BUDGETARY ENQUIRY No.IM&EE/EMS/2021/02, Dt.16.02.2021

Expression of interest(EOI) on ENERGY MANAGEMENT SYSTEM

VISAKHAPATNAM PORT TRUST

BUDGETARY OFFERS ARE INVITED FOR "SUPPLY, INSTALLATION, TESTING, COMMISSIONING OF ENERGY MANAGEMENT SYSTEM VISAKHAPATNAM PORT TRUST".

1. INTRODUCTION:

Electrical maintenance section of Visakhapatnam Port trust provides power supply to entire Port operation at various berths, installations, office buildings via 14 nos of 11KV indoor substations and other outdoor transformers at different locations. There are about 75 transformers are in service at a distance of ranging upto 20KMs span.
This section deals with
1). Receiving of Electrical Power from local Discom APEPDCL at 9 nos locations.
2). Distribution of 11 K.V. electrical power supplies to cargo handling works, various workshops, office buildings and other connected works through localized sub-stations and outdoor distribution transformers.
3). Operation and maintenance of electrical cranes at East Quay berths for cargo handling works.
4). Maintenance of stockyard lightings, shed lightings and street lightings etc.
5). Maintenance of air conditioning and refrigeration equipments.
6). Maintenance of electrical equipments of floating crafts, mobile cranes, locomotive engines, motor vehicles.
7). Maintenance of generator sets (electrical parts) installed at various locations.
8). Maintenance of domestic electrical equipments, Gadgets etc. provided in various canteens, residential & non-residential buildings, hospitals and dispensaries.
9). Maintenance of electrical installations of crude oil / LPG and other POLS being handled at dedicated berths Off Shore Tanker Terminal (OSTT), LPG Jetty and OR-1 & OR-2 berths.
10). Maintenance of electrical equipments of various pump houses.
11). Maintenance of electrical installations of Sports Complex (i.e. Centralized A.C. Plants, Indoor Stadium lightings, Auditorium lightings, sub-station equipments, street lightings etc.)
12) Operation and Maintenance of 10 MW grid connected solat plant
13) Operation and Maintenance Roof top solar plants (6 nos)

It is intended to provide LT trivector meters at all DTRs, Electrical Panels, Buildings, Pump Houses and other LT service points in order to on-line monitoring of all electrical parameters and energy consumptions. As these are scattered in several Kilometers suitable method may be adopted (with GSM SIM) as deemed fit.

2. SCOPE OF WORK

Scope, Terms and Conditions

Terms Used:
OEM – Original Equipment Manufacturer. ; Vendor – Vendor participating in the EOI tender as per the qualification criteria; EMS – Energy Management System; CT – Current Transformer; PT – Potential Transformer; MRS – Main Receiving Station; UPS - Un-interrupted Power Supply

SCOPE OF SUPPLY	
1.	It is intended to purchase Energy Management System (EMS) to capture energy consumption data from meters distributed throughout VPT. The communication will be through existing Ethernet network. The scope shall include but not limited to supply installation & commissioning of; Supply & Installation of Computers for EMS System Supply & Installation of RS 485 to Ethernet converters Supply & Installation of interconnecting cables Supply & Installation of CT based 132 intelligent energy meters, 132 nos GPRS based direct meter, CT based GPRS meter supplied by VPT Supply & Installation of application Software for EMS Supply & Installation of PVC / HDPE Conduits Installation of Energy meters and wiring of CTs and PTs for 212 numbers (CTs and PTs are in FIRM'S scope) Integration of several energy meters already installed 80nos make Land Gyris. Preparation of drawings for EMS Preparation of Cable schedules Preparation of Termination Charts Supervision of Installation works Testing of EMS equipments Pre-commissioning Checks Final Commissioning System Handing Over Training for Engineer Any other allied and implied work required for completion of system. Note :- **Landis+Gyr,India; 88nos of LT TVM WILL ARRANGED BY VPT AT FREE OF COST, 200/5A LT TVR 0.5S CLASS DLMS WITH IRDA PORT CAT-A DTR METER E650 PT CT Operated** **The E650 is a 3 ph-4 wire PT CT operated tri-vector energy meter for balance and unbalanced load of accuracy class 0.5 for metering of industrial and commercial establishments**
2	The bidder/supplier shall be responsible for engineering and functioning of a complete system, fully meeting the intent and requirements of the specifications attached data sheets/drawings.

Vendor Qualification Criteria	
3	Only those bidders / OEMs who have supplied and commissioned EMS successfully, which can support atleast 30 energy meters or more should quote. The bidder shall submit atleast 2 numbers of performance certificates as a proof of the above.
4	Vendor of EMS should be an ISO certified company with average Turnover of Rs. 3 crores for the last three years. i.e., from FY 2017-18 to FY 2019-20.
5	The vendor and the OEM should be able to support the project site and the equipment for a period of 10 years from the date of commissioning. Vendor shall give commitment letter in this regard.

	System requirements in general
6	The control room for EMS shall be in MRS.
7	Installation of energy meters as per enclosed specification. The measurement of electrical parameters will be done through CTs & PTs at the location. **Make of Energy Meters: Schneider/L&T/Conzerve/Secure/Elmeasure/**
8	All the energy meters located at various locations are to be interconnected to nearest existing LAN system of FIRM'S using RS485 to Ethernet converter. The details of meters already installed
9	The connection of meters may be done with suitable high-speed reliable data communication cable of 120 ohm, 22swg, 100% PVC insulated **Belden / Lapp make,** Ethernet converters, LAN switches & repeaters as required for transferring the data to LAN system without any data loss and not compromising the speed.
10	Further at least 1 Stand alone licensed clients software connected in existing LAN system should able to view the on line data at 2 fixed locations for all the meters in a common predefined specified formats and Web based Client software with real time data to be available at 2 location with 2 user login at a time.
11	A computer (As per the enclosed specification) connected to LAN system should be able to retrieve the selected parameters from all the individual meters & able to display the on line data/Historical data in the specified formats through the supplied Energy management software. The system should have suitable data base system software to handle & store the data and should have all administrative capability.
12	The requirement calls for a complete working system and not components thereof. Bids must be complete with all equipment and required accessories along with necessary power systems including standard Un-interrupted Power Supply for the entire equipment, energy meters , mounting energy meters, CTs, PTs, mounting and fitting hardware, plugs, sockets, and any hardware/software, cables from RJ45 , supply of RS 485 to Ethernet converter , supply and installation power or control cables, mounting energy meters in sheet metal box, etc. as required for complete installation of the System under this contract.
13	VPT shall not provide any information to integrate the existing energy meters. The required information, address mapping will have to be obtained from vendor.
Techno-Commercial Terms, Conditions and scope of supply.	
14	The scope of work is on **turnkey basis** which includes complete design, supply, installation, testing & commissioning & handing over of "ON LINE ENERGY MONITORING SYSTEM FOR VISAKHAPATNAM PORT TRUST" as per specification.

15	The energy meters are to be placed in different switchgear rooms at various locations of port area like 11KV substations, pump houses, important office buildings, auditoriums, berths outdoor transformers etc, which need to be integrated through existing LAN. Agency may visit the plant before quoting, to get an idea of the various inputs needed for designing the suitable Energy Management System (EMS). In addition to this a layout of different blocks , Single Line Diagram (SLD)and locations of sub stations may also be obtained. Engineer in charge of VPT may be contacted for this purpose.
16	The requirement is for EMS to support 400 meters, however the system shall be designed to take care of future additions and capable of handling at least 600 meters without any changes either in software. In each loop there should be a provision for addition of at 20% more meters without sacrificing the speed of the system.
17	Bidder has to share the memory register address for each of the energy meters.
18	After design of the system agency has to submit the complete data sheet & drawing for approval of VPT. ~~Only after obtaining the approval in writing, the vendor may proceed with manufacturing activities.~~
19	Installation & commissioning includes programming of energy meters, installation of PC and its peripherals, interfacing system with energy meters, report customization & analysis.
20	Any changes required to be done in the software or format during work execution period shall be done by agency without any extra cost.
21	Bidder should supply energy meters & design the system in such a way that the final data updating speed for each of the meter in the client PC should not be exceed more than 25 seconds.
22	Agency has to extend the PT supply to each of the panel where energy meter is to be fixed from the bus PT panel with colored wires with a suitable MCB at the bus PT panel.
23	For the auxiliary supply extension to the meters agency has to wire from the existing identified fuse outgoing point to the meter.
24	The agency has to quote for the complete system including installation of hardware and softwares.
25	All the items, which are required for successful commissioning of the system, are to be included in the scope of supply.

26	The work may have to be carried out in phases as per availability of shutdown. How ever if due to some unavoidable reason shutdown could not be given in the system, then party has to arrange to carry out the job during the available shutdown periods.
27	No men & material will be supplied by VPT. VPT will provide necessary shutdown and provide store room only to keep material during commissioning.
28	In case of any queries & ambiguity, the decision of CHIEF MECHANICAL ENGINEER, VPT will be treated as the final decision.
29	Exact configuration of the software & various formats, screens shall be as per VPTs requirement and will be decided at the time of installation.
30	The agency shall share the details of communication protocol used for communication.
31	The cables are to be laid in existing trenches/trays where ever it exists by removing covers/slabs and making it good after work. Proper routing including putting the cables in flexible hoses are in vendor's scope.
32	Where ever required, agency has to provide & fix suitable casing & capping arrangement OR PVC/HDPE pipes for laying the LAN/Data cables in harmony with surround.
33	The lugs, glands & cutting of glands in exiting gland plate with out removal of gland plate is in the scope of agency.
34	Agency has to arrange one week training program on the software & energy management system for at least 5 VPTs Engineers / technicians. In addition to this, during installation at VPT, the associated VPTs personnel shall be trained on the system usage.
35	Bidder has to give warrantee as per standard terms and conditions after commissioning at VPT for the system along with components & peripherals. Further any break down in the system within this period shall be restored with in 3 days of intimation with their own cost.
36	As the job may be required to be carried out in HT/LT panels in running, all the manpower deputed in site should be skilled, well experienced and should follow VPTs safety norms.
37	Ordered items shall be offered for pre-dispatch inspection (PDI) before shipment. VPT reserves the right to inspect the components or entrust any 3rd party to give dispatch clearance based on Vendor's inspection and other reports.
38	**Pre dispatch inspection (PDI):** PDI for Energy meter will be done at vendor premises based upon the specification. 1) Accuracy test in balanced & unbalanced load conditions as per IEC. 2) Frequency & voltage variation test as per IEC/IS **All test charges will be to vendor's account.**
39	All ordered equipment shall be supplied with relevant test certificates, certificate of newness of equipment and any other statutory documents.

40	Complete technical literature pertaining to the products, any relevant bench mark results/test results are to be submitted along with technical offer.
41	The Vendor shall submit the proposed plan of execution and the methodology to execute the plan at the time of bid submission.
42	**INSTALLATION AND COMMISSIONING** The cable laying and connectivity of equipment in the system will be in the scope of vendor
43	**Manuals:** 1. Energy meter manual for programming / meter 2. Three copies of manual consisting of memory mapping details of energy meters. 3. Three copies of detail software manual for operation & configuration of software as FIRM'S requirements in future. 4. Three copies of O&M manual for EMS. 5. Soft copy also shall be provided for the above.

Details of meters required :-

Sl.No.	Location	CT based KWH meter	CT set	Gateway +Enclosure	Cable in meters	GPRS Meter – direct Ct	**GPRS meter- CT based**
1	11KV Substation			1	30		
2	T4 shed	2	2	1	20		
3	GJH Substation	7	7	1	20		
4	T 5 shed	3	3	1	20		
5	EQ 7 Substation	3	3	1	20		
6	Dry Dock. ORSS Substation	11	11	1	40		
7	Oil Wharf	5	5	1	10		
8	LPG Berth SS	11	11	1	30		
9	Sports complex	10	10	1	10		**2**
10	Outdoor Transformers						**26**
11	Fresh Water pump House	5	5	5	25	9	**12**
12	MDSS Pump House	12	12	4	20	2	**5**
13	Sewage Treatment Plant	13	13	3	25		
14	S.G.Puram pump houses					1	**8**
15	OSTT ELECTRICAL EQUIPMENTS	4	4	2	15		**4**
16	LPG BERTH ELECTRICAL EQUIPMENTS	6	6	2	20		**3**
17	Indoor stadium AC Plant	1	1	1	10		**6**
18	KALAVANI AC Plant	6	6	2	10		**3**
19	AOB	3	3	1	25		**3**
20	TM BUILDING	2	2	1	15		**2**

21	DC OFFICE BUILDING						**2**
22	MF BUILDING						**1**
23	GENERAL STORES	1	1	1	5		
24	DLB BUILDING SS	5	5	1	100		
25	SIGNAL STATION 2						**1**
26	TM CONTROL DOCK AREA						**2**
27	H-Park	1	1	1	5	44	
28	Slip way Complex	9	9	1	25		
29	FISHING HARBOUR ELECTRICAL	4	4	1	20		**1**
30	SIGNAL STATION 1	1	1	1	10		
31	SG PURAM COLONY	7	7	1	20		**1**
32	Outside Firms					76	**6**
33	RFID Gates						**6**
		132	132	37	550	132	**88***

*Note :- 88 nos are VPT scope of supply as detailed in scope of work

Annexure-III Specification of Network Components

1	**EIA Industrial RS-485 cable** 22 AWG (7x30) stranded tinned copper, dateline insulated. Twisted pairs. Overall standard tinned copper drain wire. Overall 90% coverage tinned copper braid shield. Black UV resistant PVC jacket. D.C. Resistance of conductor: 14.7 ± 1 Ohm / meter D.C. Resistance of shield: 2.9 ± 0.5 Ohm / meter Capacitance between conductors: 36.1 ± 5 pF / meter Capacitance between one conductor and other conductor connected to shield: 65.6 ± 5 pF / meter **Belden or Lapp Make**
2	Ethernet Convertor **Ethernet:** 10/100 Mbps, RJ45 Make: Santeliequip / Dlink/ Easun/Moxa / Schneider / CMC / Conzerv/ equivalent **Protection:** Built-in 1.5 KV magnetic isolation **Interface:** RS-422/485 **No. of Ports:** 1 **Port Type:** DB9 (Male) **Transmission Speed:** 50-921.6 Kbps **Signals** RS-422: Tx+, Tx-, Rx+, Rx-, GND RS-485 (2-wire): Data+, Data-, GND RS-485 (2-wire): Tx+, Tx-, Rx+, Rx-, GND **Serial Line Protection:** 15 KV ESD for all signals **RS-485 Data Direction:** ADDC™ (Automatic Data Direction Control) **Power Line Protection:** 4 KV burst (EFT), EN61000-4-4, 2 KV surge, EN61000-4-5 **Advanced Built-in Features:** Watchdog timer **Serial Communication Parameters**

	Parity: None, Even, Odd, Space, Mark **Data Bits:** 5, 6, 7, 8 **Stop Bit(s):** 1, 1.5, 2 **Flow Control:** RTS/CTS, DTR/DSR (for RS-232 only), XON/XOFF Ethernet Converters shall be housed in a wall mounted panel with required LAN cable for LAN connectivity etc.
3	**PC** DEDICATED PC (The EMS runs on the following minimum specification) **bidders are requested to submit detailed specification suitable to system requirements**

Annexure-IV Specification of Demand Controller for HT application

	Demand Controller shall provide continuous monitoring of a three-phase system as required. Meter shall measure current, voltage, real, reactive and apparent power, power factor, real, reactive and apparent energy, maximum demand, voltage and current unbalance, voltage & current THDs, frequency. The meter shall also have TOU option. The meter shall have three potential free relay outputs for prediction of demand & control.
	Standards compliance: IEC 62053-21/ IS 13779/ as per latest amendments
	Supply System Demand Controller shall be multi-function 3 phase solid state unit with ability to connect to either LT, 3 phase, 4 wire or HT, 3 phase, 3 wire delta circuits with programmable PT and CT (primary only) ratio.
	Control Power: Meter must have separate auxiliary / control power, which accept the voltage range 240V (190-265V)
	Load Characteristics: Potential circuit < 8VA Current Circuit < 0.5 VA
	CT Secondary : 5A
	Measured parameters: Demand controller shall measure and report the following quantities at a minimum: Voltage, both phase to neutral and phase to phase, for all three phases and their average and total harmonic distorsion in percentage. Current, phase A, B, C and average, percentage load each phase & total harmonic distorsion in percentage. Watts (total and per phase), VARs (total and per phase), VA (total and per phase), Power Factor (total and per phase), Demand (Instantaneous, Maximum, date & time of occurrence) Frequency from any available phase. Accumulated Watt-hr, VA-hr, VAR-hr Inductive and VAR-hr Capacitive. Demand Controller shall provide updates of all voltage, current, power and energy readings at intervals 1 second. All specified readings shall be made available via the RS-485 ports. Demand Controller shall measure and record load Run hours, Meter On hours and number of power interruptions. Records high low profiles with 4 peaks & 4 lows for V, A, Hz, PF & all power parameters with day, date & time of occurrence. Time Of Use: TOU tariff timings & demand control limits programmable. Maximum number of 6 overlapping seasons per year Maximum number of 6 non overlapping tariff times zones per day.
	Memory: Storing of all energy parameters during the power failure & auxiliary supply failure.

	Starting Current : 0.2% In (Class 1.0) Frequency : 50 HZ +/- 10%
	Communication Interface: All specified readings shall be made available via the RS-485 ports. MODBUS RTU protocol and minimum baud rate 9600 bps shall be ensured.
	Ingress protection against dust and water: IP 51 (front), IP 40 (rear).
	Temperature: Meter shall operate successfully at temperature extremes from 0^0C to +60^0C.
	Marking of meter: ■ Manufacturer name or trade mark. ■ Type / model. ■ Serial no, month and year of manufacturing. ■ Electrical rating: Voltage, current, frequency ■ Unit of measurement. ■ Class of Accuracy. ■ Color coded terminal block label with terminal numbers and phase identifications for voltage, current, auxiliary, RS 485 inputs.
	Display: Power meter shall have a bright LED/ LCD display with minimum height 14mm and auto scaling feature.
	Test: All the products must undergo the proper calibration and accuracy verification and have the test report.

Annexure-V Specification of Digital Panel Energy Meter

Digital power and energy monitor shall provide continuous monitoring of a three-phase system as required. Meter shall measure Line and Phase currents, Line & Phase voltages, KVA, KVAr, Kwh, PF, Total Harmonic Distortion percent for Voltage & Current. Accumulated Watt-hr readings shall be stored in energy registers.
Standards compliance: Accuracy: IEC 62053-21/ IS 13779/ as per latest amendments
Supply System Digital Energy meter Controller shall be multi-function 3 phase solid state unit with ability to connect to either LT, 3 phase, 4 wire or HT, 3 phase, 3 wire delta circuits with programmable PT and CT (primary and secondary) ratio.
Control Power: Meter must have separate auxiliary / control power, which accept the voltage range 240V (190-270V)
Load Characteristics: Potential circuit < 8VA Current Circuit < 0.5 VA
Memory: Storing of all energy parameters during the power failure & auxiliary supply failure.
Starting Current : 0.2 %In (Class 1.0) Frequency : 50 HZ +/- 10%
Communication Interface: All specified readings shall be made available via the RS-485 ports. MODBUS RTU protocol and minimum baud rate 9600 bps shall be ensured.
Dimensions: 96mm(w)x96mm(H)x105mm(D)

Ingress protection against dust and water: IP 51 (front), IP 40 (rear).
Temperature: Meter shall operate successfully at temperature extremes from 0^0C to +60^0C.
Marking of meter: 1. Manufacturer name or trade mark. 2. Type / model. 3. Serial no, month and year of manufacturing. 4. Electrical rating: Voltage, current, frequency 5. Unit of measurement. 6. Class of Accuracy. 7. Color coded terminal block label with terminal numbers and phase identifications for voltage, 8. current, auxiliary, RS 485 inputs.
Display: Power meter shall have a bright LED display with minimum height 14mm and auto scaling feature.
Test: All the products must undergo the proper calibration and accuracy verification and have the test report.

Annexure VI PRICE BID:-

S. No.	Description	Unit	Qty.	Rate	Amount
PART - A					
1.	MICROPROCESSOR BASED DIGITAL ENERGY METER, 3 PHASE, 4 WIRE , 3 ELEMENT, ACCURACY CLASS – 0.5, CT & PT PROGRAMMABLE WITH RS485 AS PER SPECIFICATIONS	No	160		
2	MICROPROCESSOR BASED DIGITAL ENERGY METER, 3 PHASE, 4 WIRE , 3 ELEMENT, ACCURACY CLASS – 0.5, DIRECT METER WITH RS485 AS PER SPECIFICATIONS	No	160		
3	Low Voltage ring type CT of suitable rating for above sl no 1 as per the site requirement	No	160		
4	Energy Management System Software customised to VPT requirements for data logging and generation of reports upto 650 nodes (01 PC Monitor License) Load Monitor Module activated.	Job	1		
5	Energy Management System client Software (Stand Alone)	No	2		
6	1 User Web based Client software with Historical Data Logging	No	2		
7	COMPUTER SERVER SYSTEM AS PER SPECIFICATIONS	No	2		
8	Ethernet Converter to connect the field instrumentation to the PC running EMS system in a suitable junction box ie.,	No	37		

	enclosure **Make: Santeliequip / Dlink/ Easun/Moxa / Schneider / CMC / Conzerv**				
9	Supply of HIGH SPEED LOW LOSS Data Communication Cables	Mtrs	650		
10	Connector kits to connect the Meters described in HT series meter to the data communication network	Nos	35		
11	Connector kits to connect the Meters described in LT series meter to the data communication network	Nos	97		
12	Spares - Furnish break up for each item in this category.	Nos	As reqd		
13	Any other items required to complete the scope of supply not covered above. Please give details. Furnish break up for each item in this category.	Nos	As Reqd		
PART -B					
14	Installation and retrofitting of energy meter with necessary cut out and mounting of adaptor plate, CT /PT connections, auxiliary supply connection to meter, with all necessary required accessories for erection /commissioning.	No	400		
15	Laying of Data Communication Cables	Mtrs	650		
16	Erction, testing & commissioning of total EMS system with installation of Ethernet converter, RS485 networking, convertor, switches, router, enclosure, data cable, connectors, softwares and preparation of reports in formats as per VPT requirement as detailed in scope of work	Job	1		
PART-C					
17	Rate for 5 YEAR maintenance contract of energy management system after initial guarantee period of 60 month after commissioning excluding spares (minimum one visit per month and online rectification as & when required.)	Month	60		

Note:

a) The Tenderer shall furnish budgetary offer for all the items mentioned

b) The Tenderer shall visit the site and get acquainted with the topography and accordingly furnish their budgetary offer. The Budgetary offer shall be submitted **on or before 06.03.2021.**

c) For further details, the Tenderer shall contact the Superintending Engineer (Electrical), Administrative Office Building, Visakhapatnam Port Trust, Visakhapatnam-530035,. Phone No 0891-287-3404/3193, 9948298307, email: cme.pkr.vpt@gov.in, kamaraju_pandiri@yahoo.co.in ;

d) **The sealed Budgetary offers will be received by the Chief Mechanical Engineer, Visakhapatnam Port Trust, Visakhapatnam-530035 on or before 06.03.2021. The offers shall also be received through above mail IDs.also**

Sd
Superintending Engineer (Electrical),
Administrative Office Building,
Visakhapatnam Port Trust,
Visakhapatnam-530035