

# Schedule of Requirements

## Part-A Delivery /Completion Period

The delivery schedule expressed as weeks/months stipulates hereafter a delivery date which is the date of delivery and delivery period will commence from the date of signing of contract agreement/issuance of Purchase Order.

“Free delivery at consignee stores, i.e. Rawalpindi, Islamabad, Rajjar & Wah”

| Tender No. | Item Description                                              | Lot # | Qty (No.) | Date of Opening                                                                                           | Delivery Schedule                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------|---------------------------------------------------------------|-------|-----------|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16         | Single Phase AMI Meter with GPRS (2G/4G) Communication module | I     | 58333     | E-bids will be received till 28.09.2026 up to 10:30 A.M and will be opened at 11:00 A.M on the same date. | <p>“For local bidders, 19445 No. within 60 days, 19444 No. within 90 days &amp; balance 19444 No. quantity within 120 days from the date of issuance of P.O, having valid prototype approval and interoperability certificate of offered type meter”</p> <p>“For foreign bidders, full quantity within 120 days from the date of issuance of P.O, having valid prototype /type test approval and interoperability certificate of offered type meter”</p> <p>“Otherwise full quantity within 150 days from the date of issuance of P.O, for bidder(local / foreign) inclusive of interoperability and prototype/type test approval”</p> |
|            |                                                               | II    | 58333     |                                                                                                           | <p>“For local bidders, 19445 No. within 60 days, 19444 No. within 90 days &amp; balance 19444 No. quantity within 120 days from the date of issuance of P.O, having valid prototype approval and interoperability certificate of offered type meter”</p> <p>“For foreign bidders, full quantity within 120 days from the date of issuance of P.O, having valid prototype /type test approval and interoperability certificate of offered type meter”</p> <p>“Otherwise full quantity within 150 days from the date of issuance of P.O, for bidder(local / foreign) inclusive of interoperability and prototype/type test approval”</p> |
|            |                                                               | III   | 58334     |                                                                                                           | <p>“For local bidders, 19445 No. within 60 days, 19445 No. within 90 days &amp; balance 19444 No. quantity within 120 days from the date of issuance of P.O, having valid prototype approval and interoperability certificate of offered type meter”</p> <p>“For foreign bidders, full quantity within 120 days from the date of issuance of P.O, having valid prototype /type test approval and interoperability certificate of offered type meter”</p> <p>“Otherwise full quantity within 150 days from the date of issuance of P.O, for bidder(local / foreign) inclusive of interoperability and prototype/type test approval”</p> |

**Note: -** Sample of each item must be provided by successful bidder. Award of tender will be subject to passing the compatibility / interoperability test and issuance of certificate.

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### Domestic Preference:

A margin of preference shall be granted to domestic Manufacturer, in accordance with SRO. 827 (I)/2001 dated 03.12.2001, and subject to, the following provisions:

- a) Bidder applying for such preference shall provide, as part of the data for qualification, such information, including percentage of value addition during manufacturing of indigenous product in Pakistan and dedicated bonafide local manufacturer certificate of value addition according to IESCO's AMI Meters Specification for relevant type of meter from Engineering Development Board (EDB) shall be required to determine whether, according to the classification established by the Procuring agency/Employer, a particular manufacturer or group of manufacturers qualifies for a domestic preference.
- b) After bids have been received and reviewed by the Procuring agency/Employer, responsive bids shall be classified into the following groups:
  - (i). Group A: bidders eligible for the domestic preference as under:
    - a) Determined value addition by EDB and provided certificate.
  - (ii). Group B: other bidders.
- c) All evaluated bids in each group shall, as a first evaluation step, be compared to determine the most advantageous bid, and the most advantageous bids in each group shall be further compared with each other. If, as a result of this comparison, a bid from Group-A is the most advantageous, it shall be selected for the award. If a bid from Group-B is the most advantageous, as a second evaluation step, all bids from Group-B shall then be further compared with the most advantageous bid from Group-A. For the purpose of this further comparison only, the percentage of price preference of the respective bid price corrected for arithmetical errors, shall be added to the evaluated price offered in each bid from Group-B DDP cost. If the bid from Group-A is the most advantageous, it shall be selected for award. If not, the most advantageous bid from Group-B based on the first evaluation step shall be awarded the contract.

### Note:

Notwithstanding above, lowest bidder from group-A who possesses Dedicated Bonafide Local Manufacturer Certificate of Value Addition according to IESCO's AMI Meters Specification for relevant type of meter from Engineering Development Board, will be considered for price preference against group-B's lowest bidder. In case of non possession of the EDB Certificate by lowest bidder of group A, no preference will be given. Moreover, second lowest Bidder and then third lowest Bidder and so on from group-A, if possessing the EDB Certificate, will be considered for price preference and for ultimate determination of most advantageous bid of this tender for subsequent award of contract. Price preference is not to be accorded in monetary/ value terms but is intended solely as a reference tool to prepare comparative statements for evaluation of bids, thereby ensuring the first right of refusal to local firms without burdening the public exchequer.

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## Terms of Reference (TOR) for Procurement of Single Phase AMI Energy Meters

The Islamabad Electric Supply Company (IESCO) intends to procure **Single Phase-2 Wire Whole Current AMI Energy Meters with GPRS communication modules** through an open competitive bidding process under PPRA rules. The meters shall comply with the technical specifications provided in the attached document and must be interoperable with IESCO's existing Advanced Metering Infrastructure (AMI) system.

The supplier shall:

- Manufacture, supply, and deliver **Single Phase AMI Energy Meters** as per the IESCO AMI technical specifications (attached).
- Ensure compatibility with IESCO's DCU and Head-End System (HES).
- Provide necessary accessories (connection sleeves, nuts, bolts, etc.). Design of sleeve, nuts and bolts are available in specification.
- Offer **warranty and after-sales support** : 2 years from the date of delivery.
- Clause-11 of specification may be read as "Procedure of inspection for Manufacturers regarding Routine, Sample and Type Tests as per requirements of IEC standards".
- **Conduct testing Fat/Type Test** (in case of foreign manufacturer) at the manufacturer's works to be witnessed by two (02) IESCO Engineers to be nominated by Chief Engineer (MM) IESCO at manufacturer/bidder's expense @ 250 USD dollar per day for foreign inspection and provide test reports as specified in Specification. Bidder will arrange FAT and bear all charges of testing arrangement and other related expenses in case of foreign or local inspection. Foreign Manufacturer will have to deposit 0.5% of the cost of the material in favor of CEO IESCO along with the inspection call to the Chief Engineer (MM) IESCO Islamabad.
- IESCO will conduct Stage inspection of offered Energy Meters at Manufacturer's Cost in order to ascertain the quality control, value addition and manufacturing facility of local manufacturer.
- In case meter manufactured locally than FAT will be local and if manufactured abroad, FAT will be abroad.
- In case of Local manufacturer, Inspection of the material will be carried out at manufacturer's works by Chief Engineer (MI) PPMC Lahore or his authorized representative(s) jointly with rep of IESCO. Notice in writing shall have to be given to Chief Engineer (MI) PPMC Lahore and IESCO (simultaneously) by you when the store against the order is ready for inspection. All reasonable facilities as provided in the specifications or followed by the Industry or Trade in General shall also have to be afforded to the Inspecting Officer/s by you at your expenses for carrying out Inspection. You will have to deposit 0.5%

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of the cost of the material along with the inspection call to the Chief Engineer (MI) PPMC Lahore.

- In case, offered energy meters are already interoperability qualified from M/s Schenzen KAIFA Technology Chengdu Co., Ltd China the bidder will submit certificate of qualified test with bid. Otherwise, successful bidder shall arrange interoperability test from IESCO AMI Lab or any other independent lab within delivery schedule and in this regard supplier will submit thirty (30) samples in case of PLC communication module and 6 samples in case of GPRS communication module or as per technical requirement, of the proposed electricity meter for the purpose of interoperability testing with IESCO's Advanced Metering Infrastructure (AMI) system. Upon contract signing or PO issuance, the successful bidder shall pay PKR 0.5 million as interoperability-testing charges for offered meter model, if interoperability test conducted in IESCO's Own Lab. In other case, interoperability test to be conducted by any other independent lab, the successful bidder will get the test conducted directly through any other independent lab as per IESCO AMI's system requirements on its own cost and expense.
- Following successful completion of the interoperability tests, the Lab shall issue a Compatibility Certificate, confirming the meter's interoperability with IESCO's AMI system. This certificate may be utilized by the bidder for future procurements, subject to the validity period specified in the certificate. The scope of interoperability testing at this stage shall be limited to verifying communication compatibility between the meter and the Data Concentrator Unit (DCU) (for PLC meters only) and Head-End System (HES).
- If sample submitted for testing at IESCO's Own AMI Lab and the same is failed to qualify the interoperability test, then bidder will be required to upgrade firmware and pay PKR 0.25 million as firmware up gradation charges for the next sample for each round upto maximum of three rounds including first round. If the Interoperability test fails third time, the firm will be considered Non-Responsive and bid/performance security will be fortified / enchased in favour of IESCO and the LOI/ Contract Agreement shall stand cancelled. Any further delay shall be on account of the Supplier / manufacturer and IESCO reserves the right to deduct the Liquidated Damages according to the relevant clause of the bidding documents/LOI/Purchase Order.
- Mechanical, environmental, and other performance-related tests are not included at this stage and shall instead be conducted during the Factory Acceptance Test (FAT), Pre-Shipment Inspection, and/or Type Testing stage(s), as applicable.
- The meter design should fulfill all functional requirements of Employer related to system interoperability and functions demanded. However, mechanical design can vary from provided specifications and if bidder has a different mechanical design available which fulfills functional and interoperability requirements as per

specification, the same will be considered for evaluation. Please review the table of requirements attached and it is informed that fulfilling mandatory requirements is necessary. However, alternates can be provided for desirable requirements as explained.

- Conduct Prototype/ type testing through the office of CE (TSW) IESCO, from a lab having standards as mentioned in specification and complete tests as per type test listed in specification which is attached with bid document. In case the offered meter is already having valid type testing, the report will be attached at time of bid submission otherwise bidder will provide undertaking to carry out fresh prototype testing without affecting the delivery period on bidder cost and arrangement to be duly witnessed by Two (02) IESCO engineers. Prototype approval can also be obtained from concerned directorate of PPMC or any other acceptable national or international IEC/IEEE registered lab. If bidder does not have a valid prototype approval, the same can be done after bid process without affecting the delivery schedule. If prototype is done by anyone other than PPMC, PPMC will not carry out witnessing of this proto-type testing and IESCO representatives will be nominated to witness and verify the same.
- Ensure interoperability of meter with Employer's mobile app as per IEC 62056-21.
- DLMS certification of meter model proposed to be supplied to Employer from DLMS UA. The supplied meters should also have DLMS certification license.
- Ensuring acceptance and incorporation of firmware upgrades as per Employer's requirement in future.
- Successful bidder will provide shipment file for meters to be supplied as per format provided in specification separately from routine file provided by manufacturers normally for procurement of meters. The shipment file shall be provided at least 15 days before delivery of meters.
- CIM specifications and companion specifications as per compatibility with IESCO system is attached with bid document. Bidders must follow the same to ensure interoperability with AMI system of IESCO.

# Technical Specifications

## Part-B Technical Specifications

The material must be as per IESCO AMI Specifications (Amended to date) attached.

Successful bidder will provide shipment file for meters to be supplied as per format provided in specification separately from routine file provided by manufacturers normally for procurement of meters. The shipment file shall be provided at least 15 days before delivery of meters.

Companion specifications as per compatibility with IESCO system is attached with bid document. Bidders must follow the same to ensure interoperability with AMI system of IESCO.

Successful bidder will provide samples for interoperability / compatibility tests and award of contract will be subject to issuance of certificate by Employer.

The meters must comply with the following key requirements:

### General Requirements

**Type:** Single-phase, 2-wire, whole current, bi-directional.

**Nominal Voltage:** 230V, 50Hz.

**Current Range:** 5(40)A.

**Accuracy:** Class 1 for active energy, Class 2 for reactive energy.

**Communication:** Support **GPRS (2G/4G)** (as per tender inquiry).

**Display:** 8-digit (minimum) LCD with auto, manual scroll and power down modes.

**Protection:** IP54-rated (suitable for outdoor use), tamper-proof, anti-magnetic interference.

**Lifespan:** ≥15 years.

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## **Functional Requirements**

**Measurement:** Active/Reactive energy, maximum demand, power factor.

**Tariff Management:** Support 4 tariffs, 24 time-of-use (TOU) slots.

**Load Profiles:** Energy, daily, Monthly and power quality load profiles.

**Anti-Tampering:** Detection of meter/terminal cover removal, magnetic tampering, DC injection, etc.

**Remote Control:** Relay for disconnection/reconnection via HES.

**Prepayment/Post payment Mode:** Configurable via HES.

**Compatibility with mobile app of Employer.**

**Other requirements as per IESCO AMI Specification.**

## **Communication & Security**

**Interfaces:** Optical port (IEC 62056-21), 4G/2G, or GPRS (2G/4G).

**Protocols:** DLMS/COSEM, TCP/IP, HDLC.

**Security:** AES-128 encryption, HLS (High-Level Security), role-based access control.

## **DRAWINGS/BROCHURE**

**Relevant documents / brochures of material showing the technical parameters / specification / make / origin / any other specific information are part of Tender Specification /Technical Requirement**

# Table of Requirements

Single Phase Whole Current Active/Reactive Smart Energy Meter

This document differentiates mandatory and desirable requirements for meter. Please read this document in conjunction with AMI specification and Companion specification provided.

### Main Technical Features

| Technical features                         | Description                                                                | Remarks                                                                                         | Bidders Description |
|--------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------|
| Connection type                            | Single-phase two-wire(1P2W), direct connection, Bi-directional measurement | Mandatory requirement                                                                           |                     |
| Measurement accuracy                       | Active power: Class 1<br>Reactive power: Class 2                           | Mandatory requirement. However, better than required is also acceptable.                        |                     |
| Nominal voltage (Un)                       | 230 V                                                                      | Mandatory requirement                                                                           |                     |
| Specified operating voltage range          | $0.7U_n \sim 1.2U_n$                                                       | Mandatory requirement                                                                           |                     |
| Extended operating voltage range           | $0.6U_n \sim 1.2U_n$                                                       | Mandatory requirement                                                                           |                     |
| Limit operating voltage range              | $0.4 U_n \sim 1.2U_n$                                                      | Mandatory requirement                                                                           |                     |
| Voltage failure bridging time              | 0.5 Seconds                                                                | Mandatory requirement                                                                           |                     |
| Voltage restoration function standby after | 5 Seconds                                                                  | Mandatory requirement                                                                           |                     |
| Current range                              | 5(40) A, $I_n=5A$ , $I_{max}=40A$                                          | $I_n$ could be 5/10 A, $I_{max}=40$ A or above                                                  |                     |
| Starting current                           | 0.004 $I_b$ for Active<br>0.005 $I_b$ for Reactive                         | Mandatory requirement                                                                           |                     |
| Frequency                                  | 50 Hz ( $\pm 2\%$ )                                                        | Mandatory requirement                                                                           |                     |
| Meter constant                             | 2000 imp. / kWh(kvarh)                                                     | Desirable. Bidder can propose any alternate meeting DDS, IEC and other international standards. |                     |
| Calibration interval                       | Meter life-time (15 years)                                                 | Mandatory requirement                                                                           |                     |

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| Technical features       | Description                                                                                                                                                     | Remarks                                                                                                                                                     | Bidders Description |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Power consumption        | Voltage circuit: $\leq 2 \text{ W} / 5 \text{ VA}$ for base meter without a module<br>Current circuit: $\leq 4 \text{ VA}$ per phase                            | Mandatory requirement                                                                                                                                       |                     |
| Short time over current  | 30 I <sub>max</sub> according to IEC for 0.01 sec                                                                                                               | Mandatory requirement                                                                                                                                       |                     |
| Withstand voltage        | 440V (max. 6 hours)                                                                                                                                             | Mandatory requirement                                                                                                                                       |                     |
| Display type             | Segment type LCD, 8 digits, Digit height: 9mm                                                                                                                   | 8 digits mandatory                                                                                                                                          |                     |
| Energy LED               | One LED for active energy, one for reactive energy                                                                                                              | Mandatory requirement                                                                                                                                       |                     |
| Status LED               | Refer to LED indicators chapter for the communication status indication.                                                                                        | Mandatory requirement                                                                                                                                       |                     |
| Display button           | Touch type button                                                                                                                                               | Mandatory requirement with suitable type of button.<br>If bidder can provide any alternate ensuring IP-54 outdoor compliance, the same will be acceptable.) |                     |
| Communication interfaces | IR: Service Interface, Infrared optical interface, 9600bps<br>4G/2G communication module or GPRS (2G/4G) communication module, replaceable communication module | Mandatory requirement                                                                                                                                       |                     |

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| Technical features              | Description                                                                                                                                                                                                                       | Remarks               | Bidders Description |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|
| Relay                           | Contact Rating: 40A<br>230Va.c<br>Maximum switching power: 15kVA<br>Maximum switching current: 60A<br>Maximum switching voltage: 276Va.c<br>Maximum overload current: 100A (up to 15minutes )<br>Electrical endurance: 10,000 ops | Mandatory requirement |                     |
| RTC                             | IEC 62054-21( $\leq \pm 0.5$ sec/ day, 230Vac, 23°C)                                                                                                                                                                              | Mandatory requirement |                     |
| Electrostatic discharge         | Contact discharge 8kV<br>Air discharge 15kV<br>Current and voltage circuits 4kV<br>Auxiliary circuits >40V 2KV<br>Events to be recorded as well                                                                                   | Mandatory requirement |                     |
| Fast transient burst            | 4kV                                                                                                                                                                                                                               | Mandatory requirement |                     |
| Surge immunity                  | 4kV                                                                                                                                                                                                                               | Mandatory requirement |                     |
| Electromagnetic RF fields       | Frequency range 80MHz to 2000MHz<br>With current 10V/m<br>Without current 30V/m                                                                                                                                                   | Mandatory requirement |                     |
| Conducted disturbance           | Frequency range 150kHz to 80MHz<br>Voltage level 10V                                                                                                                                                                              | Mandatory requirement |                     |
| Radio interference (peak value) | 30MHz-1GHz :<br>30 to 230 MHz $\leq 30$ dB( $\mu$ V)<br>230 to 1 000 MHz $\leq 37$ dB( $\mu$ V)                                                                                                                                   | Mandatory requirement |                     |
| AC voltage                      | 4kV: 50Hz for one minute                                                                                                                                                                                                          | Mandatory requirement |                     |
| Impulse voltage                 | 8kV: 1.2/50 $\mu$ s                                                                                                                                                                                                               | Mandatory requirement |                     |

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| Technical features                          | Description                                              | Remarks                                                | Bidders Description |
|---------------------------------------------|----------------------------------------------------------|--------------------------------------------------------|---------------------|
| Clearance(Min)                              | 3.5mm(HLV to HLV)/<br>5.5mm(HLV to SELV)                 | Desirable                                              |                     |
| Creepage(Min)                               | 6.50mm(HLV to HLV)/<br>10mm(HLV to SELV)                 | Desirable                                              |                     |
| Insulation resistance                       | $\geq 5 \text{ M}\Omega$                                 | Mandatory requirement                                  |                     |
| Reference temperature                       | 23°C                                                     | Mandatory requirement                                  |                     |
| Operating temperature range                 | -25°C ~ +70°C                                            | Mandatory requirement                                  |                     |
| Limit operating temperature range           | -25°C ~ +80°C                                            | Mandatory requirement                                  |                     |
| Temperature range for storage and transport | -25°C ~ +80°C                                            | Mandatory requirement                                  |                     |
| Relative Humidity                           | Up to 95%                                                | Mandatory requirement                                  |                     |
| Altitude                                    | Up to 1000 meter above sea level.                        | Mandatory requirement                                  |                     |
| Data retention                              | $\geq 15$ years                                          | Mandatory requirement                                  |                     |
| Lifetime                                    | $\geq 15$ years                                          | Mandatory requirement                                  |                     |
| Backup power supply                         | Internal battery, external battery slot                  | Mandatory requirement                                  |                     |
| Payment mode                                | Support post-payment and prepayment mode                 | Mandatory requirement                                  |                     |
| Protection class acc.                       | Class II                                                 | Mandatory requirement                                  |                     |
| Repeater function                           | Meter should act like a repeater for nearby other meters | Mandatory requirement in case of PLC meter procurement |                     |

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## Mechanical Design

Mechanical design is flexible and IESCO will accept any other mechanical design fulfilling DDS, IEC or any International standard fulfilling IESCO requirements. Any function defined in provided specifications should not be missing.

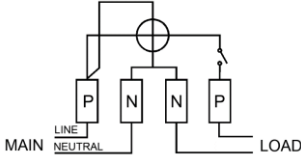
### Mechanical and other Features

| Mechanical and other features | Description                                                                                                                                                                                                                                                                                      | Remarks                                                                                                          | Bidders Description |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------|
| Ingress Protection            | IP 54 outdoor use                                                                                                                                                                                                                                                                                | Mandatory requirement                                                                                            |                     |
| Mounting                      | A Base triangle                                                                                                                                                                                                                                                                                  | Desirable. Bidder can propose other mounting arrangement also meeting DDS, IEC or other international standards. |                     |
| Meter Cover                   | UV-resistance, high impact-resistance and self-extinguishing polycarbonate (PC+10%GF)                                                                                                                                                                                                            | Mandatory requirement                                                                                            |                     |
| Meter cover color             | Grey                                                                                                                                                                                                                                                                                             | Desirable. Bidder can propose other also meeting DDS, IEC or other international standards.                      |                     |
| Terminals                     | brass with tin plated ( $\geq 5$ micron) and provide two Zinc-Nickel alloy plated ( $\geq 5$ micron) carbon steel M5 screws in each current terminal which are better protected against corrosion. The screw is at least 3 threads in the terminals. The screw head type is Philips and slotted. | Desirable. Bidder can propose alternate as per IEC, DDS or international standards                               |                     |
| Terminal diameter             | 7.2 $\pm$ 0.2mm                                                                                                                                                                                                                                                                                  | Mandatory (detailed description available in specifications) if using barrel type terminal design.               |                     |

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| Mechanical and other features | Description                                                                                                                                                                                                                                                                                                                                                       | Remarks               | Bidders Description |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------|
| Terminal cover                | <p>The terminal cover is made of UV-resistance, high impact-resistance and self-extinguishing polycarbonate (PC+10%GF) and suitable for cables incoming and outgoing vertically from the bottom, and have provision for security sealing. The connection diagram of the meters is shown on the terminal cover. The thickness of terminal cover is 2.5mm(±5%).</p> | Mandatory requirement |                     |

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| Mechanical and other features | Description                                                                                            | Remarks                                                                                                                                                             | Bidders Description |
|-------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Display Button                | The meter is equipped with one touch button for scrolling display.                                     | Button is mandatory with type suitable for IP 54 outdoor                                                                                                            |                     |
| External Battery slot         | The meter supports an external battery slot for CR2032 type, which is protected by the terminal cover. | Mandatory requirement. However, battery type can be proposed by bidder which should be common market item.                                                          |                     |
| Dimensions and weight         | The dimension of meter is L×W×H , the weight of meter is ≤1Kg                                          | Desirable. Bidder can propose alternate as per IEC, DDS or international standards                                                                                  |                     |
| Name plate                    | Completely defined in specification document                                                           | Mandatory requirement                                                                                                                                               |                     |
| Meter Serial number           | Method of allocating serial number defined in specification document                                   | Mandatory requirement. Successful bidder will get list of already allocated meter numbers from IESCO and will issue new meter numbers different from existing ones. |                     |
| Wiring diagram                |                     | Mandatory requirement                                                                                                                                               |                     |
| Sealing of meter              | Five security seals defined in specification document                                                  | Desirable. Bidder can propose alternate as per IEC, DDS or international standards                                                                                  |                     |

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| <b>Mechanical and other features</b>       | <b>Description</b>                                                                                                                                                    | <b>Remarks</b>                                                                                                              | <b>Bidders Description</b> |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Meter functions                            | Energy measurement, maximum demand measurement, cumulative maximum demand measurement and instantaneous parameters measurements are defined in specification document | Mandatory requirement. All functions should be available.                                                                   |                            |
| Real time clock                            | Details available in specification document                                                                                                                           | Mandatory requirement                                                                                                       |                            |
| Backup power supply                        | Required features defined in specification document                                                                                                                   | Mandatory requirement                                                                                                       |                            |
| Tariff                                     | Tariff structure defined in specification document                                                                                                                    | Mandatory requirement                                                                                                       |                            |
| Monthly Billing                            | Parameters and method of generating billing profile defined in specification document                                                                                 | Mandatory requirement                                                                                                       |                            |
| LED indicators                             | Three LED indicators as defined in specification document                                                                                                             | Mandatory requirement                                                                                                       |                            |
| LCD Display                                | Items to be displayed on LCD are defined in specification document                                                                                                    | Desirable. Bidder can propose alternate as per IEC, DDS or international standards                                          |                            |
| Display mode                               | Auto, manual and power down modes are defined in specification document                                                                                               | Mandatory requirement                                                                                                       |                            |
| Disconnection reasons and display messages | Details defined in specification document                                                                                                                             | Desirable. Bidder can propose alternate as per IEC, DDS or international standards. However, no function should be missing. |                            |
| Payment mode                               | Prepayment and post payment mode as per details in specification document                                                                                             | Mandatory requirement                                                                                                       |                            |

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| <b>Mechanical and other features</b> | <b>Description</b>                                                                                                                                 | <b>Remarks</b>        | <b>Bidders Description</b> |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------|
| Load profile status word             | Defined in specification document                                                                                                                  | Mandatory requirement |                            |
| Energy load profile                  | Configurable range: 5/10/15/30/60 minutes (Default 60 minutes). 5760(60 minutes, 240 days). Configurable for including or excluding any parameter. | Mandatory requirement |                            |
| Daily load profile                   | Configurable range: every 24 hours at 00:00 31(24 hours, 31 days) Configurable for including or excluding any parameter.                           | Mandatory requirement |                            |
| Power quality load profile           | Configurable range: 5/10/15/30/60 minutes (Default 60 minutes) 5760(60 minutes, 240 days) Configurable for including or excluding any parameter.   | Mandatory requirement |                            |
| Monthly profile                      | As per specification document                                                                                                                      | Mandatory requirement |                            |
| Relay control                        | As per specification document                                                                                                                      | Mandatory requirement |                            |
| Power limitation                     | As per specification document                                                                                                                      | Mandatory requirement |                            |
| Over current                         | As per specification document                                                                                                                      | Mandatory requirement |                            |
| Demand side management               | As per specification document                                                                                                                      | Mandatory requirement |                            |
| Export energy function               | As per specification document                                                                                                                      | Mandatory requirement |                            |
| Anti-tamper                          | As per specification document                                                                                                                      | Mandatory requirement |                            |
| DC immunity                          | As per specification document                                                                                                                      | Mandatory requirement |                            |

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| <b>Mechanical and other features</b>   | <b>Description</b>            | <b>Remarks</b>                                                                                                                               | <b>Bidders Description</b> |
|----------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Self-diagnostics and meter status word | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Instantaneous status word              | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Tamper status word                     | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Firmware upgrade                       | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Event logs                             | As per specification document | Mandatory requirement and meter should be configured in exactly same way                                                                     |                            |
| Communication interface                | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Optical port communication             | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Remote communication                   | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Security                               | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Keys                                   | As per specification document | Mandatory requirement                                                                                                                        |                            |
| Display item list                      | As per specification document | Mandatory requirement. Parameters defined in auto, manual and power down mode should be same as in specification and should be configurable. |                            |

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| <b>Mechanical and other features</b>                               | <b>Description</b>            | <b>Remarks</b>                                       | <b>Bidders Description</b> |
|--------------------------------------------------------------------|-------------------------------|------------------------------------------------------|----------------------------|
| Communication module                                               | As per specification document | Mandatory requirement. Mechanical design can change. |                            |
| Companion specification                                            | As per specification document | Mandatory requirement                                |                            |
| OBIS codes                                                         | As per specification document | Mandatory requirement                                |                            |
| Meter default configurations for event push or pull, displays etc. | As per specification document | Mandatory requirement                                |                            |

**Stamp & Signature of Bidder**