



MR 229/2017

**PREFERRED SUPPLIER
for
DESIGN, MANUFACTURE, TESTING AND SUPPLY
of 11kV CAPACITOR BANKS**

FIJI ELECTRICITY AUTHORITY

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REVISION HISTORY & DOCUMENT CONTROL

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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 2015, the FEA had 171,939 customers. This included residential, commercial and institutional customers.

FEA is seeking tender bids from reputable manufacturers and ts for design, manufacture, testing and supply of 11kV capacitor banks. These capacitor banks will be installed either in FEA’s zone substations (at the 11kV busbar via a circuit breaker) or on the 11kV, three-phase distribution networks.

The 11kV capacitor banks and associated equipment required are as follows:

| FEA Stock Code | Item Description |
|-----------------------|----------------------------------|
| I04412B | 100kVAR, 11kV Capacitor Bank |
| I04412D | 200kVAR, 11kV Capacitor Bank |
| I04412F | 400kVAR, 11kV Capacitor Bank |
| I0-TBC1 | 800kVAR, 11kV Capacitor Bank |
| I0-TBC2 | Capacitor bank mounting platform |

The capacitor banks will be connected in star-configuration, with the star-point solidly earthed.

FEA also requires tenderers to provide capacitor bank mounting platforms to mount the capacitor bank on standard FEA reinforced concrete poles.

This tender specification outlines the instruction to bidders for design and performance criteria for the 11kV capacitor banks 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 11kV capacitor banks.

Bidders shall provide such evidence of their continued eligibility satisfactory to FEA as FEA shall reasonably request. Bidders who are not manufacturers of such capacitor banks 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 Commercial
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TuvituD@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.

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 2.15.

2.13 Format and Signing of Bids

The bidder shall prepare one original and four (4) copies of the technical and financial proposals, clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. 1 - 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. 1 - 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 Commercial
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TuvituD@fea.com.fj

And

- b) bear the following identification:
 - Bid for: Preferred Supplier for Design, Manufacture, Testing and Supply of 11kV Capacitor Banks

- Bid Tender Number: MR 229/2017
- DO NOT OPEN BEFORE: 1600hrs on 18/10/2017

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) 21/10/2017.

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.

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.”

With

“Within 30 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 Part A with the following:

| 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 <i>purchase</i> order quantity subclause 2.2 (a)(i) | 1 |
| 11 | Minimum reorder intervals subclause 2.2 (a)(i) | Not applicable |
| 12 | Maximum <i>purchase</i> 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 for which EOTs will not be granted | Not applicable |
| 27 | Liquidated damages, rate (subclause 17.5) | Not applicable |
| 28 | Delay Damages | Not applicable |
| 29 | Date for completion of acceptance testing (subclause 18.1 and 21.1) | As stated in tender specification |
| 30 | Party responsible for unloading the <i>goods</i> (subclause 19.1) | Supplier |
| 31 | a) When risk in the <i>goods</i> passes (subclause 20.1) | At time of acceptance by Purchaser. |
| | b) Time at which ownership of the <i>goods</i> passes to the Purchaser (subclause 20.2) | Upon payment of the purchase order value |
| 32 | Period for <i>Purchaser's</i> notice that <i>goods</i> are rejected (subclause 21.1) | 14 calendar days |
| 33 | Period for <i>Purchaser's</i> notice accepting or rejecting <i>Supplier's</i> 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) • Person to nominate an arbitrator | President of Fiji Institute of Engineers |
| | • 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 |

5 REFERENCES

5.1 Applicable Standards

Capacitor banks shall be designed, manufactured and tested in accordance with the following Australian and International 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 1265 | Bushings for Alternating Voltages Above 1 000 V |
| AS 1580 | Methods for Test for Paints and Other Related Materials |
| AS 1627 | Metal Finishing – Preparation and Pretreatment of Surfaces |
| AS 1650 | Galvanized Coatings |
| AS 1824 | Insulation Co-Ordination |
| AS 1931 | High voltage testing techniques – Part 1 |
| AS 2067 | Substations and high voltage installations exceeding 1 kV a.c. |
| AS 2312 | Guide to Protection of Iron and Steel Against Exterior Atmospheric Corrosion |
| AS 2344 | Limits of electromagnetic interference from overhead A.C. Powerlines and high voltage equipment installations in the frequency range 0.15 to 1000 MHz |
| AS 2700 | Colour standards for general purposes |
| AS/NZS 3750 | Paints for Steel Structures |
| AS 4398 | Insulators – Ceramic or Glass – Station Post for Indoor and Outdoor Use – Voltages greater than 1 000V a.c. |
| AS 4680 | Hot-dip galvanized (zinc) coatings on fabricated ferrous articles |
| AS/NZS 9001 | Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing |
| AS 60529 | Degrees of protection provided by enclosures |
| AS 62271.1 | High-voltage switchgear and controlgear - Common specifications |
| AS 62271.100 | High-voltage switchgear and controlgear - High-voltage alternating-current circuit-breakers |
| AS 62271.200 | High-voltage switchgear and controlgear - A.C. metal-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 52kV |
| AS 62271.201 | High-voltage switchgear and controlgear - AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV |
| IEC 60099.4 | Surge arresters – Part 4: Metal-oxide surge arresters without gaps for a.c. systems |
| IEC 60216 | Electrical insulating materials |
| IEC 60871.1 | Shunt capacitors for AC power systems having a rated voltage above 1000 V – Part 1 General |
| IEC 60871.2 | Shunt capacitors for AC power systems having a voltage rating above 1000 V – Part 2: Endurance testing |
| IEC 60871.4 | Shunt capacitors for AC power systems having a rated voltage above 1 000 V – Part 4: Internal fuses |
| IEEE Std. 18 | Standard for Shunt Power Capacitors |

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

5.2 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 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 and Mounting

The capacitor banks shall be suitable for mounting outdoors on structures provided by FEA. It shall be designed to withstand the service conditions of Clause 2 of AS 62271.1, with the following additions.

| | | |
|-----------------------------|---|--|
| Height above sea level | : | not exceeding 1000 m |
| Atmosphere | : | Saliferous, corrosive and dusty |
| Ambient temperature | : | Peak : 40°C |
| | : | 24 Hour Average: 30°C |
| | : | Annual Average: 22°C |
| | : | Minimum: 10°C |
| Relative Humidity (Average) | : | 85% |
| Rainfall | : | Annual Average: 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.

All ferrous parts shall be treated to provide acceptable surface finish and protection. The manufacturer shall provide full details of the surface finish provided. Where required, equipment may need to be raised or have extra treatment to minimize corrosion on all metal components, particularly those in contact with the plinth.

The equipment shall include everything necessary or usually supplied for the operation, whether directly specified or not.

The insulation level shall be in accordance with the technical requirements stated. All insulation shall be of a type and quality that will give normal life expectancy without deterioration.

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: | 1 or 3 |
| Impulse Withstand voltage (peak): | 28kV |
| Power frequency withstand voltage: | 95kV (peak) |
| Nominal system voltage: | 11kV |
| System highest voltage: | 12kV |
| System earthing: | Effectively earthed |
| Short Circuit Current | 25kA |

6.3 Insulation Coordination

Suitable insulation levels and method of system earthing are required as detailed in this specification.

6.4 Harmonics

The capacitor bank(s) shall not in any way amplify or contribute to increasing the harmonic distortion at the point of connection. The Supplier shall submit evidence to substantiate this.

7 DESIGN AND PERFORMANCE CRITERIA

7.1 General

The capacitor banks will be installed either in FEA's 33/11kV zone substation at the 11kV busbar ("point of connection") or in the 11kV distribution networks to cost effectively improve the power factor.

The capacitor banks supplied shall conform to all the current requirements of:

- IEC60871.1 for capacitor units, and
- all relevant Australian and IEC Standards and this specification.

The Tenderer shall provide everything necessary, including any special tools, usually supplied for the safe operation of the equipment, whether directly specified or not.

The design and construction shall be in accordance with the technical requirements stated. All materials shall be of a type and quality that will give a normal life expectancy of 45 years.

The equipment and its components shall be designed in a manner to reduce the risk of rupture and explosive failure and subsequent fire risk. The appropriate sizing and locations of any pressure relief devices/rupture points shall be key considerations in the design and be specifically addressed by the designer in the design review. Suggested routine testing and maintenance regimes and limits shall be provided to manage ongoing risk of equipment or component failure.

Equipment/components from third party suppliers, such as surge arresters, control relays/devices and the like shall not be modified without written approval from the General Manager Network and General Manager System Planning and Control.

The Tenderer shall be responsible for all insurance relating to the equipment until the point of handover. The Tenderer shall pay all duty, taxes, freight, cartage and all other charges in this process. All network access, business hours, insurances, traffic control, stakeholder management, site access and all duties required to safely meet these requirements are the responsibility of the Tenderer.

7.2 Capacitor Bank

Each 11kV three phase capacitor banks shall have a net output as outlined in the Tables above and the units may be conveniently arranged according to the standard practice of the manufacturer and type of protection offered. The switching in and out of the bank shall be by means of fuses provided by the Tenderer.

The capacitor units shall be compactly designed in size and weight to be conveniently mounted to pole or substation structure. The housing shall have a rugged and reliable construction for outdoor mounting. Detailed drawings of construction are required.

The guaranteed minimum values of losses of the capacitor units shall include losses due to discharge resistors which may be mounted inside each unit to discharge each unit from peak voltage to maximum 70V in less than 10 minutes.

Internal fuses shall be provided in order to limit possible failure to a single capacitor element only. Internal fuses shall be provided for several individual elements within each unit. The internal fuses shall comply with IEC 60593 standards. The tolerances and the degree of unbalances shall also be

indicated as per relevant standards. The capacitors shall be able to carry continuously 1.3 times the rated current, 1.1 times the maximum system voltage and shall provide continuously 1.35 times the rated output. All the above requirements shall be fulfilled under maximum ambient temperature.

The dielectric material shall consist of an all film material being suitable to operate the capacitors on continuous load under the specified ambient conditions, having high stability and low loss per kVAR. The impregnate shall be of a hydrocarbon type fluid characterized by high electrical strength and adequate physical and chemical properties and shall be non-PCB.

Each capacitor shall be hermitically sealed and have two bushings. For outdoor installation a creepage distance of 50 mm/kV for open rack mounted or 25 mm/kV for complete enclosed material and for indoor installation of 25 mm/kV shall be considered. The capacitor shall be designed for low working stress per micron to ensure larger life and low loss per kVAR.

The arrangement of the fixing and the bushings shall be identical in order to easily exchange and replace any capacitor element of the total capacitor bank. The terminals for bushings and fixing elements shall be ISO standard (metric).

7.3 Capacitor Unit

The capacitance of the segment is realized by connecting capacitor units in series and parallel to provide the required capacitive reactance with the continuous current rating. The capacitors shall be designed to withstand higher currents such as those experienced during emergency loadings (typically the 30-min. rating), system swings and during faults as specified by FEA.

The capacitor units shall be designed to withstand the specified continuous rated current, emergency loading, swing current and power system faults with the maximum capacitor unbalance condition for which the control and protection system will allow the bank to remain in service.

If capacitor fuses are used, either internally or externally, the fuses should be designed to operate correctly for bank currents of 50% of rated current up to and including power system fault conditions.

7.4 Capacitor Bank Rating Plate

The following minimum information shall be provided by the manufacturer on the nameplate of each capacitor bank:

- FEA tender number
- Name of the manufacturer
- Place of manufacture
- Standards to which the capacitor bank complies to
- Rated output QN in kVAR - total output to be given.
- Rated voltage UN in kilovolts
- Insulation level (UI) - The insulation level shall be marked by means of two (2) numbers separated by a stroke, the first number giving the r.m.s. value of the rated power frequency short duration voltage in kiloVolts, and the second number giving the peak value of the rated lightning impulse withstand voltage in kiloVolts
- Connection symbol - A standard connection symbol may be selected from clause 25.2 of IEC 60871-1.
- Minimum time required between disconnection and reconnection of the bank.
- Time to discharge to 75V
- Year of manufacture

The rating plate shall be stainless steel to grade 316, and shall be located on the longer side of the capacitor bank.

7.5 Capacitor Protection

The capacitor banks/units protection shall meet all the requirements of IEC 60871-3 and that of this specification. They shall be provided completely with internal and external protection which is considered as part of the capacitor equipment.

Fuses shall be provided internally for protection of individual capacitor units. The fuses shall not deteriorate when the capacitor is subjected to discharge testing or the currents associated with service operations of the capacitor equipment. The Tenderer shall provide fuse rupturing curves to FEA.

Fuses shall only rupture in case the related unit is subject to failure and shall be capable of breaking the current following a failure of the capacitor unit without hazard from the fuse or the capacitor.

The ruptured fuse of each element shall withstand indefinitely the voltage imposed across it under all operating conditions.

The remaining capacitor units shall be able to operate within the capacitor bank without undue disturbance for a present number of unit capacitor failures.

The Tenderer must provide the following in his bid for tender evaluation:

- a) Calculation of constrains subjected to capacitor units.
- b) The fuse time current coordination curve.
- c) Recommendation of fusing to provide a satisfactory probability against case rupture.

Further to a fuse operation, there must not be any excessive leakage current nor any risk of sparking when a full voltage is permanently applied between the bus bar and the defective capacitor unit terminal, and such for all specified atmospheric conditions.

7.6 Over-Voltage Protection and Surge Arrestors

The Tenderer shall propose and provide suitable surge arrestor type and connection arrangement in order to limit any - transferred internal and external over-voltages on the capacitor banks.

The Tenderer shall provide recommendations on under-voltage and over voltage protection for sustained under and over voltage conditions. FEA shall apply these settings to the protection relay at the point of connection.

7.7 Earthing

All equipment, except the phase and neutral connected capacitor bushing terminations, shall be effectively earthed to the extent that there is no safety hazard to operating personnel, to prevent accidental shorts by human error, flying objects or by rodents, and to prevent mechanical damage to the devices.

Prior to accessing the capacitor bank racks it must be visually identifiable that the earthing devices have been applied.

The Tenderer shall also provide earthing stirrups for the connection of the phases and neutral points to the portable earths to be applied by an operator standing at ground level using an operating stick.

All earthing points shall be connected to the substation earthing grid through an earth bar having the full fault current rating as indicated in the System Conditions. The earth bar shall have provisions for at least two connections to the substation earth grid at diagonally opposite sides of the capacitor bank.

7.8 Ratings / Overload

The capacitor bank shall be designed to provide three phase reactive power for the one step at nominal voltage. The capacitor bank and capacitor units shall be capable of continuous operation at 135% of rated reactive power in accordance with IEEE std. 18.

In compliance with clause 27.2 of IEC 60871-1, the rated output voltage (UN) of the capacitor bank shall be not less than the maximum operating voltage of the network. However, the inductive elements such as detuning reactors connected in series with the capacitor bank, will increase the voltage at the capacitor terminals, and the rated voltage of the capacitors shall be increased accordingly. The rated voltage of the capacitor bank shall not be too high such that it limits the operating reactive power.

The capacitors shall be able to withstand the overloads specified in clauses 19 and 20 of IEC60871-1. Overloads are caused by system voltage fluctuations and the harmonic currents flowing through the capacitors.

The capacitor shall be designed for continuous operation at r.m.s. current which shall not be less than 143% of the rated current (IN) in order to take care of the combined effects of harmonics and over voltages described in clause 19 and 20 of IEC60871-1. For this purpose, the rated current (In) of the capacitor shall be calculated at the rated voltage when the capacitance is at maximum (that is, 1.1CN).

7.9 Discharge Capability

Each capacitor unit shall be provided with an internal discharge device so that the residual charge of the capacitor shall drop to 75V or less from initial maximum peak voltage of $\sqrt{2}$ times rated voltage (UN), within 10 minutes of being off line.

The internal discharge device shall not substitute the recommended practice of the manually discharging the residual stored charge before working on capacitors.

Suitable terminals for manual discharge of the capacitor shall be provided. All capacitor terminations shall be capable of being shorted to earth before handling.

7.10 Capacitor Bank Mounting Platform

A mounting platform, made of steel, shall be provided with the capacitor banks. The mounting platform shall be such that FEA can install any size of the capacitor bank to be supplied under this contract. The Tenderer shall submit a price for this item separately, so for new installations, FEA can have the option of purchasing the platform together with the capacitor banks. The capacitor banks shall be installed on standard FEA reinforced concrete poles, set-up either as a single-pole structure or as H-pole structure, drawings of which are provided in the Appendix.

The capacitor bank mounting platform shall include the following as a minimum:

- Steel frame
- Capacitor switches to isolate the capacitor bank(s) for repair and maintenance purposes
- Pole braces
- Provision for earthing of star-point of capacitor bank
- Provision for connection of cables or overhead line jumpers to the capacitor switches

The Tenderer shall ensure that such platforms are made of steel and designed and constructed to withstand the cyclonic wind loading conditions prevalent in Fiji. The structural design of such mounting platforms shall have the approval of a chartered professional engineer registered with the Fiji Institute of Engineers, or an equivalent body recognized by the Fiji Institute of Engineers.

8 TESTING

The Tenderer shall be responsible for carrying out tests to demonstrate the equipment and its components supplied, complies with the technical requirements in this specification. All routine, type and special tests shall be conducted with the equipment completely assembled in the factory with all support structures installed and operational. Type tests shall be carried out on the first unit under the contract unless otherwise agreed by FEA.

The type, special and routine tests shall be carried out on the equipment and its components in accordance with this specification, prior to approval being granted for use by FEA.

All type tests shall be carried out by a testing authority holding accreditation.

All type test reports shall be accompanied by copies of the accreditation certificate(s) issued to the testing laboratory. The accreditation certificate(s) shall be valid for the relevant test(s) and for the duration of the test(s).

Type tests shall be less than five years old. Type tests beyond this limit may be acceptable at the discretion of FEA if sufficient information can be provided to show that the manufacturing process, raw materials, design and quality control processes have not significantly changed since the original test date.

All sample and routine tests may be conducted at the manufacturing facility's test laboratory on the condition that sufficient evidence is provided to FEA to demonstrate the testing facility's capability to perform the specified tests.

As a minimum, the following information shall be provided:

- qualifications/experience of the testing staff;
- test procedures for all sample/routine tests;
- testing facility quality control procedures; and,
- test instrument calibration certificates/procedures

All documentation submitted (including reports, tests, testing procedures/policies, calibration certificates and the like) written in any language other than English shall not be accepted by FEA.

All test results shall be included in the maintenance manuals with a note indicating that the test results relate to the original or agreed nominated unit.

One copy of all test results shall be provided to FEA nominated project manager within one week of the completion of the tests for approval, and shall include a cover page that lists all the tests and a statement indicating that all tests have passed including guaranteed values. The equipment shall only be shipped from the factory after the test reports have been approved by FEA. Should there be a discrepancy or a test failure, this shall be noted on the cover sheet.

8.1 Type Tests

8.1.1 Capacitor Unit

The following type and special tests shall be carried out as indicated below:

| No. | Description of Test | Test Method Reference |
|-----|------------------------|-----------------------|
| 1. | Thermal Stability Test | IEC 60871.1 Clause 13 |

| | | |
|----|--|-------------------------------------|
| 2. | Capacitor Losses (tan delta) | IEC 60871.1 Clause 14 |
| 3. | AC voltage test between terminals and container | IEC 60871.1 Clause 15.1 |
| 4. | Lightning Impulse Test between terminals and container | IEC 60871.1 Clause 15.2 |
| 5. | Over-voltage test | IEC 60871.1 Clause 16 |
| 6. | Short Circuit Discharge test | IEC 60871.1 Clause 17 |
| 7. | Disconnecting test on internal fuses | IEC 60871.4 Clause 5.2 |
| 8. | Endurance Test (Special Test) | IEC 60871.1 Clause 17 & IEC 60871.2 |
| 9. | RIV Test | IEC 62271-1 Clause 6.9.1 |

8.2 Routine Tests

8.2.1 Capacitor Unit

Applicable routine tests in accordance with the applicable standards shall be carried out on each component of the equipment. These tests shall be included in the Factory Acceptance Tests (FAT) for the equipment and submitted to FEA for approval. The equipment shall not be delivered unless the FAT reports are approved:

| No. | Description of Test | Test Method Reference |
|-----|---|--------------------------|
| 1. | Capacitance measurement test | IEC 60871.1 Clause 7 |
| 2. | Capacitor losses (tan delta) | IEC 60871.1 Clause 8 |
| 3. | Voltage test between terminals | IEC 60871.1 Clause 9 |
| 4. | AC voltage test between terminals and container | IEC 60871.1 Clause 10 |
| 5. | Test on internal discharge device | IEC 60871.1 Clause 11 |
| 6. | Sealing Test | IEC 60871.1 Clause 12 |
| 7. | Discharge test on internal fuses | IEC 60871.4 Clause 5.1.2 |

8.3 Acceptance Tests

The Tenderer shall outline the acceptance tests which will be required to be performed on the capacitor bank units when it is installed. FEA's minimum requirements for acceptance tests are as follows:

- Capacitor unit capacitance measurement
- Power frequency tests (high voltage test)
- Insulation resistance tests
- Doctor tests on all joints
- Partial discharge tests

8.4 Witnessing of Tests

The Tenderer shall make allowance for up to two FEA's Engineers to witness the type tests which shall be requested to be performed. All costs for the witnessing of such type tests shall be borne by the Tenderer, including airfares, accommodation, meals etc. The Tenderer shall also make allowance for witnessing of routine tests by two FEA Engineers.

Where applicable, the Tenderer shall give FEA not less than four (4) weeks' notice of when each and every type test will be carried out.

8.5 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 the order number must be added to the certificate, or attachment to the test report.

9 RELIABILITY

9.1 Service Life

Tenderers 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 Evidence in Support of Reliability

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

10 ENVIRONMENTAL CONSIDERATIONS

Tenderers 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.

Tenderers are required to provide with the tender, EMF levels at capacitor bank. Such EMF levels are required at a point midway along each side, and diagonally out from each corner, at a distance of 1m above and beyond the base.

11 PACKAGING AND MARKING

The packaging of items by the Tenderer 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 Tenderer shall take all necessary precautions to ensure safe handling of all capacitor banks and associated accessories supplied.

12 QUALITY REQUIREMENTS

Tenderers are required to submit evidence that the design, manufacture and testing of the capacitor banks are in accordance with AS/NZS 9001-2016 or ISO 9001-2015. Documentary evidence shall be provided concerning the level of Quality System Certification associated with the Tenderer and or manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

13 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.

14 INFORMATION TO BE SUPPLIED BY THE TENDERER

14.1 Documentation to be supplied with the tender

To enable FEA to fully evaluate the capacitor bank(s) offered, (in addition to the completed Specification Requirement and Guaranteed Performance schedules) the Tenderer will submit the following information with their tender:

- List showing similar equipment supplied to or on order for other utilities
- Typical arrangement drawings and full details of the dimensions of the capacitor bank
- Type test certificates
- Short circuit test details for equipment of similar design and rating
- Sample inspection and test plans for the capacitor banks
- Typical installation and maintenance manuals.
- End of service life disposal method
- Full details of the protective coatings offered.
- Details of mounting structures and the footprint required
- A list of all departures of the tender from this specification
- Evidence of quality management systems
- Evidence of financial ability
- Origin of materials used in manufacture of the capacitor bank
- 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 contract (if Tenderer is successful).

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

Tender Submission - Instruction to bidders

It is mandatory for Bidders to upload a copy of their bid in the TENDER LINK Electronic Tender Box no later than 4:00pm, on Wednesday 18th October 2017

To register your interest and tender a response, view 'Current Tenders' at: <https://www.tenderlink.com/fea>

For further information contact The Secretary Tender Committee, by e-mail TDelairewa@fea.com.fj

In addition, hard copies of the tender, one original and one copy must be deposited in the tender box located at the FEA Head Office, 2 Marlow Street, Suva, Fiji no later than 4:00pm, on Wednesday 18th October 2017 - Addressed as

Tender – MR 229/2017 Preferred Supplier for Design, Manufacture, Testing and Supply of 11kV
Capacitor Banks
The Secretary Tender Committee
Fiji Electricity Authority
Head Office
Suva
Fiji

- Ø Hard copies of the Tender bid will also be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and it is dispatched before the closing date and time.

Tenders received after 4:00pm on the closing date of Wednesday 18th October, 2017

- Ø will not be considered.
- Ø Lowest bid will not necessarily be accepted as successful bid
- Ø It is the responsibility of the bidder to pay courier charges and all other cost associated with the delivery of the hard copy of the Tender submission including any Duties/Taxes. Hard copies of the Tender submission via Post Box will not be considered.
- Ø Local Bidders are requested to submit a:
 - **Valid Tax Compliance Certificate**
 - **FNPF Compliance Certificate**

APPENDIX A: SPECIFICATION REQUIREMENT

| Items and Units | Required | Supplied |
|--|---|---|
| 1.0 Capacitor Bank | | |
| 1.1 Reactive Power Output (kVAR) | As required | Manufacturer to state |
| 1.2 Capacitor Voltage Rating (kV) | 11kV | Manufacturer to state |
| 1.3 Frequency (Hz) | 50Hz | Manufacturer to state |
| 1.4 Test Requirements <ul style="list-style-type: none"> Routine Tests Type Test | As per specs | Manufacturer to provide certificates and reports. |
| 1.5 Maximum system voltage (kV) | 12kV | Manufacturer to state |
| 1.6 Maximum continuous operating voltage (kVrms) | As per IEC 60099-4 | Manufacturer to state |
| 1.7 Dimension's | | Manufacturer to state |
| 1.8 Insulation Level | | Manufacturer to state |
| 1.9 Number of capacitors (no) | | Manufacturer to state |
| 1.10 Control Voltage | 110V | Manufacturer to state |
| 1.11 Temperature range (degrees Celsius) | | Manufacturer to state |
| 2.0 Capacitor Units | | |
| 2.1 Type | All film | Manufacturer to state |
| 2.2 Bushing Type | | |
| 2.3 Rated current unit capacitor (A) | Specify | Manufacturer to state |
| 2.4 Rated Voltage unit capacitor (kV) | Specify | Manufacturer to state |
| 2.5 Insulation level of each capacitor bank | | Manufacturer to state |
| 2.6 Discharge Time | 75V in less than 10 mins | Manufacturer to state |
| 2.7 Continuous over current | 1.3x In (rated current) | Manufacturer to state |
| 2.8 Continuous over voltage | 1.1x Vn (rated voltage) | Manufacturer to state |
| 2.9 Container | | Manufacturer to specify |
| 2.10 Creepage Distance | 50mm/kV (open rack) 25mm/kV (enclosed) | Manufacturer to state |
| 2.11 Bushings | | Manufacturer to specify |
| 2.12 Dielectric material | | Manufacturer to specify |
| 2.13 Connection | 1 phase | Manufacturer to state |
| 2.14 Peak withstand current (kA) | As per spec | |
| 2.15 Rated lightning impulse (kV-peak) | | |
| 2.16 Rated short circuit current (kA) | 25kA | |
| 2.17 Pollution level (mm/kV, p-p) | As per spec | |
| 2.18 Pressure relief fitted | As per spec | |
| 3.0 Fuse – Cutouts | | |
| 3.1 Rated Voltage (kV) | 11 kV | Manufacturer to state |
| 3.2 Highest Voltage (kV) | 12 kV | Manufacturer to state |
| 3.3 Rated Continuous current (A) | Specify | Manufacturer to state |
| 3.4 Insulation level | As per spec | |
| 3.5 Total creepage distance | As per spec | |
| 3.6 Mounting angle <ul style="list-style-type: none"> Dry impulse withstand (1.2/50us) voltage (positive and negative polarity (peak) | As per spec | |

| | | |
|--|-------------|-----------------------|
| i) Across the isolating distance of the fuse base | | Manufacturer to state |
| ii) To earth and between poles | | Manufacturer to state |
| • Wet 1 minute power frequency withstand voltage (rms) | As per spec | |
| i) Across isolating distance of the fuse | | Manufacturer to state |
| ii) To earth and between poles. | | Manufacturer to state |

APPENDIX B: FEA STANDARD REINFORCED CONCRETE POLE DRAWING

NO. 2-3



