MR 07/2018

PREFERRED SUPPLIER
FOR
DESIGN, MANUFACTURE, TESTING AND SUPPLY OF HIGH VOLTAGE METERING UNITS

FIJI ELECTRICITY AUTHORITY

REVISION HISTORY & DOCUMENT CONTROL

Rev.	Notes	Prepared By	Approved By	Date
0.1	Initial Draft for internal review	KDP, ULSSP		10/12/17
1	Issued for Tender	KDP, ULSSP		4/01/18

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1 INTRODUCTION AND SCOPE OF WORK

Fiji Electricity Authority ("FEA") is responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Tavueni in Fiji. By the end of 2016, the FEA had 174,530 customers. This included residential, commercial and institutional customers.

FEA is seeking tender bids from reputable manufacturers and suppliers for design, manufacture, testing and supply of high voltage metering units.

The following stock items are covered in these specifications:

FEA Stock Code	Item Description
I04592	11kV Metering Unit

This tender specification outlines the instruction to bidders, design and performance criteria for the high voltage metering units, and supply of these for use in FEA's distribution networks.

2 INSTRUCTIONS TO BIDDERS

2.1 Eligible Bidders

This invitation is open to all Bidders who have sound Financial Background, and have previous experience in design, manufacture, testing and supply of such metering units.

Bidders shall provide such evidence of their continued eligibility satisfactory to FEA as FEA shall reasonably request. Bidders who are not manufacturers of such metering units shall provide evidence of agency.

Bidders shall not be under a declaration of ineligibility for corrupt or fraudulent practice.

2.2 Eligible Materials, Equipment and Services

The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies as specified by FEA and from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. Upon request, bidders may be required to provide evidence of the origin of materials, equipment, and services.

For purposes of this Contract, "services" means the works and all related services including design services.

For purposes of this Contract, “origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing or substantial or major assembling of components, a commercial recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

The materials, equipment and services to be supplied under the Contract shall not infringe or violate any industrial property or intellectual property rights or claim of any third party.

2.3 One Bid per Bidder

Each bidder shall submit only one bid. A bidder who submits or participates in more than one bid will cause all those bids to be rejected.

2.4 Cost of Bidding

The bidder shall bear all costs associated with the preparation and submission of its bid and FEA will in no case be responsible or liable for those costs.

2.5 Site Visits

No site visits are required for this project.

2.6 Contents of Bidding Documents

The bidder is expected to examine carefully the contents of this Bidding document. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

2.7 Clarification of Bidding Documents

A prospective bidder requiring any clarification of the bidding documents may notify FEA in writing by fax (hereinafter the term “fax" is deemed to include electronic transmission such as facsimile, cable and telex), or email addressed to:

Tuvitu Delairewa
General Manager Corporate Services
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TDelairewa@fea.com.fj

FEA will respond to any request for clarification which it receives earlier than 10 days prior to the deadline for submission of bids.

2.8 Amendment of Bidding Document

At any time prior to the deadline for submission of bids, FEA may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by issuing addenda.

2.9 Language of Bid

The bid, and all correspondence and documents related to the bid, exchanged between the bidder and the FEA shall be written in the English language.

2.10 Bid Prices

Unless specified otherwise, Bidders shall quote for the entire facilities on a “single responsibility" basis such that the total bid price covers all the Supplier’s obligations mentioned in or to be reasonably inferred from the bidding documents in respect of the design, manufacture, including procurement and subcontracting (if any), testing and delivery.

Bidders shall give a breakdown of the prices in the manner and detail called for in this bidding document, or any issued addenda.

Bids shall be given on CIF basis. The point of delivery shall be FEA’s Navutu Depot in Lautoka. The term CIF shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce, Paris.

FEA has a marine insurance cover for items it is required for purchase for its project and operational works. Bidders are required to comment if the marine insurance component is covered in their bids.

2.11 Bid Currencies

Prices shall be quoted in a single currency only.

2.12 Bid Validity

Bids shall remain valid for a period of **180 days** from the date of Deadline for Submission of Bids specified in Sub-Clause 21.1.

2.13 Format and Signing of Bids

The bidder shall prepare one original and two (2) copies of the technical and financial proposals, clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. I - TECHNICAL & PRICE PROPOSAL", etc. as appropriate. In the event of discrepancy between the original and any copy, the original shall prevail.

The original and all copies of the bid shall be typed or written in indelible ink (in the case of copies, Photostats are also acceptable) and shall be signed by a person or persons duly authorized to sign on behalf of the bidder. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.

The bidder shall provide one electronic copy of the Technical and Financial proposals on FEA's electronic tender hosting website, https://www.tenderlink.com/fea.

The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by FEA, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the person or persons signing the bid.

2.14 Sealing and Marking of Bids

The bidder shall seal the original copy of the technical proposal and the original copy of the price proposal and each copy of the technical proposal and each copy of the price proposal in separate envelopes clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. I -TECHNICAL & PRICE PROPOSAL", etc. as appropriate.

The bidder shall seal the original bids and each copy of the bids in an inner and an outer envelope, duly marking the envelopes as "ORIGINAL", "COPY No. 1", etc.

The inner and outer envelopes shall

a) be addressed to FEA at the following address:

Tuvitu Delairewa
General Manager Corporate Services
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TDelairewa@fea.com.fj

And

b) bear the following identification:

- Bid for: Preferred Supplier for Design, Manufacture, Testing and Supply of High-Voltage Metering Units
- Bid Tender Number: MR 07/2018
- DO NOT OPEN BEFORE: 1600hrs on 7th February 2018

In addition to the identification required, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to Deadline for Submission of Bids.

If the outer envelope is not sealed and marked as above, FEA will assume no responsibility for the misplacement or premature opening of the bid.

2.15 Deadline for Submission of Bids

Bids must be received by FEA at the address specified above no later than 1600 hours (Fiji Time) 7th February 2018.

FEA may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in which case all rights and obligations of FEA and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.

2.16 Late Bids

Any bid received by FEA after the deadline for submission of bids prescribed above will be rejected and returned unopened to the bidder.

2.17 Modification and Withdrawal of Bids

The bidder may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by FEA prior to the deadline for submission of bids.

The bidder's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with Sealing and Marking of Bids, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate. A withdrawal notice may also be sent by fax but must be followed by a signed confirmation copy.

No bid may be modified by the bidder after the deadline for submission of bids.

2.18 Rejection of One or All Bids

FEA reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the rejection.

2.19 Process to be Confidential

Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process. Any effort by a bidder to influence FEA's processing of bids or award decisions may result in the rejection of the bidder's bid.

2.20 Clarification of Bids

To assist in the examination, evaluation and comparison of bids, FEA may, at its discretion, ask any bidder for clarification of its bid. The request for clarification and the response shall be in writing or by fax, but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by FEA in the evaluation of the bids.

2.21 Compliance with Specifications

The tender shall be based on the equipment and work specified and shall be in accordance with the Technical Specification. It should be noted that unless departures from specifications are detailed in Schedules of the Technical Specification, the tender would be taken as conforming to the Specification in its entirety. The Bidder shall tender for the whole of the Works included in the Specification.

3 GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract shall be based upon AS 4912 – 2002 General Conditions of Contract for Periodic Supply of Goods.

The Conditions of Contract comprises two parts:

1. Part 1 – General Conditions; and
2. Part 2 – Conditions of Particular Application

4 CONDITIONS OF PARTICULAR APPLICATION

1. Interpretation and Construction of Contract

Add the following:

"Bid has the same meaning as tender."

Replace

"*Base contract sum means the sum of the products ascertained by multiplying the quantities of goods stated in Item 13 by the corresponding unit prices, excluding any additions or deductions which may be required to be made under the Contract.*"

With

"*Contract sum means:*

(a) Where the Purchaser accepted a lump sum, the lump sum;

(b) Where the Purchaser accepted unit prices, the sum of the products ascertained by multiplying the quantities of goods and the corresponding unit prices in the schedule of unit prices; or

(c) Where the Purchaser accepted a lump sum and unit prices, the aggregate of the sums referred to in paragraphs (a) and (b),

Excluding any additions or deductions which may be required to be made under the Contract."

7. Assignment

Replace *" 7. Assignment"* with *" 7. Assignment and Subcontracting"*

Add *"7.1 Assignment"* after *"7. Assignment and Subcontracting"*

Add the following after paragraph *7.1 Assignment*.

"7.2 Subcontracting

The Supplier shall not subcontract any part of the Contract without the prior written approval of the Purchaser, which approval shall not be unreasonably withheld. Any sub subcontracting shall not relieve the Supplier from any liability or obligation under the Contract. The Supplier shall if requested by the Purchaser provide copies of the proposed subcontract documents without prices."

9. Warranties

Replace "*9. Designated Items*" and its contents with the following

"*9. Warranties*

9.1 Ownership

The Supplier represents and warrants that:

a) It is the legal and beneficial owner of the goods; and

b) that upon payment of the contract sum no person other than the Purchaser will be entitled to hold any interests in, or hold any encumbrance over, the goods.

9.2 Supplier's Warranty

The Supplier represents and warrants that the goods will upon delivery:

a) comply in all respects with the Contract;

b) be suitable for the purpose stated in Item 5;

c) be of merchantable quality;

d) conform to any sample provided by the Supplier and approved by the Purchaser.

e) in the absence of any specific provision of the Contract, meet any relevant Australian Standard and industry best practice;

f) be free of design defects;

g) be, unless otherwise agreed, new.

If the Supplier is in breach of any of the warranties in this clause 9, the Purchaser may, in addition to the Purchaser's other rights and remedies, at any time give 7 days' written notice to the Supplier to rectify such breach, and if the Supplier fails to comply with such notice, the Purchaser may employ others to carry out works required to satisfy the warranty. The cost thereby incurred shall be moneys due and payable to the Purchaser.

The representation and warranties in this clause survive the completion or earlier termination of the Contract and each warranty in this clause is independent of, and is not limited by, reference to any other warranty.

The Supplier shall obtain all warranties relevant to the goods from manufacturer or suppliers or as otherwise specified in the Contract, including any warranties that are provided by any sub-contract and ensure that the Purchaser has the benefit of those warranties. "

19. Delivery

Add the following to 19.1 Date and Place for Delivery, at the end,

"The Supplier must ensure that all goods are properly, safely and securely packaged and labeled for identification and safety as follows:

a) the goods must be individually packaged for transport so that they are protected from all reasonably foreseeable condition which might cause corrosion, deterioration or physical or bearing damage during handlings and transport. All packaging and preservation materials must be supplied by the Supplier; and

b) each package must be clearly and indelibly inscribed with the Purchaser's name, the address of the delivery place, the Purchaser's contract number and any safety warnings for the contents."

24. Payment

Under 24.1 Invoices and Time for Payment, make the following change.

Replace

"Within 14 days after receiving an invoice under this Sub-clause, the Purchaser shall pay to the Supplier the amount then due to the Supplier pursuant to the Contract."

28. Dispute Resolution

Replace "28.2 Conference" and contents with the following:

"28.2 Conference

Within 14 days after receiving a notice of dispute, the parties shall confer at least once to resolve the dispute or to agree on methods of doing so, including, but not limited to, mediation, conciliation, binding expert determination and arbitration, of the whole of any part of the dispute. Where arbitration is agreed method of resolution, the arbitration shall be conducted in accordance with the rules of Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers.

At every such conference, each part shall be represented by a person having authority to agree to such resolution or methods. All aspects of every such conference except the fact of occurrence shall be privileged.

If the dispute has not been resolved nor a method of resolution agreed within 56 days of service of the notice of dispute, that dispute shall be dealt with in accordance with subclause 28.3."

Replace "28.3 Arbitration" and contents with the following

"*28.3 Elevation of Disputes*

If the parties are unable to resolve the dispute or agree a method of resolution in accordance with sub clause 28.2:

a) the dispute shall be referred to the Chief Executive Officer, or a duly authorized representative, of the Purchaser and the Chief Executive Officer/Managing Director, or a duly authorized representative, of the Supplier to resolve the dispute or agree on a method of resolution;

b) the individuals referred to in sub clause 28.3 (a) shall meet within 14 days after referral of the dispute in an effort to resolve the dispute or agree a method of resolution;

c) if the individuals referred to in sub clause 28.3 (b) are unable to resolve the dispute but agree at that meeting on a method of resolution, they shall also nominate a timeframe for the commencement and conclusion of the method of resolution; and

d) if the individuals so referred to in sub clause 28.3(b) are unable to resolve the dispute or agree a method of resolution, each within 14 days of the dispute being referred, either parts may give written notice to the other stating that the parties have been unable to resolve the dispute or agree a method of resolution.

Where arbitration is the agreed method of resolution, the arbitration shall be conducted in accordance with the Rules stated in Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers."

Replace "28.4 Summary Relief" and the contents with the following:

"28.4 Instituting Proceedings
Neither party shall proceed to resolve a dispute by instituting court proceedings until issuing to, or receiving from, the other party, a notice in accordance with sub clause 28.3(d)."

Add the following after 28.4 Institutional Proceedings

"*28.5 Summary Relief*
Nothing herein shall prejudice the right of a party to institute proceedings to enforce payment due under the Contract or to seek injunctive or urgent declaratory relief."

Annexure A

Replace Annexure A Part A with the form provided in Schedule B.

5 REFERENCES

5.1 Applicable Standards

High voltage metering units shall be designed, manufacture and tested in accordance with the following Australian Standards and all amendments issued prior to the date of closing of tenders except where varied by this Specifications.

AS 1100	Drawing Practice Scales – Part 7
AS 1194	Winding Wires Parts 1 – 4
AS 1243	Voltage transformers for Measurements and Protection
AS/NZS 1580	Paints and Related Materials – Methods of Test
AS 1627	Metal Finishing – Preparation and Pretreatment of Surfaces
AS 1650	Galvanized Coatings
AS 1675	Error Ratio & Phase angle for Current Transformers
AS 1767.1	Insulating Oil for Transformers and Switchgear
AS 1931	HV Testing Techniques – General Definitions and Test Techniques
AS 2312	Guide to the Protection of Iron and Steel Against Exterior Atmospheric Corrosion
AS 2700	Colour Standards for General Purposes
AS 3000	Electrical Installations
AS 4436	Guide for Selection of Insulators in Respect of Polluted Conditions
AS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS 60137	Insulated Bushings for Alternating Voltages above 1000V
AS 60529	Degrees of Protection provided by Enclosures for Electrical Equipment
AS 62271.200	High Voltage Switchgear and controlgear (Part 200)
AS/NZS 9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing
IEC 60068	Environmental Testing (All parts)
IEC 60694	Common specifications for high voltage switchgear and controlgear standards
IEC 61619	Insulating liquids - Contamination by polychlorinated biphenyls (PCBs) - Method of determination by capillary column gas chromatography
IEC 61869	Instrument Transformers (all parts)
IEC 62271	High voltage switchgear and controlgear (all parts)
IEC 17025	General requirements for the competence of testing and calibration laboratories Production, Installation and Servicing

Equipment's conforming to any international standard(s) which ensure(s) equal or better quality than the standard(s) mentioned above will also be acceptable and in such case(s) the copy of standard (English version) adopted should be provided with the Bid.

Should inconsistencies be defined between Standards and these Specifications, this Specification will take precedence. However, significant inconsistencies shall be referred to FEA for resolution.

5.2 Applicable Laws

The Bidder warrants (without limiting any other warranties or conditions implied by law) that all Goods have been produced, sold and delivered to FEA in compliance with all applicable laws (including all workplace health and safety and electrical safety legislations and codes of conduct).

6 SERVICE CONDITIONS

6.1 Environmental Conditions

The high voltage metering units shall be suitable for installation outdoors and shall be designed to withstand the service conditions of Clause 1.2 of AS 2374 (Part 1), with the following additions.

Height above sea level	:	not exceeding 1000 m	
Atmosphere	:	Saliferous, corrosive and dusty	
Ambient temperature	:	Peak :	40^{o}C
	:	24 Hour Average:	30^{o}C
	:	Annual Average:	22^{o}C
	:	Minimum:	10^{o}C
Relative Humidity (Average)	:	90%	
Annual Average Rainfall	:	1900 mm	
Wind Speed	:	Sustained :	55 m/s
	:	Gusts :	70 – 110 m/s
Isokeraunic Level	:	60 Thunder days per year	
Seismic	:	To a maximum of 7 on the open-ended Richter Scale	

Note: Fiji is situated in a region where cyclones are experienced frequently. All plant and equipment shall be designed and constructed to withstand these extreme conditions. All plant and equipment shall be rust proof, vermin proof and weather proof and designed to be suitable for a damp, tropical climate, which may be experienced simultaneously.

6.2 System Conditions

The rated frequency of FEA's power system is 50 Hz.

Each unit shall be suitable for use on its respective system position.

Highest (Equivalent) System Voltage:	12kV
Number of phases:	3
Impulse Withstand voltage (peak):	95kV (peak)
Power frequency withstand voltage:	28 kV
Nominal system voltage:	11kV
System earthing:	Effectively earthed
Short Circuit Level	25kA for 3sec

7 DESIGN AND PERFORMANCE CRITERIA

7.1 High Voltage Switchgear

7.1.1 General

The high-voltage switchgear shall be provided with the metering cubicle and switch/disconnector cubicle to allow incoming cable connections. The metering cubicle shall house the metering equipment, including the instrument transformers. Options shall be provided to allow either a single incoming cable connection or two cable connections. The high voltage switchgear will be bonded to an earthing system using (green/yellow) at least PVC insulated 70 mm² copper cable.

The primary busbar system shall be designed to have a continuous rating of 630Amps minimum, without any temperature-dependent factors.

7.1.2 Clearances and Insulation

The minimum electrical clearance in air to earth for all high voltage parts of the equipment shall be not less than that specified in AS 2067. All current carrying high voltage conductors that are air insulated (not in SF6 gas tank) shall be enclosed with either cold shrink or thermofit insulation.

7.1.3 Equipment Housing

The design of the HV switchgear shall be such that all electrically active parts of each switchgear function and inter-bay busbars are housed in a sealed enclosure.

7.1.4 Operation

The HV switchgear shall be ergonomically designed with operating handles preferably of the removable type. The handle shall be of such a length that it complies with the relevant internal arc protection requirements and extends beyond the enclosure to enable ease of operation. The effort exerted on the handle by the operator should not be more than 250 N.

7.1.5 Switch Disconnector

The switch disconnector along with the earth switch shall be load breaking and fault making type and comply in all respects with AS 60265.1-2001, AS 62271.102-2005 and AS 62271.100-2008. Switches shall be designed for interrupting full rated current as stated as well as small inductive or capacitive currents involved in disconnecting cables or overhead lines.

The switch-disconnector shall be provided with an interlocked earthing switch for earthing the isolated incomer cable. Option of having two independent manual operating mechanisms for switch disconnector and earth switch is also acceptable. However the Bidder shall ensure that the safety of operators is not compromised and the interlock systems are provided in these specifications.

The design shall prevent simultaneous closing of the main switch contacts and the earth switch contacts. The switch-disconnectors and earth switches shall be three-phase and gang operated. The earth switch contacts shall be designed to close into a fault and shall have the same short circuit capacity as that of the main switch disconnector itself. The front panel of each switch unit shall incorporate a mimic display of the switching arrangement with clear signs to ensure a high level of safety in operation. The operating positions shall be clearly marked, indicating the "ON" and "OFF" position for both the switch-disconnector and earthing switch.

7.1.6 High Voltage Metering Cubicle

The high voltage metering cubicle shall be a component of the high voltage switchgear system and house the instrument transformers required to make the complete HV metering solution. It shall be

designed such that if the current transformers or voltage transformers are to be replaced in future, then they shall be done with ease. Instructions for such repair or replacement work shall be provided with the offer.

The cubicle shall be designed to allow single-core, 300mm^2 Aluminium cables connections per phase.

7.1.7 Insulating and Switching Mediums

Switch units shall be of vacuum or SF6 gas interrupter type. Oil immersed switchgear will NOT be considered.

The detailed procedure for replacing a vacuum bottle shall be stated in the instruction manual.

Where SF6 gas interrupters are used, it shall comply with the requirements of AS 62271-200. Switchgear that requires the periodic filling of SF6 gas WILL NOT be considered. A stainless steel label shall be fixed to the switchgear stating the total mass and volume of SF6 gas present in the switchgear at a specified date. The Bidder shall state the nominal SF6 gas filling pressure and nominal fill temperature.

The annual loss rate of SF6 gas shall not exceed 0.1% of the total mass. The Bidder shall confirm that this requirement can be achieved and detail the guaranteed annual loss rate for the Switchgear. Any departure from this requirement shall be clearly stated in the Technical Schedules. The Bidder shall guarantee that pressure of the SF6 gas shall be above the operating limit throughout the lifetime of the switchgear.

A robust SF6 gauge(s) shall be provided for visual indication of SF6 gas pressure inside the switchgear chamber. The SF6 gauge shall be readily visible from the front of the unit without the necessity to remove any covers and be clearly marked to indicate the normal gas pressure by a green area on the gauge face and the low gas pressure by a red area on the gauge face.

The switchgear and busbar housing containing SF6 gas shall be sealed for life except one common access point for the SF6 gas gauge sensor via the SF6 gas non return valve. A separate low pressure SF6 gas switch shall be provided for low pressure alarm. The low pressure switch is to be set to operate at pressure which will indicate loss of SF6 within switchgear and will not generate false alarms as the SF6 gas pressure drops due to the ambient temperature drop or change.

Bidder shall state the pressure at which the switch is activated (in bar or kPa) which shall be greater than atmospheric pressure.

7.1.8 Interlocks

An adequate mechanical interlock system shall be provided to prevent mal-operation and to ensure operator safety. The design of the interlock system must be such that it shall not be possible for the operator to physically override the interlock controls.

7.1.9 Padlocking

The switchgear shall have robust padlocking facilities for locking each switch operating handle entries in the “ON” or “OFF” position. This provision includes switch-disconnector and fuse-switch and earth switch. These locking facilities shall prevent inadvertent operator switching as well as unauthorized switching.

The switchgear shall have a minimum 10 mm diameter hole for attaching the padlock at the lips of the operating handle entries. The padlocking facility material shall be robust and compatible with the life

of the switchgear. The Bidder shall ensure that the padlocking facilities are properly secured so that they are not susceptible to damage during transportation.

7.1.10 Voltage Indication

The switchgear shall provide a means of permanent voltage indication with bright indicators on all phases. Provision shall also be made for the use of test lamps as an additional means of voltage indication. The switchgear shall have voltage test points to allow phasing out of the switchgear. Voltage indication systems that require an external power supply will not be accepted.

7.1.11 Cable Connections

The switch-disconnector and metering cubicles of the switchgear shall be provided with a cable box, enclosure or compartment suitable for the cable terminations. The switchgear shall be equipped with facilities for earthing and testing of all connecting cables. There shall be adequate clearances so that HV testing of a cable may be carried out with safety for both the tester and equipment.

Bidders shall ensure that the cable compartment is designed to accommodate single-core 300mm^2 Aluminium-core XLPE insulated cables per phase.

7.1.12 Cable Entry and Cable Support

Incoming cables shall be bottom entry. Suitable cable supports in the form of cable mounting plates and cable cleats complete with mounting accessories shall be supplied at the base of the switchgear units to support incomer cables so that the weight of the cables is not transferred to the switchgear terminal bushings.

7.1.13 Earthing

Earth connection points for terminating suitably sized cable lugs for the purpose of making earth connections shall be provided. All earth bars shall be rated for fault currents to allow for the termination of cable screen wires. The preferred location of these earth connection points shall be located inside the front left and right hand panel near the base of the leftmost and rightmost cable compartments respectively and away from the cable terminations.

7.1.14 Surface Protection

The Equipment may be installed in severely corrosive condition mainly induced by water, salt laden atmosphere and low levels of industrial pollutants. FEA requires all exposed internal and external surfaces to be cleaned, prepared and treated with a coating system suitable for severe marine environments corrosion category E-M in accordance with AS 2312-2002. It is not expected that the switchgear will require re-coating during the anticipated lifespan of the Equipment.

The estimated life of the protective coating shall also be specified.

Bidders shall provide details of all tests (accelerated aging, salt spray, fog, impact, etc.) that prove the effectiveness of the proposed protective coating. All testing shall be carried out in accordance with AS 1580.0-2004 or equivalent international standards.

7.1.15 Mounting Bases

Bidders shall advise if mounting bases are required for all switchgear, to prevent deformation of the equipment and its functionality during handling, lifting or transportation. Bidders shall submit details of the handling, lifting or transportation instruction for such a design with the bid. Separate designs and installation instructions along with details of centre of gravity.

7.2 Instrument Transformer Requirements

The CTs and VTs shall be adequately braced to withstand all mechanical shocks which may occur under working conditions including those produced by short circuits and also stress resulting from transport, lifting by slings and forces arising from the connection of cables.

7.2.1 Internal CT and VT Core and Primaries

The Bidder shall provide information as to the quality of steel laminations used in the cores of the current and voltage transformers to maintain the initial accuracy and performance of the CTs and VTs.

The high voltage windings of the voltage transformers shall be insulated from the cubicle. The high voltage windings of the voltage transformers shall be star connected and brought out to a neutral bushing and connected to the earth terminal with an earth link.

7.2.2 Current Transformer

The design and performance of the current transformer shall comply with IEC 61869. The current transformer shall be installed in such a location that is easily accessible for inspection and testing.

The current transformers shall comply with the following:

a. It shall be suitable for 11kV and with frequency of 50Hz
b. It shall have a narrow type with dual ratio
c. It shall have the tapped Primary current ratings of 200/400Amps
d. It shall have secondary current rating of 5Amps (continuous)
e. It shall have a minimum burden of 30VA at maximum ambient temperature so that it can support the FEA standard energy meter and secondary leads, and it shall have an accuracy of 0.5S class or lower
f. It shall have a thermal limit current of not less than 200% of rated current

The secondary terminals of the CTs shall be robust in design so as to provide effective and firm termination.

7.2.3 Voltage Transformer

The design and performance of the voltage transformer shall comply with IEC 61869. The voltage transformer shall be installed in such a location that is easily accessible for inspection and testing.

The voltage transformer (VT) shall comply with the following specification:

a. It shall be suitable for an operating voltage of 12kV under continuous operation and with a nominal frequency of 50 Hz
b. It shall be rated at 11,000/110 V
c. It shall have minimum rated burden of 100VA at ambient temperature
d. It shall have a voltage factor of 1.5
e. It shall be uniformly insulated
f. It shall have an accuracy class of 0.5S or lower
g. Colour coding shall be via Red/Yellow/Blue for identification of phases and black for neutral
h. It shall be designed so that the increased magnetising current due to any persisting over-voltage does not produce injurious overheating. Phase barriers shall be provided.
i. The low voltage windings of the voltage transformers shall be star connected inside the enclosure with the phase ends and neutral brought out.
j. The star point (neutral) shall be insulated from the enclosure and connected to a separate neutral terminal.

7.2.4 Secondary Cable

A secondary cable shall be provided between the CTs and VTs and the low voltage compartment of suitable length and sufficient number of cores to allow connection to the CT and VT secondaries from the low voltage compartment. The conductor size has to be at least 4mm2 and each core shall be

individually labeled. The secondary cable shall be terminated at the terminal box with a suitable marine grade weatherproof cable gland.

All wiring within the low voltage compartment of the metering unit shall be laid and restrained as per AS/NZS 3000 Clause 3.9.8.3, so that there is no possibility of it coming into contact with any live apparatus.

Terminals or intermediate connectors between low-voltage compartment and the respective CT and VT secondaries shall not be used. Insulated crimp type lugs/connectors are not to be used in any of the CT-VT secondary wiring terminations, non-insulated crimp connectors are permissible.

7.3 Housing and Corrosion Protection

All internal and external surfaces shall be protected against corrosion. All exposed metal surfaces shall be protected by the application of a painting system at least equivalent to ISO 9223 Category C4-C5 in Table B1 and suitable for severe marine environments as specified in AS 2312.

7.4 Fittings

The complete HV switchgear, with switch-disconnector and metering compartment, shall be supplied with fittings as detailed below.

7.4.1 Lifting Provision

Lifting lugs/eyes shall be provided for lifting the unit.

7.4.2 Nameplate

A nameplate shall be provided for the complete switchgear, labeled in accordance with AS 62271.1-2012 and AS 62271.200-2005, and fitted such that it is clearly visible on the front of the panel. The true rating of each of the component parts shall be marked by etching or stamping on the plate. The following information shall be provided on the rating plate (minimum requirement):

- True rating of each of component parts (busbar, instrument transformers, switch-disconnector, earth switch etc.)
- Serial number of cubicle
- Year of manufacture and testing
- Engineering Standards to which equipment is manufactured and tested
- IAC category

The nameplate shall be made of stainless steel and shall be permanently fitted - by means of rivets or firmly bolted down using stainless steel bolts. Stick-on, glued-on or painted-on nameplate labels are NOT acceptable.

Nameplates shall be also provided for the instrument transformers, which shall be installed in a location which is accessible and visible when the unit is energized.

7.4.3 Terminal Markings

The medium voltage terminals shall have markings in upper case, such that red phase is A1, A2, yellow phase is B1, B2 and blue phase is C1, C2. The terminal markings shall be so applied that at the instant when current through the primary winding is from A1 to A2 the direction of the secondary current through the external circuit providing the burden is from as1 to as2.

7.4.4 External Markings

In addition to nameplate markings, FEA's stock code shall be stencilled in black numerals onto the tank where it can be easily seen. Each numeral shall be 75 mm high and have a body width of not less than 12 mm.

DANGER signs as per AS/NZS 3000 shall be fixed to the MV and LV panels which can provide access to high voltage parts. Wording on signs at these locations shall consist of letters not less than 12 mm high and shall contain the words '**DANGER — HIGH VOLTAGE'.**

8 TESTING

8.1 Test Requirements

Prior to delivery, the units shall have completed the type, routine and accuracy tests and inspections as required by the relevant international and Australian standards. The passing of such tests shall not prejudice the right of FEA to reject the Equipment if it does not comply with the Specification when installed.

All testing shall be undertaken by an IEC 17025 accredited test house. The Bidder shall submit evidence showing IEC 17025 compliance. A formal report covering the outcome of the testing shall be made available to FEA.

8.2 Type Test Obligations

All units of the same design shall be identical in all respects relating to materials, design and manufacture.

A copy of the type test certificates shall be provided upon request, free of charge, to FEA for any item purchased against this specification. If a specific item was not tested in the past, FEA shall allow the tests to be performed on units purchased at the Supplier's expenses. Should FEA require any test(s) to be repeated despite the earlier certificate being available for an identical (or similar, as allowed below) unit, the cost of such test will be borne by FEA.

The Bidder may be requested during the tender evaluation period to substantiate that claim with written engineering evaluation. Such evaluation shall provide all relevant details permitting FEA to establish validity of existing type tests.

Any modification, resulting from a type test failure or change of design instigated by the Supplier or change of design to comply with the specification, which could affect the result of earlier type tests, shall require a repeat of such earlier type test. Any repeat type tests to provide compliance with the Standard's requirements shall be to the Supplier's cost.

8.3 Metering Equipment

8.3.1 Type Tests

The instrument transformers shall be type tested in accordance with this specification and the IEC 61869-1, IEC61869-2 and IEC 61869-3.

As a minimum the following type tests shall be required:

- Temperature rise test
- Impulse voltage test on primary terminals

- Electromagnetic compatibility tests
- Tests for accuracy
- Verification of degree of protection

Accuracy tests shall include current flow in both directions through the current transformer of the HV metering unit. Where the offered product has already undergone such type testing according to IEC 61869, the Bidder shall furnish complete type test reports with its bid.

8.3.2 Routine Tests

Individual Routine tests shall be applied to each individual HV metering unit in accordance with this specification and IEC 61869-1, IEC61869-2 and IEC 61869-3.

As a minimum, the following shall be required:

- Power frequency voltage withstand tests on primary terminals
- Partial discharge measurements
- Power frequency voltage withstand tests between sections
- Power frequency voltage withstand tests on secondary terminals
- Test for accuracy
- Verification of markings

Where the offered product has already undergone such routine tests in the past, the Bidder shall submit copies of such routine tests with its bid.

The test reports of all routine tests performed on the HV metering units shall be submitted to FEA prior to the delivery of the batch HV metering units.

8.4 High Voltage Switchgear Tests

8.4.1 Type Tests

Type tests shall be carried out on the HV switchgear according to IEC 62271 and AS 62271, and other related standards.

The following shall be required as a minimum:

- Power frequency voltage withstand test according to IEC 62271-200
- Lightning impulse voltage withstand test according to IEC 62271-200
- Power frequency voltage withstand test on auxiliary circuits according to IEC 62271-200
- Short time withstand current test according to IEC 62271-200
- Verification of IP coding according to IEC 62271-200
- Enclosure tightness test according to IEC 62271-200
- Electromagnetic compatibility test according to IEC 62271-200
- Verification of making and breaking capacities according to IEC 62271-200
- Mechanical operation test according to IEC 62271-200

The equipment shall also have undergone seismic qualification dynamic analysis according to IEEE 693.

Where the offered product has already undergone such type testing according to IEC 62271, the Bidder shall furnish complete type test reports with its bid.

8.4.2 Routine Tests

Routine tests shall be carried out on the HV switchgear according to IEC 62271 and AS 62271, and other related standards.

The following shall be required as a minimum

- Dielectric test on the main circuit according to IEC 62271-200
- Tests on auxiliary and control circuits according to IEC 62271-200
- Tightness test according to IEC 60694
- Design and visual checks according to IEC 62271-200
- Mechanical operation test according to IEC 62271-200

Where the offered product has already undergone such routine testing according to IEC 62271 and other related standards, the Bidder shall furnish complete type test reports with its bid.

8.4.3 Other Tests

The Bidder shall carry out as many IAC tests necessary to gain compliance with AS 62271.200 and AS 62271.202 at their own cost. Any design modification done to the equipment must comply with the IAC test requirements. These tests will have to be carried out by the Bidder at their own cost.

The indoor IAC test on the switchgear equipment itself shall be carried out in accordance with AS 62271.200. The minimum test current shall be equal to the rated short circuit withstand current of the HV switchgear unit for a period of three (3) seconds.

If the various tests associated with fault levels of 25kA have not been carried out on the design offered, the Bidder shall state what tests it guarantees to have made and by which testing authority and shall demonstrate that the tests.

8.5 Witnessing of tests

The Bidder shall make allowance for witnessing of routine tests by one FEA Engineer. The return-air travel, accommodation, meals and other expenses related to routine test witnessing shall be borne by the Bidder. Such costs shall not be provided separately from the offer of HV metering units.

The Supplier shall give FEA not less than four (4) weeks' notice of when each and every type test will be carried out. Such witnessing shall be required once in the contract period, upon purchase of the first unit. A copy of Inspection and Test Plan shall be submitted to FEA with the bid submission, which shall be used in the factory.

8.6 Test certificates

Two certified copies of all test results shall be supplied to FEA. Electronic copies shall also be submitted. All test certificates shall include the manufacturer's serial number. On allocation, the corresponding FEA stock code must be added to the certificate, or attachment to the test report.

9 RELIABILITY

9.1 Service Life

Bidders are required to comment on the reliability of the equipment and the performance of the materials offered for a service life of 45 years under the specified system and environmental conditions.

9.2 Spare Parts and Maintenance

The Supplier shall supply a list of recommended spare parts, special tools and appliances required for the whole of life operation and maintenance of the HV metering unit installation. The list, together with prices, shall be indicated in the appropriate schedule. The Supplier must also provide details (if required) of the recommended maintenance and the frequency at which it must be carried out. Details of the manufacturers repair capability and options shall be provided

9.3 Evidence in Support of Reliability

The Supplier shall indicate and provide updates to FEA the mean time between failures (MTBF) of the HV metering unit and its components including the recommended maintenance regime and maintenance tasks and intervals. This regime shall be based on the mean time between failure (MTBF) and the critical failure modes identified by the failure mode, effects and criticality analysis (FMECA) of the equipment. Details substantiating the FMECA analysis shall be included in the offer.

Such comments will include evidence in support of the reliability and performance claimed including information on Failure Mode and Effect Analysis.

10 ENVIRONMENTAL CONSIDERATIONS

Bidders are required to comment on the environmental soundness of the design and material used in the manufacture of the items offered. In particular, comments should address such issues as recyclability and disposal at end of service life.

FEA will require, after the evaluation and award of the Tender, to visit the Supplier's factory for compliance checks on various Environmental protection practices in the design, manufacturing, testing and supply of HV metering units.

11 PACKAGING AND MARKING

The packaging of items by the Bidder must ensure that they are capable of being delivered undamaged giving due consideration to the quantity, distance of transportation and the preferred method of handling at each location.

The Bidder shall take all necessary precautions to ensure safe handling of all HV metering units and associated accessories supplied.

12 QUALITY REQUIREMENTS

12.1 Quality System

Bidders are required to submit evidence that the design, manufacture and testing of the HV metering units are in accordance with AS/NZS 9001.

Documentary evidence shall be provided concerning the level of Quality System Certification associated with the supplier and or manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

FEA may require, after the evaluation and award of the Tender, to visit the Supplier's factory for compliance checks on various quality management practices in the design, manufacturing, testing and supply of HV metering units.

13 STOCK AVAILABILITY

The bidder is required to show the size of his/her stock holding and the ability to meet the required estimate quantity per annum. The movement (usage) of the HV metering units is as outlined in the table below.

FEA Stock Code	Item Description	Movement in Last Four Years (2014-2017)
I04592	11kV Metering Unit	4

14 PRODUCT WARRANTY PERIOD

The Bidder is required to provide the warranty period as part of the proposal.

A minimum warranty period of twenty-four (24) months from time of dispatch from factory shall be provided.

15 INFORMATION TO BE SUPPLIED BY THE BIDDER

15.1 Documentation to be supplied with the tender

To enable FEA to fully evaluate the HV metering unit offered, (in addition to the completed Specification Requirement and Guaranteed Performance schedules) the Bidder will submit the following information with their tender:

- List showing similar equipment supplied to or on order for other utilities for at least the past ten years, as per Schedule A
- Completed Schedule B as per specifications
- Completed Schedules C and D
- Typical arrangement drawings, wiring diagrams and full details of the dimensions of the HV metering unit
- Type test certificates for the HV metering unit offered, including HV equipment, CTs and VTs and switchgear
- Short circuit test details for equipment of similar design and rating
- Sample inspection and test plans
- Typical installation and maintenance manuals
- End of service life disposal method
- Full details of the protective coatings offered
- A list of all departures of the tender from this specification, using form in Schedule E
- Evidence of quality management systems used in manufacture, testing and supply
- Evidence of Health, Safety and Environmental plans
- Evidence of financial ability to provide the level of service and support
- Origin of materials used in manufacture of the HV metering unit
- Detailed procedure for receiving, handling, lifting and storage
- Names and resumes of key team members who will be assigned to work with FEA upon successful award of the three-year supply contract (if Bidder is successful).

Where sub-contractors are used, the Bidder shall provide the above information for the sub-contractors as well.

Bidders may be asked to provide additional information during tender assessment period or following award of contract.

15.2 Documentation to be supplied during the course of the contract

Within two (2) weeks of the placing of the order, the successful Bidder shall supply copies of the following:

a) A certified outline drawing for HV metering unit
b) Inspection and Test Regimes and plans

The Bidder must exercise reasonable diligence in the design of items in order to satisfy FEA's specific integration requirements between the Bidder's offered item and FEA's requirement for the item to be utilized in its electricity distribution network.

FEA will comment on the drawings supplied under the contract in relation to how the equipment interfaces with FEA's design, construction, operation, maintenance and other requirements. Comments about drawings by FEA shall not in any way absolve the Supplier of responsibility for the safety and reliability aspects of the plant or equipment supplied. The Supplier shall amend the drawings as directed and resubmit them to FEA within one week.

Drawings shall be to scale and in accordance with AS 1100. The contract number shall be shown prominently on all contract drawings. All drawings shall be produced on standard FEA borders, which shall be issued to the Supplier upon award of contract.

15.3 Samples

Samples of typical units may be required during the tender assessment period. Sample will be required only from Bidders who have previously not supplied transformers to the FEA.

When samples are required, production samples shall be delivered freight free, suitably packaged and labeled including reference to the Tender Number.

FEA may at its discretion either purchase the samples at the tendered price or return the samples to the respective Bidder after the contract has been awarded.

15.4 Training

Training material in the form of drawings, instructions and/or audio visuals shall be provided for all the items offered and accepted by FEA. This material shall include but is not limited to the following topics:

- Handling
- Storage
- Installation
- Maintenance program
- Environmental performance
- Electrical performance

- Mechanical performance
- disposal

The Bidder shall also be required to provide training to FEA personnel (two sessions, one in Suva and the other in Navutu, to an audience of 25 per session) soon after contract award, and once a year thereafter, at the Bidder's cost, on the items above. Such cost shall be included in the cost of supply of HV metering unit and FEA WILL NOT pay separately for such training.

SCHEDULE A: LIST OF EXPERIENCE, PERSONNEL & FINANCIAL STATEMENTS

Previous Experience

The Bidder is to submit a list of Projects worked under with a similar scope, involving the design and manufacture of control panels for outdoor switchgear 33kV and above, in chronological order of year completed.

Client	Scope and Description	Quantity of HV Metering Units Supplied	Contact Person

Personnel

The Bidder is to submit list of personnel who will be allocated to work with FEA for the contract period and also provide their resumes in its bid.

Name	Designation	Duration of Employment with Company	Years of Experience

Financial Statements

The Bidder shall also submit past three years audited financial statements and records showing its financial ability to undertake this project.

SCHEDULE B: AS 4912 ANNEX A (TO BE SUBMITTED BY BIDDER)

Item		
1	Purchaser (Clause 1)	Fiji Electricity Authority
2	Purchaser's Address	2 Marlow Street, Suva
3	Supplier (clause 1)	Supplier to provide
4	Supplier's Address	Supplier to provide
5	Stated purposes (clause 1 definition of acceptable)	As stated in tender specifications and/or purchase order
6	a) Jurisdiction (legislative requirements)	Fiji
	b) Governing Law	Laws of Fiji
7	a) Currency (clause 1(g))	Supplier to state
	b) Place for payments (clause 1 (g))	Same as Item 2
	c) Place of Business of bank (clause 1(c)- definition of security)	
8	Term (clause 1)	3 years
9	The Goods clause 1	As stated in tender specifications
10	Minimum *purchase* order quantity subclause 2.2 (a)(i)	One (1)
11	Minimum reorder intervals subclause 2.2 (a)(i)	Not applicable
12	Maximum *purchase* order quantity subclause 2.2 (b)(ii)	Supplier to state
13	Minimum quantity to be ordered during term subclause 2.2 (a)(iii)	Not applicable
14	Maximum quantity to be ordered during term subclause 2.2 (b)(iii)	Not applicable
15	Supply lead time subclause 2.3(c)	Supplier to provide
17	Supplier's security	Not Applicable
18	Purchaser's security	Not Applicable
19	Purchaser – Supplied documents (subclause 6.2)	As stated in tender specifications
20	Supplier- supplied documents (subclause 6.3)	As stated in tender specifications
21	Time for Purchaser's direction about documents (sub clause 6.3 (b))	14 days
22	Legislative requirements, those expected (subclause 10.1)	Not applicable
23	Reference date (subclause 10.2 (b))	Date of closing of Tender
24	Time by which the insurance cover of goods is to be effected (subclause 13.1)	Time at which order is placed
25	Public and product liability insurance (subclause 13.2)	Supplier to provide
26	Qualifying causes of delay, causes of delay	Not Applicable

	for which EOTs will not be granted	
27	Liquidated damages, rate (subclause 17.5)	0.5% per day upto 10% of the purchase order value
28	Delay Damages	As assessed by FEA
29	Date for completion of acceptance testing (subclause 18.1 and 21.1)	As stated in tender specification
30	Party responsible for unloading the *goods (subclause 19.1)*	Supplier
31	a) When risk in the *goods* passes (subclause 20.1)	At time of acceptance by Purchaser.
	b) Time at which ownership of the *goods passes* to the Purchaser (subclause 20.2)	Upon payment of the purchase order value
32	Period for *Purchaser's* notice that *goods* are rejected (subclause 21.1)	14 calendar days
33	Period for *Purchaser's* notice accepting or rejecting *Supplier's* proposal (subclause 21.4)	14 calendar days
34	Defects liability period (clause 22)	24 months
35	Invoice (subclause 24.1) Time for Invoice	Within 30 days of delivery
36	Interest rate on overdue payments (subclause 24.3)	Nil.
37	Supplier's default (subclause 25.2 (c))	28 days
38	Arbitration (subclause 28.3) a) Person to nominate an arbitrator	President of Fiji Institute of Engineers
	b) Rules for arbitration	Laws of Fiji
39	The Supplier's liability is limited as follows (clause 29)	Purchase order value
40	The Purchaser's liability is limited as follows (clause 29)	Purchase order value

SCHEDULE C: SPECIFICATION REQUIREMENT (METERING UNIT)

Item	Particulars	Specified Requirement	Offered
	General Details		
	Name and Address of Manufacturer		
	Country of Manufacture of components: - HV cubicle - Current Transformer - Voltage Transformer		
	Number of years since the offered unit has been in production		
	Number of units sold worldwide		
	Metering High Voltage Cubicle		
	Nominal System voltage	11kV	
	Highest system voltage	12kV	
	Nominal system frequency	50Hz	
	Impulse withstand peak voltage	95kV	
	Power frequency withstand voltage (a) Primary (b) Secondary	 28kV 3kV	
	Rated current	600Amps	
	Short time current (1 second)	25kA	
	Minimum phase to phase distance	255 mm	
	Shortest distance between metal part and earth	190mm	
	Make & type of HV bushing		
	Bushing Profile		
	Bushing Material		
	Bushing Creepage		
	Housing and Corrosion Protection of Equipment – Details (thickness of coating, paint system etc.)		
	Insulating Medium		
	Current Transformer		
	CT Ratio	400/200/5A	
	Rated burden in VA	10VA	
	Kneepoint voltage (@ highest ratio)		
	Class of accuracy	0.5 or less	
	Maximum ratio error	As per AS 1675	
	Maximum phase angle error	As per AS 1675	
	Maximum attainable winding temperature	80 deg C	
	Insulation Level	28kVrms/75kVpk	
	Short time thermal current rating for 1 sec	CT Primary 6kA for upto 20/5A& 13KA for >20/5A	
	Saturation Factor	To be indicated	
	Normal Current density of primary winding	=<1.6 Amps per sq.mm	
	Continuous percentage over load	120%	
	ISF		
	Voltage Transformer		
	VT Ratio	11,000/110 V	
	Rated burden in VA	100VA	
	Rated voltage factor and time	1.2 continuous and 1.9 for 30 seconds	
	Temperature rise over max ambient temperature	As per AS1675	

	Maximum phase angle error	As per AS1675	
	Maximum ratio error	As per AS1675	
	Maximum attainable winding temperature	80 deg C	
	Class of accuracy	0.5 or less	
	Insulation level	28kVrms / 75 kVpk	
	Winding connection	Star / Star	
Weight of core & winding			
	Current Transformer		
	Core	To be indicated in separate sheet for each rating	
	Primary Winding		
	Secondary winding		
	Potential Transformer		
	Core	To be indicated	
	Primary Winding		
	Secondary winding		
	Quantity of oil in Ltr	To be indicated	
	Grade of oil	To be indicated	
	Total weight of complete ME including all accessories and oil	To be indicated	
Resistance of primary & secondary winding per phase at 75°C			
	CT Winding (i) Primary	To be indicated in separate sheet for each rating	
	(ii) Secondary		
	PT Winding (i) Primary	To be indicated	
	(ii) Secondary	To be indicated	
	Maximum attainable winding temperature	85°C	
	Bi-metallic terminal connector with nut, plain washer, spring washer & check nut suitable for aluminium conductor as per CT ratio	6 nos to be provided	
	Type of core material	To be indicated	
Type & thickness of gasket used on			
	Top cover tank	To be indicated	
	Secondary terminal box	To be indicated	
	HV bushings	To be indicated	
Details of Metering Unit			
	CT Details		
	Cross section area of each turn of CT winding (in sq mm)		
	Primary winding	To be indicated in separate sheet for each rating	
	Secondary winding		
	No of turns		
	Primary winding	To be indicated in separate sheet for each rating	
	Secondary winding		
	Winding material		
	Primary winding	To be indicated	
	Secondary winding	To be indicated	
	Voltage Transformer Details		
	Cross section area of each turn of PT winding (in sq mm)		
	Primary winding	To be indicated	
	Secondary winding	To be indicated	
	No of turns		
	Primary winding	To be indicated	
	Secondary winding	To be indicated	
	Winding material		

	Primary winding	To be indicated	
	Secondary winding	To be indicated	
Identification/marking of			
	Primary terminals		
	Incoming	RM, YM, BM	
	Outgoing	RL, YL, BL	
	Secondary terminals		
	CT's	1s1- 1s2, 3s1 - 3s2, for single ratio & 1s1- 1s2- 1s3, 3s1 3s2-3s3 etc for multi ratio	
	PTs	r,y,b,n	
Size and material of			
	Primary studs	M12 up to 20A& M16>20A.	
	Secondary studs	M6	
	Secondary chamber shall have double door type& sealing arrangement in both the doors	To be provided	
General			
	Dimensional Drawings, Electrical Drawings		
	Dimension of Terminal Box		
	Mass in kg		
	Dimensions in mm		
	IP Rating	IP44	
	Fittings as per Specifications		
	Drawing of Sample Nameplate		

SCHEDULE D: SPECIFICATION REQUIREMENT (HIGH-VOLTAGE SWITCHGEAR)

ITEM	REQUIREMENTS	UOM	12kV 3-PH SWITCHGEAR OPERATING AT 11kV NOMINAL SYSTEM VOLTAGE
D1 GENERAL			
D1.1	System highest voltage	kV (rms)	12
D1.2	Nominal system voltage	kV (rms)	11
D1.3	Lighting impulse withstand voltage	kV (peak)	95
D1.4	Power frequency withstand voltage (1 –minute) (rms)	kV – min (rms)	28
D1.5	Rated frequency	Hz	50
D1.6	Internal arc withstand (3s) (rms)	kA	25
D1.7	Design fault level (minimum 3s) (rms)	kA	25
D1.8	Maximum dimensions		
D1.9	Details of protective coating		
D1.10	Serviceable life expectancy (supported with design report)		
D1.11	Country of Manufacture and Testing		
D1.12	Name of Manufacturer		
D1.13	Address of Manufacturer		
D2 BUSBAR SYSTEM			
D2.1	Rated current (rms)	A	630
D2.2	Rated short – time withstand current (3s) (rms)	kA/time	25/3 second
D3.0 SWITCH-DISCONNECTOR			
D3.1	Rated normal current (rms)	A	630
D3.2	Power frequency withstand voltage (1-min) (rms)	kV	28
D3.3	Lightning impulse withstand voltage	kV (peak)	95
D3.4	Rated short- time withstand current (3s) (rms)	kA	25
D3.5	Rated peak withstand current	kA	50
D3.6	Making capacity (peak)	kA	50
D3.7	Load breaking capacity	A	630
D3.8	Busbar Current Rating	A	630
D3.9	Maximum cable sizes supported	-	• 11kV 3x 1 core $300mm^2$ Aluminium XLPE insulated PVC/HDPE sheathed. • 11kV 3x 1 core $240mm^2$ Copper XLPE insulated PVC/ HDPE sheathed.
D3.10	Minimum number of mechanical switching operations at no load	no.	1000
D3.11	Minimum number of mechanical switching operations at rated normal current (630A)	no.	100
D3.12	Minimum number of mechanical switching operations at rated short circuit current.	no.	5
D3.13	Padlocking facility provided with minimum padlock hole size (mm)	mm	As per specification
D3.14	Facilities for voltage indication (via Led lamp) and phase concordance provided per 3 –	-	Yes

	phase.		
D3.15	Switchgear main electric circuits degree of protection (IPxx)	-	IP64
D3.16	Switchgear drive mechanism degree	-	
D3.17	Switchgear MV cable compartment (with access cover closed) degree of protection	-	
D4 EARTH-SWITCH			
D4.1	Earth-Switches are provided for Switch-Disconnectors and Fuse-Switches panels.	-	Yes
D4.2	Power frequency withstand voltage (1-min) (rms)	kV	28
D4.3	Lightening impulse withstand voltage	kV (peak)	95
D4.4	Rated short-time withstand current (3s)	kA	25
D4.5	Rated Peak withstand current (3s)	kA	50
D4.6	Busbar Current Rating	A	630
D4.7	Stranded earth conductor size	mm^2	70/150
D4.8	Minimum number of mechanical switching operations at no load.	no.	1000
D4.9	Minimum number of mechanical switching operations at rated short circuit current	no.	5
D4.10	Padlocking facility provided with minimum padlock hole size (mm)	mm	10 mm hole

SCHEDULE E: FEA ENERGY METER SPECIFICATIONS & MANUAL

FEA energy meter manual is provided as a separate attachment/pdf file.

SCHEDULE F: DEPARTURE FROM SPECIFICATIONS

The Bidder shall nominate the Clause or relevant section of the tender specification and describe the departure.

Tender Specification Reference[i]	Departure

[i] Where possible, the Tender shall refer to the specific clause of the tender specification.