MR 268/2024

DESIGN, MANUFACTURE AND SUPPLY OF 415V STATION SERVICES INDOOR BOARD

ENERGY FIJI LIMITED

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2 INVITATION FOR TENDER

Energy Fiji Limited ("EFL") is responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Tavueni in Fiji. It owns a total of thirty-eight (39) Substations and switching stations on the islands of Viti Levu, Vanua Levu, Taveuni and Ovalau.

EFL is replacing the existing ACDB boards in 33kV/11kV zone substations as part of the aged asset replacement program. EFL is seeking bids from reputable manufacturers and suppliers for design, manufacture, testing and supply of the station services LVAC indoor switchboard.

All tenders for the contract shall be submitted on the appropriate forms provided and shall include the completed price schedule, technical schedule and schedules of experience etc. The bid shall be on the basis of a lump sum contract based on firm prices. Bids without completed returnable schedules will be viewed as unresponsive and will not be considered for evaluation.

During evaluation of tenders EFL may invite a tenderer or tenderers for discussions, presentations and any necessary clarification before awarding of the contract.

The tender submissions close at **1600hrs on 4th September, 2024** Fiji Time. Further information for this tender may be acquired from:

Jitendra Reddy
Manager Procurement Inventory & Supply Chain
2 Marlow Street, Suva, FIJI.
Phone: 679 3224320/9992400
Email: tenders@efl.com.fj

3 INSTRUCTIONS TO TENDERERS

3.1 Eligible Tenderers

This invitation is open to all Tenderers who have sound financial background, and have previous experience in supply of such equipment. Tenderers who are not manufacturers shall provide a letter of declaration from the manufacturer authorizing them to represent the nominated manufacturer.

Tenderers shall provide such evidence of their continued eligibility satisfactory to EFL as EFL shall reasonably request, using the forms provided in the Schedules.

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

3.2 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 EFL and from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. Tenderers shall be required to provide evidence of the origin of materials, equipment, and services in their bids.

For purposes of this Contract, "services" means the works and all project-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.

3.3 One Bid per Tenderer

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

3.4 Cost of Bidding

The Tenderer shall bear all costs associated with the preparation and submission of its bid and EFL willin no case be responsible or liable for those costs.

3.5 Site Visits

No site visits are required for this tender.

3.6 Contents of Bidding Documents

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

3.7 Clarification of Bidding Documents

A prospective Tenderer requiring any clarification of the bidding documents may notify EFL in writing by email.

EFL will respond to any request for clarification which it receives earlier than five (5) days prior to the deadline for submission of bids.

3.8 Amendment of Bidding Document

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

3.9 Language of Bid

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

3.10 Bid Prices

Unless specified otherwise, Tenderers 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 andsubcontracting (if any), testing and delivery.

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

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

3.11 Bid Currencies

Prices shall be quoted in a single currency only. **All Local bidders to quote with FJD VIP terms.**

3.12 Bid Validity

Bids shall remain valid for a period of **90 days** from the date of Deadline for Submission of Bids specified in Sub-Clause 3.15.

3.13 Format and Signing of Bids

The original copy of the **bid shall be typed** shall be signed by a person or persons duly authorized to sign onbehalf of the Tenderer. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.

The Tenderer upload Technical and Financial proposals on EFL’s electronic tender hosting website, https://www.tenderlink.com/efl. There will be no provision for hard copy submission.

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

3.14 Deadline for Submission of Bids

Bids must be received by EFL at the address specified above no later than 1600 hours (Fiji Time) 4th September, 2024.

EFL may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in whichcase all rights and obligations of EFL and the Tenderers previously subject to the original deadline willthereafter be subject to the deadlines extended.

3.15 Late Bids

Any bid received by EFL after the deadline for submission of bids prescribed above will be rejected andreturned unopened to the Tenderer.

3.16 Rejection of One or All Bids

EFL 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 Tenderer orTenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the rejection.

3.17 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 Tenderers or any other personsnot officially concerned with such process.

Any effort by a Tenderer to influence EFL's processing of bids or award decisions may result in the rejection of the Tenderer's bid.

Lowest bid will not necessarily be accepted as successful bid.

3.18 Clarification of Bids

To assist in the examination, evaluation and comparison of bids, EFL may, at its discretion, ask any Tenderer 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 EFL in the evaluation of the bids.

3.19 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 Schedule G of the Technical Specification, the tender would be taken as conforming to the Specification in its entirety. The Tenderer shall tender for the whole of the Works included in the Specification.

3.20 Signature of Tenderer

A tender submitted by a Partnership shall be signed by one of the members of the Partnership and shall be accompanied by a certified authorization of all the partners authorizing the individual partner to signon behalf of the Partnership. A tender submitted by a Corporation to the Contract and shall be accompanied by a certified resolution of the Board of Directors authorizing the individual to sign on behalf of the Corporation.

3.21 Insurance

The Tenderer is to confirm that they have in effect the insurance policies below and provide copies of valid certificates with the bid:

1. Products Liability Insurance

4 GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract shall be based upon AS 4911 — 2002 General Conditions of Contract for Supply of Equipment without Installation.

The Conditions of Contract comprises two parts:

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

5 CONDITIONS OF PARTICULAR APPLICATION

1. Interpretation and Construction of Contract

Add the following:

"Bid has the same meaning as tender."

Replace

"qualifying cause of delay means

a) any act, default or omission of the Purchaser, its consultants, agents or othercontractors (not being employed by the Supplier); or
b) other than
  i) a breach or omission by the Supplier;
  ii) industrial conditions or inclement weather occurring after the due for delivery;and
  iii) stated in item 22"

With

"qualifying cause of delay means a cause of delay other than that caused by

a) a breach or omission by Supplier;
b) industrial conditions or inclement weather occurring after the due for delivery; and
c) a cause stated in item 22 "

5. Service of notices

Replace

"ii) confirmation of correct transmission of fax"

With

" ii) confirmation of correct electronic transmission"

6. Contract Documents

Under 6 Contract Documents, make the following change:

Replace "*6.1 Discrepancies*" and contents in subclause 6.1 Discrepancies with the following,

"6.1 Discrepancies and Priority of Documents

The following priority of documents applies if there is any ambiguity, discrepancy or inconsistency in the documents comprising the Contract:

a) *Letter of Acceptance from Supplier*
b) *Conditional Award Letter from Purchaser*
c) *EFL Tender Addenda (if any issued, if not, remove this item from list)*
d) *EFL Tender Specifications, including drawings*
e) *Conditions of Particular Application to AS 4911-2003*
f) *General Conditions of Contract AS 4911-2003*
g) *Supplier's Tender Clarifications (if any provided by Supplier during tender evaluation, ifnot, remove this item from list)*
h) *Supplier's Bid Document*

If either party discovers any inconsistency, ambiguity or discrepancy in any document prepared for the purpose of performing the Contract that party shall give the other party written notice of it. The Purchaser, thereupon, and upon otherwise becoming aware, shall direct the Supplier as to the interpretation and construction to be followed, with the priority order of documents above.

If compliance with any such direction under this subclause causes the Supplier to incur more or less cost than otherwise would have been incurred had the direction not been given, thedifference shall be assessed by the Purchaser and added to deducted from the contract sum."

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 entitledto 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 AustralianStandard 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 additionto the Purchaser's other rights and remedies, at any time give 7 days' written notice to the Supplierto 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 shallbe 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 toany 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-contractand ensure that the Purchaser has the benefit of those warranties. "

14. Directions

Add the following to 14 Directions, at the end,

"The Purchaser may appoint the individual stated in Item 1A to exercise delegated Purchaser's functions. The Purchaser may, from time to time, by notice in writing to the Supplier, substitute or appoint more than one such Purchaser's representative, provided that no aspect of any function shall at any time be the subject of delegation to more than one Purchaser's representative.

Every reference in the Contract to the Purchaser's representative shall include the Purchaser andvice versa."

17. Time

Under 17.2 Claim, make the following change

Replace

" a) delivery is or will be delayed by a qualifying cause of delay; and "

With

" a) delivery is or will be delayed by a qualifying cause of delay that includes but is not limited to any act, default or omission of the Purchaser, its consultants, agents or other contractors (not being employed by the Supplier; and "

19. Delivery

Add the following to 19.1 Mode of and 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."

21. Acceptance or Rejection of Equipment

Add the following to 21.1 Notification, at the end,

"The Purchaser shall be under no obligation to give written notice to the Supplier that the Equipment is acceptable unless:

a) the Purchaser is satisfied that the Equipment is satisfactory and complies with the "as manufactured" drawings approved by the Purchaser; and

b) all drawings and manuals required to be supplied by the Supplier, have been duly supplied by the Supplier. "

24. Payment

Replace *"24.1 Invoices and time for payment"* With *"24.1 Claim for Payment and time for payment"*

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

Replace all occurrences of *"an invoice"* with *"written claim for payment".*

26. Termination by frustration

Under 26 Termination by frustration, make the following change.

Replace all occurrences of

"an invoice"

with

"written claim for payment".

27. Notification of claims

Under 27.1 Communication of claims, make the following change

Replace

"As soon as practicable after a party becomes aware of any claim in connection with the subject matter of the Contract, that party shall give to the other party the prescribed notice of a notice of dispute under subclause 28.1."

With

"As soon as practicable and in any event not later than seven (7) consecutive days after a party becomes aware of any claim in connection with the subject matter of the Contract, thatparty shall give to the other party the prescribed notice of a notice of dispute under subclause 28.1."

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 resolvethe 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 tosuch 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 withsub 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 ofthe 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 forthe 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, shallbe 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 C.

6 REFERENCES

6.1 Applicable Standards

The station services equipment shall be manufactured and tested in accordance with the following Standards and all amendments issued prior to the date of closing of tenders except where varied by this Specifications.

AS 1100.101	Technical Drawings – Part 101
AS 1319	Safety Signs for the Occupational Environment
AS 2067	Substations and High Voltage Installations Exceeding 1kV AC
AS 2676.2	Guide to Installation, Maintenance, Testing and Replacement of Secondary Batteries in Buildings – sealed cells
AS 2700	Colour Standards for General Purpose
AS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3100	Approval and test specification – General requirement for electrical equipment; AS/NZS3111 Approval and test specification – Miniature overcurrent circuit-breakers; AS/NZS3133 Approval and test specification – Air Break Switches;
AS/NZS 3190	Approval and test specification – Residual current devices (current operated earth- leakage devices);
AS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS 60146.2	Semiconductor converters – self-commutated semiconductor converters including direct d.c. converters
AS 60529	Degrees of protection provided by enclosures (IP Code)
AS/NZS 3100	Approval and test specification – General requirements for electrical equipment AS/NZS 3820 Essential safety requirements for electrical equipment
AS/NZS 4680	Hot dip galvanized coatings on fabricated ferrous articles
AS/NZS 60079.14 AS 61000	Explosive atmospheres – electrical installations design, selection and erection Electromagnetic Compatibility – Parts 1.1, 3.2, 6.4
AS 61439	Low-voltage switchgear and control gear assemblies – Parts 1, 2, 3
AS 61588	Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100V
IEC 17025 IEC 60297-3-100	General requirements for the competence of testing and calibration laboratories Mechanical structures for electronic equipment
IEC 60664-1	Insulation coordination for equipment within low-voltage systems
IEC 60668	Electrical measuring transducers for converting A.C. and D.C. electrical quantities to analogue or digital signals

IEC 60352	Solderless Connections – Part 2; Crimped Connections – General Requirements, Test Methods and Practical Guidance
IEC 60529	Degrees of Protection provided by Enclosures (IP Code) IEC 60947 Low Voltage switchgear and controlgear assemblies
ISO 9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing
ISO 45001	Occupational Health and Safety Systems Management

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

6.2 Applicable Laws

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

7 SERVICE CONDITIONS

7.1 Environmental Conditions

The equipment shall be manufactured to withstand the following service conditions of:

Atmosphere	:	Sulfurous, corrosive and dusty		
Ambient temperature	:	Peak : 40˚C		
	:	24 Hour Average: 30˚C		
	:	Annual Average : 22˚C		
	:	Minimum:	10˚C	
Relative Humidity (Average)	:	85%		
Annual Average Rainfall	:	1900 mm		
Wind Speed	:	Sustained	:	55m/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		
Low voltage Supply Ratings	:	Control/Alarm/Emergency – 89V to 132V, 110V nominal Supply voltage of auxiliary equipment – 415V/240V ±5% Supply voltage of auxiliary equipment - 89V to 132V, 110V nominal		

Note: 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.

7.2 System Conditions

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

	System Voltages
Particulars:	240V/415V
Nominal System Voltage:	240V (p-n), 415V (p-p)
Highest (Equivalent) System Voltage:	254.4V (p-n), 439.9V (p-p)
Number of phases:	1 or 3
Impulse Withstand voltage (peak):	AC 10kV rms
Power frequency withstand voltage:	

EFL's 11kV system is 3 phase, 3 wire, 50 Hz. The transformer 415V neutral is generally solidly grounded.

7.3 Seismic Disturbances

The equipment shall be designed to withstand the most onerous seismic events over its operating life.The design shall meet the requirements as shown in table below and shall be in accordance with AS 1170.4 and the Building Code of Fiji.

Seismic requirements	Particular Detail
Earthquake structural design criteria (AS 1170.4, 2007)	Structure Importance Level 4 Probability factor kp = 1.5 Hazard Factor Z = 0.12 Structural Ductility Factor

7.4 Operational Life

The operational life of power system plant and equipment is the recommended age limit to predict the end of life for specific components for asset management.

The station services LVAC board shall **have an operational life of >40 years.**

The Tenderer shall submit details of all necessary maintenance that is required to be performed by theEFL on the equipment to ensure validity of the warranty. The Tenderer shall also disclose to EFL any special obligations or requirements to ensure continuity of the warranty.

The Tenderer shall submit details of all necessary maintenance that is required to ensure continued safe and effective operation during its remaining design life. All batteries shall be recycled at the end oftheir useful life.

8 DESIGN, PERFORMANCE AND CONSTRUCTION REQUIREMENTS

8.1 General

The AC Switchboard shall be indoor, metal clad, dead front assemblies, non-withdrawable type, free standing and rated for a form of separation of Form 4b for Incomer and Feeder Breakers and Form 2b for Distribution Boards.

The distribution board shall be:

- free standing,
- suitable for mounting adjacent to a wall,
- fitted with access doors on the front,
- indications visible from the front,
- capable of fixing to the floor by bolting (M12 bolts preferable, Supplier to provide),
- capable of front access to fastening locations,
- fastening locations within the footprint of the distribution boards.
- Able to have any hinged door reversed to swing from the opposite side.

The AC Switchboard shall be provided complete with properly sized busbars, MCCBs and MCB's, earthing bus bars, CTs and all necessary protection, control and monitoring equipment, with electrical and Mechanical interlocking mechanisms, isolators, auxiliary relays, switches, contactors and any other devices required for safe operation and maintenance as well as be fully arc fault contained.

The cable zone, bus bars, auxiliary equipment as well as control compartments shall be enclosed within the fixed housing and be segregated to form 4b. The design of the distribution board shall be such that connection and disconnection of outgoing cables may be performed in relative safety by competent authorized persons, and consequently the distribution board shall incorporate protective measures asoutlined in AS/NZS 61439.1.

When operating at distribution panel board rated full load, the maximum temperature rise within the distribution panel board enclosure shall not exceed 15˚C above outside ambient temperature.

8.1.1 Switchboard Interlocks and Transfer Scheme

Electrical and mechanical interlocking shall be provided between auxiliary transformer Incomer and thestreet supply incomer to prevent operation of both supplies being on simultaneously.

8.1.2 Switchboard Transfer Scheme Operation

The scheme will be an Automatic transfer via Automatic Transfer/changeover system meaning if the mains voltage drops or fails, the Switchboard shall automatically transfer from supply 1 to the supply 2. Provision shall be made for manual changeover also should EFL desire to do so.

All MCCB's shall be fitted with adjustable overcurrent relays to adapt settings to the required protectionand application levels.

8.1.3 Switchboard Metering and Indication

A revenue meter is required for metering of the transformer incomer or Generator incomer supplies. Indication is required for the Phase present / healthy indication of Transformer and alternative incomingSupplies. EFL will supply the revenue meter whereas the CTs and wiring for installation of the metershall be provided by the Supplier. EFL required CT ratio is 400/200/5A, revenue metering grade CT complying with AS 60044.

Digital voltage display on the LVAC board is also required, together with digital display of load in Amps,kW, kVAR and power factor. A Nemo meter shall be installed for this purpose.

8.1.4 Bus, Earth and Neutral bars

The main circuit equipment shall have a busbar rating of not less than 400 amperes for 3-phase use and feeder circuit equipment with busbar rating of not less than 100 amperes for 3-phase use. At all points where connections or joints occur, the busbars and connecting pieces shall be tinned or silver- plated or the bus bar system should incorporate integral single piece bar and coupling links to avoid chances of hot spot developing as is possible with bolted construction of bus bar and links.

The bus bar system should accept triple pole and single pole MCCB and MCB in any combination of these. The bus bars should be shrouded against accidental contact. The circuit breakers should be arranged in vertical banks with switch levers operating in horizontal planes for on-off switching. The mounting of breakers should be quick snap and easy removal type without disturbing the other breakers. It should be capable of being connected up to at least cable sizes of 35mm2 for phase conductors and16 mm2 for neutral conductors. Two conduit entry plates at the top and the bottom should facilitate drilling of holes at site to suit individual requirements. Shall provide at least a 48 pole encapsulated chassis rated for 250A and a separate CNS chassis rated for 630A (see MCCB and MCB allocation below).

The resistance of any length of conductor containing a joint shall not be greater than that of an equal length without a joint. The short time withstand capacity of the busbars shall be 40 kA for 0.5 seconds.All busbars will be of tinned copper type.

8.1.5 Internal wiring

All wiring shall comply with AS/NZS 3000. Wires shall be numbered at both ends of each wire by indelibly marked ferrules.

The AC Switchboard wiring shall be at least V90, 0.6/1kV grade insulated stranded copper conductors complying with the relevant Australian Standards.

All secondary control wiring in circuit breakers, panel wiring, and the like shall be carried out in a neat and systematic manner with cable supported clear of the panels and other surfaces at all points to obtain free circulation of air. In all cases, the sequence of the wiring terminals shall be such that the junction between multi-core cables and the terminals is affected without crossover. Claw washers or crimped connectors of approved type shall be used to terminate all small wiring. Insulating bushings shall be provided where necessary to prevent the chafing of wiring.

All wiring and apparatus which is, or may become, connected to potential source equal to or greater than 50 volts shall be tested for insulation resistance.

The wiring on each panel shall be subjected for one minute to a voltage equal to the test voltage specified for the apparatus to which it's connected. This test shall take place after the complete assembly of the apparatus, including wiring in panels, cubicles or racks.

8.1.6 Miniature Circuit Breakers and Links

Facilities shall be provided for protection and isolation of circuits associated with protection control and instruments. They shall be of approved type and grouped, as far as possible, according to their functions. They shall be clearly labelled, both on the panels and the associated wiring diagrams. Facilities shall be provided to enable the control circuits for circuit breaker to be individually isolated formaintenance purposes. A label shall be fixed immediately below each MCB clearly showing the ratingof the fuse link and its function.

All MCB's in the AC distribution board will be mounted on a Chassis system.

8.1.7 Nameplate

Switchgear identification nameplates will contain the following minimum information.

- Manufacturer's name
- Date of manufacture
- Type and serial number
- Form Rating used
- Degree of Protection
- Rated voltage
- Rated frequency
- Rated normal current
- Rated short circuit breaking current
- Rated duration of short circuit current
- AS Standard used to verify board
- Weight

8.1.8 Protection of persons against electric shock

The means of providing protection against electric shock including the integration of the ASSEMBLY into the installation are given in IEC 60364-4-41.

The following methods shall be used for protection against contact with live parts are integral to the protection of persons against electric shock; these are described in terms of:

- basic protection (protection against direct contact);
- fault protection (protection against indirect contact).

8.1.8.1 *Basic protection (protection against direct contact)*

Basic protection shall be achieved by the following constructional measures within the ASSEMBLY with the inclusion of switchboards being installed in locations where access is only permitted for authorized personnel.

8.1.8.2 *Basic insulation provided by insulating material*

Hazardous live parts shall be completely covered with insulation that can only be removed by destruction. The insulation is required to be made of suitable materials capable of withstanding the mechanical, electrical and thermal stresses to which the insulation may be subjected in normal service.

8.1.8.3 *Barriers or enclosures*

Air insulated live parts shall be inside enclosures or behind barriers providing at least a degree of protection of IP 2X. Horizontal top surfaces of accessible enclosures having a height equal to or lower than 1.6 m above the standing area, will provide a degree of protection of at least IP 4X.

The manufacturer shall construct the ASSEMBLY so as to enable it to be opened or barriers be removed for maintenance with either:

a) a key or tool is required to open the door, remove the cover or override an interlock;
b) An intermediate barrier providing a degree of protection at least IP 2X prevents contact with live parts, the removal of the barrier requiring the use of a key or tool.

8.1.8.4 *Fault protection (protection against indirect contact)*

Fault protection is intended to protect against the consequences of a fault within the ASSEMBLY and those of a fault within an external circuit supplied through the ASSEMBLY. The ASSEMBLY will normally include protective measures and be suitable for installation in a network designed to be in accordance with IEC 60364-4-41.

8.1.8.5 *Faults within the ASSEMBLY*

For an adequate protective circuit all exposed conductive parts of the ASSEMBLY will be interconnected together, noting the following:

a) when a part of the ASSEMBLY is removed, the protective circuits (earth continuity) for the remainder of the ASSEMBLY should not be interrupted;

b) for lids, doors, cover plates and the like, the usual metal screwed connections and metal hinges are considered sufficient to ensure continuity provided that no electrical equipment exceeding the limits of extra low voltage is attached to them.

c) If apparatus with a voltage exceeding the limits of extra-low voltage are attached to lids, doors,or cover plates; a protective conductor (PE) or an equivalent electrical connection especially designed and verified for this purpose shall be used.

d) Exposed conductive parts of a device that cannot be connected to the protective circuit by the fixing means of the device will be connected to the protective circuit of the ASSEMBLY by a conductor of adequate cross-sectional area.

e) Minor exposed conductive parts (not exceeding 50 mm x 50 mm) of an ASSEMBLY that do not constitute a danger need not be connected to a protective conductor. This applies to screws, rivets, nameplates, parts of small devices, and similar.

f) Connection of an exposed conductive part to the incoming protective circuit is considered sufficient if the resistance of this connection is less than 0.1Ω.

8.1.8.6 *Faults in external circuits supplied through the ASSEMBLY*

The Contractor shall provide a protective circuit within the ASSEMBLY capable of withstanding the highest thermal and dynamic stresses that may occur at the place of installation of the ASSEMBLY, forfaults in external circuits supplied through the ASSEMBLY. The protective circuit provided may be theASSEMBLY'S enclosure or frame and/or a separate conductor. The protective conductors within an ASSEMBLY will not include a disconnecting device such as switches or disconnectors.

8.1.8.7 *Protection by total insulation*

Protection by total insulation shall be used to provide adequate protection against electric shock. The construction of ASSEMBLIES that are protected by total insulation shall include specific features so that adequate protection against electric shock is provided under all anticipated operating conditions. These features shall include:

a) Completely enclosing all apparatus in insulating material that is equivalent of double or reinforced insulation and marked accordingly.

b) No conducting parts pierce the enclosure and no point should be pierced by conducting parts in such a manner that there is the possibility of a fault voltage being brought out of the enclosure. This requirement includes metal parts such as actuator shafts unless they are suitably insulated.

c) Arrangements such that when the ASSEMBLY is ready for operation and connected to the supply, all live parts, exposed conductive parts and parts belonging to a protective circuit will be enclosed to at least IP 2X so that they cannot be touched.

d) Exposed conductive parts within the ASSEMBLY shall not be connected to the protective circuit.

e) Where doors or covers of the enclosure can be opened without the use of a key or tool, a secondary barrier, made from insulating material, shall be provided behind the door or cover. This shall provide protection against unintentional contact with the accessible live parts and with the exposed conductive parts that would otherwise become accessible, after the door or Cables

8.1.9 Cable Colour Coding

As required by AS/NZS61439.1 all conductors shall be identified by either colour coding or symbols.

a) If identification of conductors is to be by colour coding, the colour coding system used throughout the whole switchboard shall preferably be in accordance with the following colour coding system:
   i. Red Phase - Red
   ii. White Phase - White
   iii. Blue Phase - Blue (Bright Blue to AS2700)
   iv. A.C. Neutral - Black
   v. Earth - Green/Yellow

b) Where a special proprietary cable having a non-conforming colour coding system is required to be used, cable terminations shall be fitted with colored sleeving in accordance with the above colour coding system.

8.1.10 Protection of Cable Insulation

Further to the requirements of AS3000, wherever practical, appropriate grommets or glands shall be used to protect cable insulation where such cables pass through holes in panels or cubicles. Such devices shall be selected so as not to reduce the required IP rating of the cubicle.

8.1.11 Support of Electrical Equipment Cubicle Wiring

a) Electrical equipment cubicle wiring shall be neatly grouped and harnessed or, where practical enclosed in PVC duct.

b) Wiring shall be straight and run parallel when in cable duct. A minimum clearance of 50 mm shall be maintained between terminals and associated cable duct. When not run in cable duct,spiral band lacing and/or cable ties shall be used to form the looms. Looms shall be installed square with the cubicle and frequently supported.

c) Duct shall be arranged to allow wiring passing through the slots to be taken as directly to the terminals as possible

d) Duct fixings shall not have sharp projections inside the duct which could damage cable insulation.

e) Wiring, wiring looms and cable duct shall be arranged so that, as far as is practical, equipment labels and/or terminal markings are not obscured.

f) The weight of wiring looms shall not cause any undue strain on the conductor strands or insulation.

g) Cable looms connecting hinged panels shall be supported either side of the hinge, and the loom arranged between such supports in a generous loop so as to prevent cable strain when the hinged panel is moved.

8.2 Secondary Terminations

a) All secondary panel terminations shall meet IP2X "finger-safe" requirements in accordance with AS 60529.

b) At all times the Supplier/Contractor shall adhere to the manufacturer's link or terminal requirements for wiring terminations. The maximum conductor size specified by a link or terminal manufacturer shall not be exceeded. Should the design require that a larger wire sizebe used than what the manufacturer specifies for that terminal or link, then the Supplier shall discuss these with EFL.

c) A maximum of two wires only is permitted for a tunnel type (screw-type) link and terminal

d) When more than two wires need to be terminated to the same point, additional terminals (with the same terminal number) shall be added next to and bridged to the original designed terminals.

e) Seven strand field cables shall be terminated with no crimping lugs with one exception: high current AC and DC supply wires terminated to switchgear (breakers, etc.) where the switch gear manufacturer requires a particular type of lug.

f) The IP2x integrity of any termination shall not be compromised by the bootlace or lug.

g) Upon request, the Manufacturer shall demonstrate to EFL, if alternatives are proposed, that good quality lugs: suitable lug types and correct crimping tools and methods are used for all terminations.

h) Mid-run cable connections or straight-through cable joints shall not be used.

i) Terminal bridging shall be done with matching top insertion bridges

j) Screw terminals bridging shall be done with top screw bridges and all adjacent terminals are bridged.

k) Comb-style rigid bridges fitted on the terminal side sharing the connection point with wires shallnot be used.

8.2.1 Metalwork Earth Bonding

a) All mounting panels within cubicles, including cubicle doors shall be bonded electrically to the cubicle frames and hence to the cubicle protective earth bar.

b) Within cubicles containing electronic signaling or measuring equipment, such bonding shall be achieved by:

i. welded connections
ii. bare aluminum to bare aluminum bolted connections
iii. bare zinc plated steel to bare zinc plated steel bolted connection
iv. bare stainless steel to bare stainless steel bolted connections, or
v. braided conductor bonded connections.

c) The resistance between the cubicle frame or any mounting panel and the cubicle protectiveearth bar shall be not more than 0.2 ohm.

8.3 Mechanical Construction

8.3.1 Dimensions

Due to the nature of replacing the existing ACDB with the new tendered ACDB, availability of space inside the Zone Substation is limited. Allowing only the **restricted dimensions** that would allow works to continue as normal after installation is complete.

The preferred dimensions of the ACDB's for both 2-source and 3-source are stated below:

2-Source: Length – not greater than 1.8m, Height – less than 2.0m, Depth – 0.5m (plus door & door equipment)

3-Source: Length – not greater than 2.8m, Height – less than 2.4m, Depth – 0.60m (plus door & door equipment)

8.3.2 Fixings and Supports

All fixings and support necessary to support or hold equipment in place shall be supplied.

8.3.3 Miscellaneous Fittings

a) All threaded components, including metal threads, screws and bolts used throughout the electrical equipment cubicle shall be stainless steel; or non-ferrous metal; or nickel chromium electroplated steel to AS1192; or zinc electroplated steel to AS1897 and AS1791.

b) All saddles, clamps and miscellaneous fastenings shall be non-ferrous metal, stainless steel, zinc plated steel, nylon or P.V.C. Adhesive fixings shall not be used.

8.3.4 Silicone Based Components

a) Unless specified otherwise on the drawings, greases, jellies and/or sealing compounds which include silicone based compounds shall not be used inside switchboard enclosures.

8.3.5 Lifting and Transport Facilities

a) Clearly marked (with a permanent label or stencil), fully rated lifting and hold down points will be provided on the LV Board to facilitate the hoisting and holding down during transport.

b) Two lifting lugs marked “LV Board Lifting Point” with a minimum hole diameter of 26 mm will be provided suitable for lifting the LV Board. These lugs will arranged so that any slings attacheddo not foul any part of the LV Board and when suspended by them, the LV Board will hang without tilting.

c) All parts of the LV Board weighing in excess of 15 kg that will be removed for inspection or repair will be fitted with lifting points suitable for use with shackles and slings.

d) Clear and legible Safe Working Load (SWL) markings should be provided on all lifting points.

8.3.6 Earthing Points when installed within Outdoor Cubicle

a) An earthing point (flag) shall be provided near the bottom of the cubicle. The earthing point shall comprise a flat surface not less than 50 x 100 mm drilled with two 14 mm diameter holeson 50 mm centres. The surface shall be arranged to facilitate an effective and non-corrodible earthing connection. There shall be ample access to both sides of the earthing point for the insertion of bolts and nuts for connection to the earth grid. The earthing point shall be marked with the “earth” symbol or stamped ‘earth’.

b) Additional earth flags will be provided where necessary to permit the earthing of the steel base (where fitted).

8.4 Finish and painting

All surfaces of Assemblies shall be finished with an appropriate coating system which will provide the necessary protection against corrosion, with minimal maintenance, for the design life of the cabinet. All surface preparation and protective coating shall be done in the manufacturer’s works. The only work in this regard after delivery would be reinstatement of any coating damage sustained in transport or work on site.

If any part of the installation requires galvanizing, this shall be in accordance with the hot-dipped galvanized coatings on ferrous articles Australian standard (AS/NZS 4680, 2017).

Any painting of metallic surfaces shall be in accordance with the following procedure:

a) After fabrication of each section of equipment is completed, and before any paint is applied, the surface of the parts to be painted shall be thoroughly cleaned of all rust, oil, grease, dirt or other foreign matter.
b) The painting shall consist of at least one primary coat, one undercoat and one finishing coat each continuously and evenly applied. The three coats of paint shall be of different colours with the external finishing coat being gloss enamel.
c) Alternatively, the surfaces may be powder coated to a minimum thickness of 75 micron.
d) Cubicle colour shall be X15 Electric Orange ripple finish

All paint shall be non-corrosive, heat and oil resistant. It shall be made by a reputable paint manufacturer and shall be applied in accordance with the manufacturer's recommendations.

8.4.1 Paint Coatings for Steel

The paint system to be used for steel shall be:

a) All surface visible rust, scale and other foreign matter shall be removed completely in accordance with AS1627 so that the surface is suitable for the application of a gloss finish. Allcleaning solutions shall be removed completely by thorough rinsing.
b) Immediately prior to priming, all surfaces shall be solvent wiped to remove any handling grime.
c) A gloss paint system providing medium term protection in accordance with AS2312 (industrialand marine) environments shall be applied.
d) All paint used in the paint system shall be from the same manufacturer who shall certify their compatibility.

8.4.2 Powder Coatings for Steel

a) Powder coatings shall not be used on bare steel.
b) Powder coatings shall not be used on zinc (or zinc alloy) coated steel on which the coating hasbeen damaged by welding or any other means.
c) Powder coatings shall be applied to zinc (or zinc alloy) coated steel and shall be gloss thermoset powder coating in accordance with AS/NZS 4506 Cat 5 employing a chromate or zinc phosphate pre-treatment and resulting in a powder coating DFT of not less than 60microns.

8.4.3 Cubicle Metals

All stainless steel and aluminum sheet used in the construction of switchboard cubicles and panels shall be marine grade. Aluminum sheet thickness shall be not less than 3mm. Steel and stainless steelsheet thickness shall be not less than 2mm for doors, hinged panels and equipment mounting panels, and shall not be less than 1.2mm elsewhere.

8.4.4 Adjacent Dissimilar Metals

Where dissimilar metals are positioned adjacent to one another, bimetallic corrosion shall be preventedby the use of metallic plating or by other approved methods. Screws and bolts penetrating external aluminum surfaces shall be stainless steel, as shall be any associated nuts and any associated external or internal washers. Screws, bolts and washers in contact with internal aluminum surfaces shall be stainless steel or shall be nickel, chromium or passivated zinc plated steel.

8.4.5 Additional Supports

Sufficient bracing shall be provided to doors and panels to ensure that the equipment mounted thereonis supported properly. Where doors and panels are weakened by drilling or cutting during constructionof the switchboard, such sections shall be reinforced by additional bracing.

8.4.6 Welding

All butt joints shall be fully seal welded and all such welds shall be ground flush and smoothed.

8.4.7 Corrosion

Clause 8.1.2 of AS/NZS 61439.1 is applicable with the following additions.

a) All internal and external surface treatments shall provide a minimum of 35 years protection against corrosion induced by service and environmental conditions specified above.
b) Coatings shall be oil resistant, heat resistant and non-corrosive.

8.5 Labelling

Bidders shall provide comprehensive details for panel and device labelling including label positions, label size, label text and label materials.

Additional warning labels shall be fitted according to relevant Australian standards. The labels shall include Danger and Warning labels to AS 1319.

8.6 NEMO Meter

TECHNICAL SPECIFICATION:

The NEMO Base HD96+ MF96021 shall be multifunction and digital type with specification as below:

Display Technology: LCD

Refresh Time: 1.1 s

Input Frequency, Nom: 50 Hz

Input Range(s): 1 ... 5A

Input voltage, 1ph, nom (rms): 50 - 230 V AC nom (rms)

Input voltage, 3ph, nom (rms): 80 - 400 V AC nom (rms)

Accuracy Class, Active: 0.5

Accuracy Class, kWh, IEC 61557-12: 0.5 IEC 61557-12

Accuracy Class, kVARh, IEC 61557-12: 2 IEC 61557-12

Umin, Supply Voltage, AC, Min - Max: 80 - 265V AC

Connection Method: CT connect & VT connect

IP Rating, Front: IP54

Standards Compliance; EN 60529-IEC 61010-1 IEC 60529-EN 61326-1

8.7 Transducer

The Transducer IF96001 shall be multifunction power monitor type with specification as below:

Type: IME IF96001 with Modbus

Communications Module Communication: RS485 module with multifunction power monitors

Protocol: MODBUS/JBUS RTU protocol

Address Range: Address selection 001 – 255

9 TESTING AND INSPECTIONS

9.1 Testing Requirements

Prior to delivery, the LVAC board system shall have completed the type, routine and accuracy tests andinspections as required by the relevant Australian standards. The passing of such tests shall not prejudice the right of EFL to reject the Equipment if it does not comply with the Specification when received or installed.

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

The Tenderer shall submit a copy of Inspection and Test Plan (ITP) for the Equipment with its Bid.

9.2 AS/NZS 61439 Design Verification

The design verification of the project switchboard design in respect to the requirements of AS/NZS 61439 may be by testing, or may be by comparison with a reference design provided that the project switchboard enclosure(s) are the same as used in the reference switchboard design.

9.3 Type Tests

Type test certificates shall be supplied with the submitted documents showing that equipment identicalin all respects with the plant being offered has successfully passed all the type tests set out in the standards for each type of plant and equipment referred to in this specification. Any equipment which undergoes any design or constructional modifications shall be type tested again or tested to the satisfaction of EFL.

Type tests required, in accordance with the low voltage switchgear and control gear assembliesAustralian standard AS/NZS 61439.1, include:

- Verification of temperature-rise limits
- Verification of dielectric properties
- Verification of short-circuit withstand strength
- Verification of effectiveness of the protective circuit
- Verification of clearances and creepage distances
- Verification of mechanical operation
- Verification of degree of protection and internal separation
- Verification of increased security against the effects of internal arcing

9.4 Routine Tests

All materials, components and items of auxiliary equipment shall be subjected, during the course of manufacture, to all the tests prescribed in the relevant Australian or IEC Standards in that order. All tests considered necessary by either the Manufacturer or Customer shall be performed to prove compliance with the performance figures stated in this Specification and associated Schedules.

Routine tests shall be undertaken according to the low voltage switchgear and control gear assembliesAustralian standard to AS/NZS 61439.1, include:

- Inspection of the assembly including inspection of wiring and, if necessary, electrical operation test
- Dielectric test
- Checking of protective measures and of the electrical continuity of the protective circuit

- Point to point wiring checks and earth continuity tests

9.5 Test Certificates

Upon completion of any test, the Supplier shall provide the certified test reports detailing the testing methods, instruments used, results and engineers responsible, to EFL. If the results of any Test Certificates are found to be incorrect or incomplete, EFL may reject the plant or equipment.

The plant or equipment shall be considered as substantially incomplete and payment shall not be madeuntil all test certificates have been received.

9.6 Final Inspection Report

Final inspection reports shall be supplied prior to delivery showing plant is suitable for transport andthat all associated manuals and test reports are included.

9.7 Tests after Delivery

On completion of the installation and before the plant has been put into use (pre-commissioned), EFL may carry out compliance tests considered necessary to prove that the plant and equipment fulfils the requirements of this specification. The Supplier shall provide list of recommended tests that need to bedone on site prior to putting the equipment into service. The Supplier shall also ensure that its staff areavailable to provide any kind of technical support during this period.

10 TOOLS, SPARES AND ACCESSORIES

Tenderers shall submit a document detailing the price of spare parts and any accessories considered necessary for the lifecycle management of the items. The nominated manufacturers shall guarantee the supply of spare parts for a minimum of 10 years after expiry of the contract.

Tenderers shall submit a document detailing the price of any special tools, gauges and jigs considerednecessary for the appropriate installation, commissioning and maintenance of the items.

11 SERVICE HISTORY

Tenderers shall state:

- The period of service of typical items tendered within the Fijian environmental conditions.
- Australian or New Zealand electricity authorities that have a service history of the plant and equipment offered.

No item of plant shall be dispatched from the Supplier's works until the Test Certificates have been approved by EFL. Contact names and telephone numbers of relevant employees of those supply authorities who can verify the service performance claimed.

12 PROGRAMME AND PROGRESS OF WORK

The Tenderer shall provide a work program with its bid in the format as given in the Schedules of this specification. Within seven days of the receipt of the official EFL purchase order, the Tenderer shall submit a confirmed programme of work for the entire project upto the delivery. The programme is to conform to the timelines as stipulated in this tender.

The Tenderer shall also be required to submit monthly reports on the status of various activities. Such reports shall be submitted within five (5) calendar days of start of the month.

13 QUALITY REQUIREMENTS

Tenderers shall have a Quality Management System that complies with ISO/AS/NZS 9001, and shall submit evidence of certification.

If the Tenderer is not the manufacturer of the items, documentary evidence shall include the quality system certifications of both the Tenderer and the manufacturer. If this is not possible the Tenderer shall submit a Quality statement detailing how the Quality of products is achieved and maintained overthe lifecycle of the plant and equipment.

Once accepted, any deviations shall not be implemented without submission of relevant Quality Assurance documentation and re-qualification test certificates that are acceptable to the Customer andapproved in writing by the Customer prior to delivery of goods.

Tenderers shall be required to submit copies of ISO certification of the workshops or laboratories where the Equipment will be assembled and tested.

14 OCCUPATIONAL HEALTH AND SAFETY SYSTEMS

Tenders shall have Occupational Health and Safety Certification as per ISO 45001 or equivalent national certification.

All work shall be undertaken in workshops which have an Occupational Health and Safety certificationissued by the local regulatory authority or Ministry of Labor. Tenderers shall be required to provide a copy of this certificate.

Tenderers also need to submit health and safety plans implemented in workshops for assembling and testing protection and control panels, which will be used in this project.

15 TRAINING

Training material in the form of detailed instructions, drawings, and/or audio visuals shall be provided for the items offered to be accepted.

This material shall include but is not limited to the following topics:

1. Handling.
2. Storage.
3. Application (particularly in areas of heavy coastal pollution).
4. Installation and commissioning
5. Maintenance.
6. Environmental performance.
7. Electrical performance.
8. Mechanical performance.
9. Disposal.

Preference is given to computer or web-based training for initial individual training or as a refresher. Aminimal assessment after the training with reporting is recommended as evidence of a successful learning outcome. Web based training for each device should be produced in SCORM package format for use in the Customers online training material.

16 PACKAGING

Equipment shall be carefully packed for transport and shipment in such a manner that it is protected from all dust and climatic conditions during loading, transport, unloading and subsequent storage in theopen.

Equipment shall be suitably packed and protected against vibration, movement and shock which may occur during loading and transport. Particular care in packing shall be taken when the apparatus is transported by road.

Instruments and fragile items shall be packed separately. All items, which include delicate equipment,shall be sealed in polythene sheeting and silica gel desiccant or vapor corrosion preventive shall be inserted within the polythene packing. Straw shall not be used as packing material.

Should any timber packaging be supplied from overseas manufacturers, then it shall meet all conditions and inspections required by the Biosecurity Authority of Fiji and that all these costs are included in thetendered price.

All plant and equipment shall be at the Supplier's risk until received at the agreed delivery point; any damage in transit shall be the responsibility of the Contractor to replace or repair and prove fit for service.

Each item shall be individually packaged and delivered with fittings, hardware and associated manualsand test reports.

All bright and polished parts and screw threads shall be treated with petroleum jelly or other suitable rust preventative.

The Contractor shall mark all cases of plant which cannot be safely stored outside with the words "FOR INSIDE STORAGE ONLY".

17 DELIVERABLES

17.1 Information to be provided by Tenderer with offer

The Supplier shall provide the following with the offer:

1. Full details of items offered including pricing.
2. Confirm compliance with Legislation, Acts, Regulations, Rules and Codes of Practice.
3. Confirm compliance with the applicable Australian, IEC and IEEE standards.
4. Confirm compliance with all requirements of this Specification.
5. Provide all schedules fully completed.
6. Provide Quality Management Plan.
7. Provide electronic Manuals (PDFs) for all plant and equipment offered.
8. Provide electronic copies (PDFs) of Type Test Certificates, examples of Routine Test Reports and examples of Final Inspection Reports
9. Provide electronic copies (PDFs) of drawings of plant and equipment
10. Provide each component manufacturers datasheet

17.2 Information to be provided by Tenderer

Within two weeks from the date of issue of purchase order, the Supplier shall provide a comprehensive detailed program indicating timing for all activities required to establish the contract and enable sustained agreed performance.

Within six weeks from the date of issue of purchase order, the Supplier shall provide the design reports,drawings and material datasheets. EFL will review drawings and or documentation supplied complies with this Technical

Specification in relation to how the plant and equipment meets design, construction,operation, maintenance and other requirements for the operational life of the plant and equipment.

Alterations and or modifications may be requested to meet these requirements. The Supplier shall remain responsible for the safety and reliability aspects of the plant or equipment supplied.

Initial copies of drawings submitted for approval purposes may be supplied in PDF format. Drawings that shall be provided by the Supplier shall include but not be limited to:

i. Single line operating diagrams
ii. General arrangement plan and elevations
iii. Mechanical loadings of plant and terminals
iv. Materials lists of all major plant and equipment

Two copies of installation and operations and maintenance manuals shall be provided by the Supplier.

18 SCHEDULE A: LIST OF EXPERIENCE, PERSONNEL & FINANCIAL STATEMENTS

18.1.1 Previous Experience

The Tenderer is to submit a list of Projects worked under with a similar scope, involving the design andmanufacture of LVAC systems in chronological order of year completed.

Client	Project Scope and Description	Approx. Project Value	Year Completed

Authorized Signatory of Tenderer:

Signature: ……..

Name: ……..

Date: ……..

18.1.2 Project Personnel

The Tenderer is to submit list of personnel who will work on this project and also provide their resumesin its bid.

Name	Designation	Duration of Employment with Company	Years of Experience

Authorized Signatory of Tenderer:

Signature: ……..

Name: ……..

Date: ……..

18.1.3 Financial Statements

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

19 SCHEDULE B: PRICE AND PAYMENT SCHEDULE

Currency of Tendered Price: .....

No	Component	Unit Price	Quantity	Total Price (CFR Navutu Depot & Kinoya Depot)
1	Design, Manufacture, Testing and Supply of 400A, 50kA rated, 415V, 3 Ph **AC DISTRIBUTION BOARD WITH AUTOMATIC CHANGEOVER SWITCH- PROVISION FOR 2 INCOMER SOURCE AND 54+ POLE CHASIS.**		3 Lot	
2	Design, Manufacture, Testing and Supply of 800A, 50kA rated, 415V, 3 Ph. **AC DISTRIBUTION BOARD WITH AUTOMATIC CHANGEOVER SWITCH- PROVISION FOR 3 INCOMER SOURCE AND 54+ POLE CHASIS.**		3 Lot	
3	400A, 415V, 3 Phase, 50Hz Automatic Transfer Switch with built-in UA controller for 2 Incomer.		7 Units	
4	Supply of NEMO Meter HD96 + MF96021		10 units	
5	Supply of Transducer IF96001		5 units	
6	Recommended Spares for Item No. 1 & 2		2 Lot	
7	Shipping Charges			
	Total			

The Payment Schedule shall be as per the table below:

Milestones	Percentage	Amount in Dollars
Receipt of Goods by EFL	90%	
Expiry of Warranty period (12 months after receipt of Goods)	10%	

Authorized Signatory of Tenderer:

Signature: ……..

Name: ……..

Date: ……

Note: Tenderer shall also provide unit prices for critical components.

20 SCHEDULE C: AS4911 ANNEX A (TO BE SUBMITTED BY TENDERER)

All Tenderers are required to complete and submit a copy of this form with their bid submissions.

Item		
1	Purchaser (Clause 1)	Energy Fiji Limited (EFL)
1A	Purchaser's Representative (Clause 1A)	*To be nominated by EFL at time ofcontract.*
2	Purchaser's Address	2 Marlow Street, Suva
3	Supplier (clause 1)	*Supplier to provide*
4	Supplier's Address	*Supplier to provide*
5	Stated purpose for equipment (clause 1definition of acceptable)	As stated in tender specifications and/or purchase order
6	Period of time for delivery (Clause 1 and Sub-clause 19.1)	*Supplier to provide*
7	Delivery Place (Clause 1 and Sub-clause 19.1)	EFL's Kinoya Depot, Kinoya, Suva
8	Mode of Delivery (Sub-clause 19.1)	*Supplier to provide*
9	Governing Law (Clause 1(h))	Laws of Fiji
10	a) Currency (clause 1(g))	*Supplier to provide*
	b) Place for payments (clause 1 (g))	*Supplier to provide*
	c) Place of Business of bank (clause1(d))	*Supplier to provide*
11	Limits of Quantities to be supplied anddelivered (clause 2.2)	As stated in tender specifications and/or purchase order
12	Suppliers security	Not applicable
13	Purchaser's security	Not applicable
14	Purchaser supplied documents (sub-clause6.2)	Tender specifications and addenda (where issued).
15	Supplier Supplied documents (sub-clause 6.3)	*Supplier to provide*
16	Time for Purchaser's directionabout documents (sub-clause 6.3(c))	14 calendar days
17	Sub-contract work requiring approval (sub-clause 7.2)	All work.
18	Legislative Requirements, those excepted(sub-clause 10.1)	Not applicable
19	Reference date (clause 1, sub-clause 10.2(b))	Deadline for Submission of Bids, asdefined in tender specifications
20	Time by which insurance cover for theEquipment is to be effected (sub-clause 13.1)	Prior to tender award.
21	Public and product liability insurance (sub-clause 13.2)	*Supplier to provide*
22	Qualifying cause of delay, causes for which EOTs will not be granted (page 3, subparagraph (b) (iii) of Clause 1 and sub- clause 17.2)	None.
23	Liquidated damages, rate (subclause 17.5)	0.5% per day upto 10% of the purchaseorder value
24	Delay Damages	As assessed by EFL

25	Date for completion of acceptance testing (subclause 18.1 and 21.1)	As stated in tender specification
26	Party responsible for unloading the *Equipment (subclause 19.1)*	Supplier
27	When risk in the *Equipment* passes (subclause 20.1)	At time of acceptance by Purchaser.
28	Time at which ownership of the *Equipment passes* to the Purchaser (subclause 20.2)	At time of acceptance by Purchaser.
29	Period for *Purchaser's* notice that *Equipment* are rejected (subclause 21.1)	14 calendar days
30	Period for *Purchaser's* notice accepting or rejecting *Supplier's* proposal (subclause 21.4)	14 calendar days
31	Defects liability period (clause 22)	12 months
32	Claim for Payment (subclause 24.1)	Within 5 days of delivery
33	Period for Payment (subclause 24.1)	30 calendar days from time of acceptanceby Purchaser
34	Equipment for which prepayment may be claimed (subclause 24.2)	Nil.
35	Interest rate on overdue payments (subclause 24.5)	Nil.
36	Arbitration (subclause 28.3) a) Person to nominate an arbitrator	President of Fiji Institute of Engineers
	b) Rules for arbitration	Laws of Fiji
37	The Supplier's liability is limited as follows(clause 29)	The contract sum as adjusted pursuant tothe Contract
38	The Purchaser's liability is limited as follows (clause 29)	The contract sum as adjusted pursuant tothe Contract

Authorized Signatory of Tenderer:

Signature: ……..

Name: ……..

Date: ……..

21 SCHEDULE D: OUTGOING CIRCUIT SCHEDULE

Below is the typical outgoing circuit schedule

No of poles	Quantity	Typical MCB rating Amps	Breaking Capacity @415V, 50Hz and curve type	Description of circuit
3	1	20A	16kA, type C	Battery charger 1
3	1	20A	16kA, type C	Battery charger 2
3	1	80A	16kA, type B	3Φ Transformer 1
3	1	80A	16kA, type B	3Φ Transformer 2
1	1	16A	10kA, type C	Transformer Control Panel
1	1	32A	10kA, type C	33kV Switchboard
1	1	32A	10kA, type C	11kV Switchboard
1	1	20A	6kA, type C	Communication Panel
1	1	20A	6kA, type C	Oil Water Separator Alarm Unit
1	1	20A	6kA, type C	Indoor Trench Sump Pump
1	1	20A	6kA, type C	Outdoor Trench Sump Pump
1	4	10A	6kA, type C	Building light
1	2	20A	6kA, type C	Building Security lights
1	1	20A	6kA, type C	Building outlet 1
1	1	20A	6kA, type C	Building outlet 2
1	1	20A	6kA, type C	Building outlet 3
1	1	10A	6kA, type C	Fire alarm
3	2	32A	6kA, type C	3Φ Building
1	6	16A	6kA, type C	Air Conditioners
1	4	16A	10kA, type C	Spare
3	1	TBC	16kA, type B	Main Switch for the Distribution Board
3	2	32A	16kA, type B	Spare

22 SCHEDULE E: TECHNICAL PARTICULARS

Technical Parameter	Units	Offered
General:		
Type of enclosure		
Mounting Arrangement		
No. of Cubicles inside the enclosure (EFL preference is two with a separate cable compartment)		
IP Rating of enclosure protection		
Country of Manufacture of the enclosure		
Maximum Total Mass	Kg	
Maximum Total Mass including components	Kg	
Maximum Dimensions: Width (including Base) Length Height (including base) EFL Requirement: (approx. 450mm x 1650mm x 2080mm)	 Mm Mm Mm	
Material used for enclosure		
Material thickness		
Switchboard rating	kA	
Type of Bus Bar used inside the enclosure		
All bolts (Fasteners, Studs, etc.) nuts and washers 316/304 grade stainless steel?		
Sample Routine & Type Test Reports Provided and complying with IEC 61439-1:		
Type of Corrosion Protection / Protective Coating Layer Details? Compliance to ???		
Thickness of Layer of Protective Coating		
Internal & External paint colour		

23 SCHEDULE F: PROGRAMME OF WORK

The Tenderer is required to state the commencement and completion dates for different components of the project schedule given below. The Tenderer is required to also submit a Gantt chart showing the timelines in weeks for supply of the transformer.

Component or Work	Commencement Date	Completion Date
1. Receipt of Official Purchase Order		
2. Submit Design Drawings and DesignReport		
3. Procurement of Components, Assembly/Manufacture of LVAC Board		
4. Factory Testing of LVAC System & Components		
5. Dispatch from Factory and Shipping to designated delivery point		
Total Duration of Project in Weeks (from time Purchase Order is issued)		

Authorized Signatory of Tenderer:

Signature: ……..

Name: ……..

Date: ……..

24 SCHEDULE G: EVALUATION CRITERIA

Tender Evaluation Criteria	
Category	**Criteria**
Bid Responsiveness	General responsiveness of bid, compliance to submission requirements and documentation
Health, Safety& Environment	Assessment of Tenderer's compliance to health, safety and environmental requirements detailed within the technical specification. Past performance of Tenderers. Manufacturer holds third party accreditation to ISO 14001, ISO 45001
Quality Assurance	Tenderer holds third party Quality Assurance accreditation to ISO/AS/NZS 9001:2015. Tenderer has Quality Management systems in place that are acceptable to Energy Fiji Limited.
Technical Compliance	Does the Tender meet Energy Fiji Limited's minimum technical requirements as outlined in the Technical Specification? Equipment and all components Performance of equipment and all components Sustainability and ease of operation Reliability data Past experience Ability to deliver on time / delivery timeframe
Commercial Compliance	Tenderer holds the required current insurance provisions and has provided evidence through valid insurance certificates of currencies. Has the Tenderer submitted Departures to the Terms and Conditions? If so is it likely that Energy Fiji Limited will be able to negotiate agreement without undue delay? Assessment of the Tenderers operational risks including conflicts of interest. Tenderer must comply with statutory requirements, such as that enforced by FRCS, FNPF, FNU, etc. and provide evidence of compliance as required in the specifications.
Energy Fiji Limited Procedures	Tenderer must comply with all relevant Energy Fiji Limited safety and environmental procedures. This is indicated by the Tenderer signing the Form of Tender Schedule, acknowledging all applicable procedures. Tenderer must also comply with the requirements of Electricity Act (2017), Electricity Regulations (2019).
Financial Stability	Assessment of Tenderer's current financial stability and ability to remain Financially stable.
Price Evaluation	Base tendered prices; Other value adding options.

25 SCHEDULE H: DEPARTURE FROM SPECIFICATIONS

The Tenderer shall nominate the Clause or relevant section of the tender specification and describe thedeparture.

Tender Specification Reference*	Departure

***The Tenderer shall refer to the specific clause of the tender specification.**

26 SCHEDULE I: MANUFACTURERS, PLACE OF MANUFACTURER & TESTING

The Tender shall provide details of each item and ensure departure from each schedule is advised in the bid document.

ITEM	RECOMMENDED MANUFACTURER	BIDDER'S PROPOSAL	
		PLACE OF MANUFACTURE	PLACE OF TESTING & INSPECTION
AC Distribution Board			
Switchboard Complete	Schneider Electric/MES/ NHP/ABB		
415V AC 3 Phase Busbar	Schneider		
MCB's	Schneider		
MCCB 25kA	Compact NSX		
Metering CT's	NHP		
Multifunction Meter	NEMO HD		
Changeover contactors			
Earth bar			
Neutral Bar			
3P Transfer switch	Schneider		
Chassis 3 pole double sided	Schneider		
Phase sequence, Phase Loss, U/V			
Electronic Time Delay Relay(Timer)	NHP		
20A 16kA, type C	Schneider/Clipsal		
80A 16kA, type B	Schneider/Clipsal		
16A 10kA, type C	Schneider/Clipsal		
32A 10kA, type C	Schneider/Clipsal		
20A 6kA, type C	Schneider/Clipsal		
10A 6kA, type C	Schneider/Clipsal		
32A 6kA, type C	Schneider/Clipsal		
16A 16kA, type B	Schneider/Clipsal		
32A 16kA, type B	Schneider/Clipsal		

27 TENDER CHECKLIST

The Bidders must ensure that the details and documentation mention below must be submitted as part of their tender Bid

1. Tender Number : _____
2. Tender Name : _____
3. Full Company / Business Name : _____
4. (Attach copy of Registration Certificate) : _____
5. Director/Owner(s) : _____
6. Postal Address : _____
7. Phone Contact : _____
8. Fax Number : _____
9. Email address : _____
10. Office Location : _____
11. TIN Number : _____
    (Attach copy of the VAT/TIN Registration Certificate - Local Bidders Only (Mandatory)
12. FNPF Employer Registration Number: _____ **(For Local Bidders only) (Mandatory)**
13. Provide a copy of Valid FNPF Compliance Certificate (Mandatory- Local Bidders only)
14. Provide a copy of Valid FRCS (Tax) Compliance Certificate (Mandatory Local Bidders only)
15. Provide a copy of Valid FNU Compliance Certificate (Mandatory Local Bidders only)
16. Contact Person : _____

I declare that all the above information is correct.

Name : _____

Position: _____

Sign : _____

Date : _____

28 Tender submission

Bidders are requested to upload electronic copies via Tender Link by registering their interest at: https://www.tenderlink.com/efl

EFL will not accept any hard copy submission to be dropped in the tender box at EFL Head Office in Suva.

This tender closes at 4.00pm 1600hrs on 4th September, 2024.

For further information or clarification please contact our Supply Chain Office on phone (+679) 3224360 or (+679) 9992400 or email us on tenders@efl.com.fj

The bidders must ensure that their bid is inclusive of all Taxes payable under Fiji Income Tax Act. Bidders are to clearly state the percentage of VAT that is applicable to the bid prices.

The lowest bid will not necessarily be accepted as the successful bid.

The Tender Bids particularly the “Price” must be typed and not hand written.

Any request for the extension of the closing date must be addressed to EFL in writing three (3) working days prior to the tender closing date.

Tender Submission via email or fax will not be accepted.