mounting provision	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		shall be made for the equipment. • Enclosure: Provision for security sealing shall be provided and in case the gasket of the cover is used for protection against moisture, dust and insects, the gasket shall be made of weather and aging resistant material.	
	Communication	• The communication architecture shall be any, as defined under IS 16444. • The DCU shall ensure the appropriate backhaul for secure transfer of data to HES either via GPRS 3G/4G or Fiber Optic communication. In case of GPRS/3G/4G backhaul, it shall support SIM card with dynamic IP from any service provider. It shall have Wide Area Network (WAN) connectivity to the HES through suitable means. • DCU shall be able to communicate with meters either on RF mesh (Unlicensed frequency band as permitted by WPC) or PLC. • DCU shall periodically monitor meter reads/downstream commands and shall retry and reconnect in case of failed events/reads. • It shall push events like tamper, power off etc. to HES immediately on occurrence/ receipt from field devices/meters. DCU shall be able to acquire and send data to HES for full capacity (as per designed for no. of meters/ field devices) to ensure the performance level. Full capacity of DCU is required to be indicated in the offer. • After Power Interruption, on restoration of power supply, DCU shall establish communication with underlying devices as well as upstream application	

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

(F) Head End System:

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/ DCU 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.	
	Functionality & Interface	• It will support self-discovery and self-registry functionality to detect and register meters within 60 minutes of meter connection. • Acquisition of meter data on demand & at user selectable periodicity • Audit trail and Event & Alarm Logging • Store raw data for defined duration (minimum 3 days) • Handling of Control signals / event messages on priority	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		• Setting of Smart meter configurable parameters • Communication device status and history • Maintain time sync with DCU / 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.	

(G) Meter Data Management System:

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	General requirement,	• The MDM solution must be named in Gartner's Magic Quadrant for Meter Data Management (MDM) Products (For the year 2016 to 2018). MDM should be capable enough to integrate at least 3 types of HES and should be scalable enough to fit for at least 20,00,000 no smart meters.	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	Functionality & Interface	• System shall support storage, archiving, retrieval & analysis of meter data • It shall act as a central data repository with interactive dashboard. • MDM shall have capability to import raw or validated data in defined formats and export the processed and validated data to various other systems sources • support the integration of other smart grid functionalities like consumer Information system, customer care, Network planning & analysis, load analysis/forecasting, Peak Load Management, Outage management, Distribution Transformer Health Monitoring system, self-healing system etc. as and when implemented by utility. • It Support data purging and archiving. • Handle special metering configurations like net metering/pre-paid metering/multiple meters at same premises. • The MDM shall have the ability to manage at a minimum 15 minute interval data • It shall have asset management features and functionalities as per bid document. • Support all functionalities specified in VEE (Data Validation, Estimation, and Editing) • Support Billing Determinants Calculations • Revenue protection support	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		• All analytics specified in Bid document • All reporting specified in the document also export report in all suitable formats (PDF, text, CSV etc.) • User interface for utility users with all functionalities specified in this document.	
	Integration	• Integration with other systems shall include but not be limited to the following: Utility Administration, HES for data exchange with AMI solutions, Billing and collection system like Base Computing System (BCS), Existing other Data Collection Systems, Support of interface with HHU or manual reading system etc., Consumer Portal. • MDM shall have standard interfaces, and the data exchange models and interfaces shall comply with CIM / XML / IEC 61968/ MultiSpeak / IS15959. MDM solution shall be Service Oriented Architecture (SOA) enabled. • Support integration with all other external system, 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. • Providing middleware software that will be used for overall integration and will undertake any future integration between applications. The integration middleware shall be based on Service Oriented Architecture (SOA) and shall use publish / subscribe mechanism with visual mapping points.	

(H) Cloud Infrastructure:

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
	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.	
	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). • CSP is having public facing services in a zone (DMZ) different from the application services. The Database nodes (RDBMS) should be in a	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		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	
	Disaster Recovery Management	• RPO should be less than 1 hours and RTO shall be less than 12 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.	
	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	

S. No.	Description of the Features	Minimum Requirement of Features	As per Bidder Offering
		provisioned 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 on quarterly basis	

ANNEXURE-IX: 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-X: 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:	
15	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-XI: 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-XII: PROFORMA OF DECLARATION OF BLACK LISTING/HOLIDAY LISTING

Reference: Tender Notice No. WBSEDCL/IT & C / 33.10 (iv)/1402, dtd.20.02.2019.

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-XIII: PROFORMA OF DECLARATION REGARDING ABANDONMENT OR RESCISSION OF WORK

Reference: Tender Notice No. WBSEDCL/IT & C /33.10 (iv)/1402, dtd.20.02.2019.

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-XIV: 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 Cloud based End to End Advance Metering Infrastructure (AMI) Solution for all RLI consumers, Consumers having Connected Load 5 KVA to 50 KVA with all DTR 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-XV: 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)	(Signature)
_____	_____
(Name)	(Name)
_____	_____
(Official address)	(Designation with Bank Stamp)
	_____
	Attorney as per Power of
	Attorney No._____
	Date_____

ANNEXURE-XVI: INSTALLATION AND COMMISSIONING CONFIRMATION CERTIFICATE FORMAT

Installation Certificate Of DTR Smart Meter (A)

Ref LoA No:
Date of Installation:
Name of Division:

Sl No	CCC Name	DTR ID/ DTR Painting Code	DTR Meter No.	DTR Capacity	DTR Site Address	Installed CT PT	The Smart Meter is installed in the circuit and and DTR 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 DTR Meter (B)

Ref LoA No:
Date of Installation:
Name of Division:

Sl No	CCC Name	DTR ID/ DTR Painting Code	DTR Meter No.	The Smart Meter is installed at the DTR with necessary SIM card / RF retrofit with seal accordingly.	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 of Consumer Meter (C)

Ref LoA No:
Date of Installation:
Name of Division:

Sl No	CCC Name	Consumer No / Installation No. / Con ID	Meter No.	The Smart Meter is installed at the Consumer premises with necessary SIM card / RF retrofit with cover box and seal accordingly.	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 (D)

Ref LoA No:

Date of Installation :

Name of Division :

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 Web application		

Signature of Successful Bidder's Representative
With Designation and Stamp

Signature of Site Officer, WBSEDCL
Designation with stamp

ANNEXURE X: FORMAT OF THE PERFORMANCE CERTIFICATE

Performance Certificate on DTR Meter Monthly Reading Data (A)

Ref LoA No:
Name of Division:
For the Month:
Year:

Sl No	Name of CCC	No. of DTR (A)	No. of DTR fitted with Smart meters (B)	% of DTR fitted with Smart meters (C)=A /B*100	No. of DTR having WBSEDCL issue (like DTR not accessible, disconnected premises etc.) (D)	Actual no of billable DTR (E) = (A) – (D)	No. of DTR reading through AMI (F)	**% of DTR billed through AMI (G) = F/E*100**	No. of DTR. reading through CMRI (H)	**% of reading billed by CMRI reading (I) = (H)/E*100**	Remarks
1											
2											
3											
: :											
N											
Weighted average percentage for the division											

NB: One consolidated performance certificate covering billed % against total no. DTR under scope of this project are to be calculated as per SLA reference.
The load survey, tamper information etc. can be viewed as per requirement through MDM from desktop.

`The defined reports available can be generated without any issue using the application.

Performance Certificate on Consumer Meter Monthly Billing Data (B)

Ref LoA No:
Name of Division:
For the Month:
Year:

Sl No	Name of CCC	No. of RLO consumers and consumers having connected load between 5 kva and 50 kva(A)	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: One consolidated performance certificate covering billed % against total no. Consumer under scope of this project are to be calculated as per SLA reference.
The load survey, tamper information etc. can be viewed as per requirement through MDM from desktop.

`The defined reports available can be generated without any issue using the application.

Performance Certificate on Consumer Meter Remote DC-RC (C)

Ref LoA No:
Name of Division:
For the Month:
Year:

Sl No	Name of CCC	Remote Disconnection			Remote Reconnection			Remarks
		No of Smart Meters where Disconnection Attempted (A)	Disconnection Successfully Done (within 10 minutes from action performed) (B)	Total Failed nos. of Disconnection (C)	No of Smart Meters where Reconnection Attempted (E)	Reconnection Successfully Done (within 10 minutes from action performed) (F)	Total Failed nos. of Reconnection (G)	
1								
2								
3								
: :								
N								
Total No. of Failed Remote Disconnection					Total No. of Failed Remote Reconnection			

NB: Above total failed Remote Disconnection & Reconnection attempted are calculated as per SLA reference.
The defined reports available can be generated without any issue using the application.

Performance Certificate on Analytical Data (D)

Ref LoA No:
Name of Division:
For the Month:
Year:

Sl No.	Name Of CCC	Total No. Of consumer under scope of AMI (A)	Availability of all analytical data for no. Of Smart Meters							Percentage % of Availability (C) = ((B)/ ((A) X No. Of Days)) X 100	Remarks
			1	2	3	4	.. ..	End Day of the month	Total No of Data (B)		
1											
2											
3											
:											
N											
Total											

NB: Above availability of analytical data percentages are calculated as per SLA reference. The defined reports available can be generated without any issue using the application.

ANNEXURE-XVIII: 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-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