Ref No: IIT/ EE/SMART CITY/SMART METERS/2015/01

INVITATION FOR QUOTATIONS FOR SUPPLY OF THE FOLLOWING ITEMS REQUIRED FOR SMART CITY PILOT PROJECT AT IIT KANPUR

S.No.	Brief Description of the Goods	Specifications	Qty.	Delivery Period	Place of Delivery	Installation Requirement if any
1.	Smart meter (single phase, 5-60 A)	Mentioned below	20	2 months	Department of Electrical Engineering IIT Kanpur-208016	Installation will be done by another agency, whereas installation support services will be provided by the meter vendor.
2.	Smart meter (Three phase, 10 -100 A, CT operated)	Mentioned below	5			

1. SMART METERS (DETAILED SPECIFICATIONS OF SINGLE AND THREE PHASE SMART METERS)

The smart meters are to be provided with time of use (TOU) registers. There will be separate registers for the energy import and export so that, in addition to the net metering, the energy (real and reactive) import and export can visualized and analyzed separately With the addition of two way communications between the meter and the electricity distributor, the consumer will be provided the information about consumption pattern, time based tariff and alerts. This will enable the consumer to use the electricity in the preferred time so as to reduce the bill.

The smart meters shall meet the following minimum features:

1. Measure and compute electrical parameters.
2. The smart meter shall support bidirectional communication feature.
3. The smart meter shall support **demand side management, import, and export of power, individually as well as collectively.**
4. Store and communicate requested data as per programmed interval.
5. Detect and resolve abnormal and tamper events for a required period.
6. Inbuilt memory to store all relevant meter data and events for a required period.
7. Meter communication protocol shall be as per open standard mentioned IS/IEC codes.
8. Option for both prepaid and postpaid metering.
9. Shall be configurable remotely.
10. Interface to a Home display unit/tablet.
11. Support remote firmware upgrade.

12. Support remote load management.
13. The following groups of data shall be captured
a) Electrical Parameters.
b) Power quality parameters.
c) Abnormal events.
14. Load reconnect/ disconnect switch-requirements given below
- All smart meter shall have a supply Disconnect/ Reconnect switch/Contactor.
- The smart meter compatible for AMI system integration, shall support only remote disconnect/reconnect of consumer supply via the supply contactor with 1 relay,2 relay and 4 relay outputs.
- When the smart meter performs a disconnect operation, all outgoing circuits from the meter shall be disconnected.

15. The basic Technical Specification is tabulated below in Table 1:

Table: 1

Accuracy	Class1.0
StandardApplicable	• IS-13779 with Latest revision, • IS 9000:Environment testing • IS 12346 (1988):Specification for testing equipment for A.C. Electrical Energy meter • CBIP No. 304–Specification for A.C.Static Electrical Energy Meters (latest amendment). • IS 15884:Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2) • IS15959:Data Exchange for Electricity Meter- Reading Tariff and Load Control • IEC 62052-11 (2003) :Electricity Requirements (AC) General Requirements, Tests and Test conditions for A.C. Static Watt hour meter for active energy Class 1.0 and 2.0. • IEC 62053-21 (2003) : A.C. Static Watt hour meter for active energy Class 1.0 and 2.0 • IEC 62056-1-0:2014 Smart metering standardisation framework. • IEC 61850 MMS protocol. • COSEM for 3-phase meters as per IS 15959. • NEMA Smart Grid Standards Publication SG-AMI 1-2009- Requirements for Smart Meter Upgradeability

RatedVoltage240 V(for single phase), 415 V(Phase to phase)	Phase to Neutral, phase to phase
OperationalVoltage (Single Phase/Three Phase)	240Volts/415 Volts, Voltage Variation range: -30% to +20%. As per IS 13779
RatedCurrent	5-60Amps(1 phase), 10-100Amps (3phase), Imax= 120% of Ib (basic current), StartingCurrent=0.2%Ib
Meter Constant	3200Impulse / KWh
Frequency	50 Hz (+- 5%)
PowerFactor	Zero(lagging) through toUnityto zero(leading).
Power Consumption	AsperIS13779
Display Type	LCD Display 16 Character byalphanumeric display
CommunicationOptions	• RS232 • Compatibility for SCADA,AMI integration • Modems(PSTN/GPRS/GSM) • Master/Slave Arrangement • Wi-Fi, Zigbee • TCP/IP • InternalModem PowerSupply • ANSItype2 opticalport
Remote Connect &Disconnect	Connection/DisconnectionThroughLatchingRelay
OperatingTemperature Range	AsperIS 13779
StoredData	• TOD (Time ofday) data • TwoseasonsandTwo TOD tariff tablesconfiguration in meter • Load profile storage for one year

BillingData at the timeofbilling,parametersto belogged	• Billdate andTime • BillNo. • Billing type - Import / Export/Net metering • Cumulative Active Energy • Cumulative Apparent Energy • Billingperiod MaximumdemandImport/Export/Net in kWwith date andtime • Billingperiod MaximumdemandImport/Export/Net in kVA with date andtime • BillingAverage PowerFactor • 'Power on'duration in billingperiod. • Tamper count forbilling period • Energyconsumption/supply (kWH) duringbillingperiod • TOD kWHconsumption/supplyduringbillingperiod • TOD
Data storage	• Average phaseVoltage • Average phase Current • ConsumedActive Energy • ConsumedApparent Energy • Maximum demand(kW) • Maximum demand(kVA) • Average PowerFactor • Average SignalStrength
DailyEnergyDataparameters	• Cumulative Active Energy • Cumulative Apparent Energy • Consumption of Active Energyin theday • Consumption of Apparent Energyintheday • Power failurecount in theday • Maximum demand in KWoftheday
Tamper /Event Data	• Power Quality/VoltageRelatedTampers • CurrentRelatedTampers/Events • MD reset/Billingcounts • Meter Programmingcount • BillingdateandTime
Measurement Data Reporting Rate	• 10 sec

Software	• Software for programmingandreadingof meter compatible withwindows, AMI system • Allow offline configuration • Generate reports
Training	Comprehensive hands-ontrainingto beprovided to staff for operation.
Service Support	To be provided preferablywithin 24 hours.
Prices	To be quoted in CIFKanpur
Note	**The Guaranteed Technical Particulars in the form of Table 1 hasto be filled (with make) and submitted for evaluation in separate envelope for technical qualification**

General Requirements:

(a) GENERAL SPECIFICATIONS:

1. Thethicknessof casing,baseandterminalcovershallbe 2.0mm+/-0.2mm.
2. Sufficientclearanceshallbeallowedbetweenterminals.Further,thesupportingwebs betweenthetwoterminalsoftheterminalblockshouldbesufficientlyhightoensurethatthetwon eighboringterminalsdonotgetbridgedbydustoritisnotpossibletohaveflashoverbetween adjacentterminals ofterminalblock.
3. Theterminalsshallbeofsuitableratingtocarry150%ofImaxandmadeofelectro-plated (ortinned) brass. Forverification,thetest will beconducted at Vref,150%Imax,UPFfortwohours.Afterthetestnophysicaldamageshouldoccurand %errorshouldnot exceedaccuracyclassofthemeteratIb (basic current),UPF.
4. Allconnectionscrewsandwashersshouldbetinned/nickelplatedbrass.Theterminalscrewssha llnothavepointedendatthebottom.Allterminalswillhavetwoscrews.Theterminalsshallbepro perlyboundintheinsulation.Sufficientclearancecanbeprovidedbetweenterminals to avoid possibleflashover.
5. Aluminumcrimpingpinsofsuitablesizeshallbesuppliedbythesuppliersalongwiththemetersfo rproperterminationofthecableends,whicharetobepackedinapolythenecoverandtaggedtoea chmeter(forterminationincominga n d outgoingAluminumleads).
6. Theshuntshallbedirectlyterminatedonterminalblockwithoutusinglug.Alternatively,theterm inationofcurrentwires,ifusedinsidethemeter(shunt)ontheterminalblockshouldbethroughlu gsandwashersofpropersize.Thelooplength ofthe primarycurrentcircuitshould bekeptminimum.
7. Theembossingshallbeprovidedonmeterbase,metercover,terminalcoverandterminalblockas under–'IIT Kanpur'andmanufacturer'slogo/tradename.

(b) METERCOVER FIXINGARRANGEMENT:

AtleasttwosealingscrewsofNickelplatedsteelshallbeprovidedforproperfixingof metercover.Eachsealingscrewshallhavetwoindependentsealingholes.Oneholeshouldbeprovi dedintheheadandoneinthebottomportion,sothattwoseparatesealscanbeprovided.Thediamet eroftheholeshallbe2.0mmand1.5mmfortheheadandbottomportionrespectively.Thelengthof thesealingscrewshallbelongenoughtoflushwith theground.

(c) METER BASE FIXING ARRANGEMENTS:

Metershallhavetwofixingholes,oneattopandotheratbottom.Thetopscrewholeshallbeprovided onback ofthe metersothatscrewheadarenotaccessibleafterthe meterisfixed.Lowerholeshallbeprovidedinsidetheterminalcompartmentsoastomaketheminac cessibletoan unauthorizedpersonafterterminalcover isfixed.

(d) SEALING ARRANGEMENT:

Thesealingscrewusedforthemetercovershallbefixedupsidedownsothatthesearetightenedfro mtherear.ThesealingscrewshallbeBRASSorNickelplatedsteel.Inadditiontothesealingscrewspr ovidedforthemetercover,thereshallbeoneortwosimilartinnedbrassor nickelplated steelsealing screwfortheterminalcover.

(e) INSULATION MATERIALS:

Allinsulationmaterialsusedintheconstructionofmetershallbesubstantiallynonhygroscopic.

(f) PROTECTION OF PARTS:

Allparts,whicharesubjectedtocorrosionundernormalworkingcondition,shallbeeffectivelyprote ctedagainstcorrosionduetoatmosphericcondition.Theprotectioncoatingshallnotbeliabletodam agebyordinaryhandlingorinjuriouslyaffectedbyexposuretoair undernormalcondition ofserviceinactual practice.

(g) SCREW INSULATION:

Allelectricallylivescrewsshallbeofheavilytinnedbrassornickelplatedsteel.Allotherscrewsshallb eelectroplated.

(h) TERMINAL BLOCK:

TheterminalblockshallbeofPOLYCARBONATEofFRand glassfilledqualityand shallfulfillfollow ing requirements:

(i.) Itshallhavetheglowtemperatureof960deg.CwhentestedasperIS:11000(part2/sec1)1984o r IEC 60695212

(ii.) Ballpressuretestof125deg. Centigrade.asperIEC–60695102

(iii.) Heatdeflectiontestof132deg.C.asperISO75/AeHDT/Ae,1.8Mpaedge100mm

(iv.) ItshallconfirmtoflameretardantFR)ratingofVOasperUL94testingOR.verticalspecimenmethodas per IS–11731(Part2)–1986 (FVOcategory)

(i) TYPE OF TERMINAL COVER:

TheTerminalcovershallbetransparent,extendedopentypeandshallencloseterminalcompartmentexceptfortheprovisionofconductorentryatthebottomforincoming &outgoing leads.

(j) LENGTH AND MATERIALS OF TERMINAL:

Thelengthofterminalintheterminalblockshallbeadequatetohaveapropergripofthe conductorwiththehelp of thescrew.
Theinternaldiameterofterminalholesshouldbe4to6mm.Thematerialsoftheterminalsshallbeofappropriatelyplated brass.

(k) TYPE OF TERMINALS:

Theterminalsshallbesuitabletocarryratedcontinuousmaximumcurrentandshorttimeoverload currentandbemadeofbrass.PC endsshall beprovidedwith lugs.

(l) TERMINAL SCREWS:

Theterminalscrewsshallnothaveathreadsizesless thanM4andlessthan5 mmdia.Thescrewsshallnothavepointedendofthreads.

(m) TERMINAL SCREW MATERIALS:

Thematerialsof terminalscrewsshallbeof brass.

(n) CLEARANCE BETWEEN ADJACENT TERMINALS:

Theminimumcentretocentreclearancebetweentheadjacentterminalsshallbe13mm.
(i.) THETOPCOVERSHOULDBEULTRASONICALLYWELDEDORbreaktoopentypearrangement

(o) CRIMPING PINS:

Crimpingpins(aluminum)generallyconformingtoIS8309shallbeprovidedon theincoming andoutgoing terminalstofacilitatepropercabletermination atsite.

(p) NAME PLATE:

Themetershallhavenameplatebeneaththemetercoversuchthatthenameplatecannotbeaccessed withoutopeningthemetercoverandwithoutbreakingthesealsofthemetercoverandthenameplateshallbemarkedindelibly.Thenameplatemarkingshallnotfadewith lapseoftime.

Thebasicmarking onthemeternameplateshall beasunder:

Smart City Pilot Project, IIT Kanpur

- Manufacturer'snameandtrademark
- Typedesignation
- Monthand Yearofmanufacture
- Referencevoltage
- RatedandMaximumCurrent
- Principalunitsofmeasurements(kWH)
- Meterconstant(imp/kWh)
- 'BIS'Mark(ApplicableforIndianmeter manufacturersonly)
- AccuracyClassof m e t e r (class-1.0).
- Propertyof IIT Kanpur
- PurchaseOrder No.&date
- Guaranteeperiod-5 years.
- BarCodeidentificationofadequatesize.

Theabovedetailshallbeclearlyvisible,effectivelysecuredagainstremovalanddistinctlymarked.
Thebarcodeshallcontaindetailsof**(i)** Themake,**(ii)**Srnoand **(iii)**Model/type.

(q) PRINTED CIRCUITBOARD:

The fully tested double layered glass epoxy shall be used. The latest technology such as hybrid microcircuit or application specific integrating circuit (ASIC) shall be used to ensure reliable performance. The mounting of components on the PCB shall be SMT (Surface Mounted Technology) Type. The electronic components used in the meter shall be of high quality from world renowned manufacturers and there shall be no drift in accuracy of the meter for at least up to 5 years. The make/grade and the range of the components should be from the following list.

2. General Terms & Condition

1. **The scope includes:**
   - **a)** Supply of smart meters for smart home system under smart city pilot project at IIT Kanpur.

b) Open source code availability for future modification for R&Dand installation support services.

2. Bid Price

a) The contract shall be for the full quantity as described above. Corrections, if any, shall be made by crossing out, initialing, dating and re writing.**The cost of the three phase smart meters is to be quoted including the cost of required CT's, if any.**

b) All duties, taxes (including sales tax) and other levies payable on the raw materials and components shall be included in the total price, **Except Central Excise Duty & CDEC** (custom duty), as IIT Kanpur is exempted from these duty.

c) The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

d) The Prices shall be quoted in Indian Rupees only.

e) The service tax has not to be included into rate. It will be reimbursed by the institute as per reverse mechanism.

3. Each bidder shall submit only one quotation.

4. Criteria of Eligibility

a) The supplier has turnover of 100% of the value for last 3 financial years.

b) **Authorization from manufacturer**: In the case of a bidder offering to supply goods under the contract, which the bidder did not manufacture or otherwise produce, the bidder has been duly authorized by the goods manufacturer or producer to supply the goods in India. The manufacturer will have to endorse guarantee of the supplied goods in favor of IIT Kanpur.

c) Details of the experience of supplying similar equipments during the last 2 years.

5. Validity ofQuotation

Quotation shall remain valid for a period not less than 60 days after the deadline date specified for submission.

6. Evaluation of Quotations

Note: The bidder has to submit their quotation/offers in two envelopes. One envelope will contain technical particular/technical bid (please see Table 1). The second envelope will contain the quoted offers/financial bid (please see Table 2).

Quotations from bidders will be evaluated only if the quotations satisfy the following.

(1) Quotations are properly signed
(2) Conform to the terms and conditions, and specification
(3) The filled technical particular/technical bid will be evaluated as per the specification, and quotations of only vendors meeting the technical specifications will be shortlisted for opening of their quoted offers/financial bid.

7. Award of contract

The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive (includes technically suitable) and who has offered the lowest evaluated quotation price.

7.1 Notwithstanding the above, **the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.**
7.2 The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be incorporated in the purchase order.

8. Payment shall be 90% against the delivery and 10% after satisfactory installation and configuration.

9. Warranty/ guarantee shall be 60 months to the supplied goods.

10. You are requested to provide your offer latest by 3:00PM on16.10.15.

11. We look forward to receiving your quotations/tender and thank you for your interest in this project.

Table : 2

FORMAT OF QUOTATION/TENDER

Sl. No.	Description Goods	Specifications	Qty.	Unit	Quoted Unit Rate in Rs.	Total Amount (in Rs.)	
						In Figures	In Words
1. 2.	Smart meter (single phase, 5-60 A) Smart meter (Three phase, 10-100 A)	As per Table 1	20 5	No. No.			
	TOTAL (in Rs.)						

Gross Total Cost: Rs.....

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. ..... (amount in figures) (Rs. ..... amount in words) within the period specified in the Invitation for Quotations.

We also confirm that the normal commercial warrantee/guarantee of 60 months shall apply to the offered goods.

Signature of Supplier

Certifiedthatalltheinformation/parametersindicatedaboveexistinthemeterofferedbyu sandshallstandallthetestsspecifiedabovewithinthevariationofcurrent/voltagefrequen cyandclimaticconditionsspecified therein.

SIGNATURE

OFBIDDERNAM

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DESIGNATION

SPECIAL CONDITION

1) Authorization from Manufacturer

In the case of a Bidder offering to supply goods under the contract which the Bidder did not manufacture or otherwise produce, the Bidder has been duly authorized by the goods' Manufacturer or producer to supply the goods in India.

2)Proof of Manufacturing and past performance.

Details of experience and past performance of the bidder on equipment offered and on those of similar nature within the past one year and details of current contracts in hand and other commitments.

3) Details of last 3 years turnover of the bidder.

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