ENERGY FIJI LIMITED

BIDDING DOCUMENT

TENDER NO – MR 265/2025

SUPPLY, DELIVER, INSTALL AND COMMISSION 110V DC STATION SYSTEM FOR WAILOA POWER STATION

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1 INVITATION FOR TENDER

Energy Fiji Limited ("EFL") is responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Taveuni in Fiji. It owns a total of nineteen (19) thermal and hydro power stations on the islands of Viti Levu, Vanua Levu, Taveuni and Ovalau.

EFL is replacing the 110V Battery Charger for Wailoa Power Station. As part of this power station development, EFL is seeking bids from reputable manufacturers and suppliers for design, manufacture, testing and supply of the substation DC supply equipment.

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 10th September 2025, 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 3224 320/9992400
Email: tenders@efl.com.fj

2 INSTRUCTIONS TO TENDERERS

2.1 Scope of Tender

The Energy Fiji Limited (EFL) invites Tenders for the design, manufacture, factory testing, delivery to site and commissioning of an 110V DC System for the Wailoa hydropower facility.
The General Conditions of Contract pursuant to which the Contractor will provide the Works are based on FIDIC Conditions of Contract for Plant and Design Build for Electrical and Mechanical Plant and for Building and Engineering Works Designed by the Contractor, First Edition, 1999.
These Instructions comprise these instructions to tenderers together with all documents issued to tenderers in respect of the Works.
These Instructions do not constitute an offer, but are merely an invitation to the tenderer to submit a Tender.
All documents supplied by EFL remain the property of EFL. EFL reserves the right to request the immediate return of all documents supplied and any copies made of them at any time.

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 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.

2.3 One Bid per Tenderer

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

2.4 Cost of Bidding

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

2.5 Information Required with Tender

Tenders shall include the name of the tenderer and a complete postal address for service of notices. Tenders shall include the following minimum information for evaluation:

- Fixed, lump sum tender price. All prices must be quoted in a single currency, nominated by the contractor plus Fijian dollars if required. The prices should excluding Fiji VAT and Withholding Tax and shall be deemed to include all direct, indirect and ancillary charges and costs for the Works:
- Statement of compliance with all Tender and Contract requirements.
- Completed tender forms;
- Full details of the 110V DC System proposed.
- Proposed programme for design, fabrication and delivery:
- Proposed key personnel;
- Any supplementary information required by the documents issued to the tenderers;
- Any interpretation or other statements by the tenderer affecting the Tender;
- The Tender shall be signed by or on behalf of the tenderer by a person with the delegated authority to do so. Written proof of the delegated authority to sign the tender offer may be requested.

2.6 Site Visits

No site visits are required for this tender. However, should any tender wish to arrange a visit they shall advise EFL within two weeks of the date of the Employer issuing the tender documents. The Employer will then endeavor to arrange a single visit a time that best suits the Employer, Engineer and all other bidders.

2.7 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.

2.8 Clarification of Bidding Documents

A prospective Tenderer requiring any clarification of the bidding documents may notify EFL via 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.

2.9 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.

2.10 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.

2.11 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 and subcontracting (if any), testing and delivery.

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

Bids shall be given on CIF basis. The point of delivery shall be EFL’s Navutu Depot in Navutu, 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.

2.12 Bid Currencies

Prices shall be quoted in a single currency only.

2.13 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 2.14.

2.14 Format and Signing of Bids

The Tenderer shall submit an electronic copy of the Technical and Financial proposals on EFL’s electronic tender hosting website, https://www.tenderlink.com/efl or on a portable storage device with the printed submissions.

Only Electronic Tender Bids will be accepted and should be uploaded in the EFL Tender site as per Tender Link no later than 1600 hours (Fiji Time) on Wednesday 10th September, 2025.

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 corrections shall be initialed by the person or persons signing the bid.

2.15 Deadline for Submission of Bids

Bids must be received by EFL at the address specified above no later than 1600 hours (Fiji Time) 10th September, 2025.

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

2.16 Late Bids

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

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

2.18 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 persons not 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.

2.19 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 email, 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.

2.20 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 the section 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.

2.21 Evaluation of Tenders

Tenders received will be evaluated based on such matters as EFL in its sole discretion determines are relevant, which may include the following:

- Quality of the solutions, plant offered, and completeness of the offer.
- Tender sum and quoted rates and on-costs for possible approved variations.
- Proposed programme for the implementation and completion of the Works.
- Tenderer's experience, capability and commitment to achieving the project objectives.
- Tenderer's health and safety performance record and commitment.
- Compliance with the Contract conditions and specifications.

EFL may apply whatever weighting it considers in its sole discretion to be appropriate and the order set out above is not and shall not be taken to be the order of priority of the factors being considered by EFL.

2.22 Acceptance of Tender

EFL may, in its absolute discretion:

- Decline to consider any Tender;
- Reject all Tenders;
- Accept any Tender, notwithstanding that any other tender may propose a lower cost method of achieving EFL's objectives;
- Accept any Tender, even though it may not be in accordance with these Instructions.

EFL reserves the right to enter into negotiations with any unsuccessful tenderer or other party after the Tender Closing Time to complete the Contract.

2.23 Advice on Tender Outcome

All tenderers who submit a complying Tender will be notified of the outcome of the Tender. The advice will be limited to the name of the successful tenderer only if a Tender is accepted.
The successful tenderer will be invited by EFL to execute the Contract Agreement.
The original copies of all Tenders delivered to EFL will be the property of EFL and will not be returned to tenderers (unless EFL determines otherwise, in its absolute discretion).

2.24 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 sign on 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.

2.25 Tender Conditions

EFL reserves the right to:

- Suspend or cancel (in whole or in part) this tender process and/or overall process without assigning a reason;
- Terminate or exclude at any time participation by any tenderer in the tender process without assigning a reason;
- Call and/or re-advertise for tenders or revisit any tender process;
- Waive any irregularities or informalities in this tender process;
- Run the tender process as it sees fit, including by varying the process without assigning reason;
- Select suppliers based on their tender responses and/or invite them to participate in a further closed or open tender process;
- Issue Instructions with modified descriptions of goods/services requirements, including innovations identified and/or proposed EFL through this tender process:
- Enter into discussions and/or negotiations with one or more tenderers relating to matters dealt with in these Instructions;
- Deal separately with any of the divisible elements of any tender response, unless the relevant tender response specifically states that those elements must be taken collectively:
- Limit or extend the list of potential tenderers beyond those who respond to these Instructions;
- Seek clarification of any aspect or information provided in any tender response, and seek further information from any party;
- Consider, accept or reject any further Tenders (including any alternative or non-conforming Tenders) it may receive from any tenderer or other correspondent;

- Change any time, date or timeframe in, or any other aspect of, this tender process (including extending the closing date for the receipt of tender responses) by notice in writing to each tenderer;
- Liaise or treat with any prospective or actual tenderer at any time without necessarily liaising or treating with any other prospective or actual tenderer:
- Delete or change its requirements for any goods/services covered by this tender process:
- Conduct a financial check on any tenderer submitting a tender response; and
- Obtain similar goods/services from any third party and not deal exclusively with any tenderer under this tender process.

EFL will not be bound to give any reasons for decisions made as a result of the tender process or as an outcome of the Tender evaluations. Nothing contained or implied in these Instructions shall oblige EFL to discuss, justify or give reasons for any of its decisions or actions relating to these Instructions or any response.
Whilst EFL seeks to ensure that the supporting information contained in these Instructions and otherwise provided by or on behalf of EFL to the tenderer is accurate:

- EFL makes no representation or warranty, whether express or implied, as to the completeness, correctness or accuracy of such information; and
- Any drawings, reports or other material provided by or on behalf of EFL are provided for information purposes only and may not be relied upon as constituting accurate information.
- The tenderer is to make its own enquiries as it considers necessary before relying on any information provided by EFL and before submitting its Tender. EFL shall have no liability for any inaccuracies, errors, omissions or mistakes in such documentation.

Those submitting tender responses will be deemed to have:

- Examined these Instructions and all documents referenced (if any);
- Considered all the risks, contingencies and other circumstances that may have an effect on their tender responses;
- The Tenderer will be deemed to have visited the site and satisfied themselves that the offer is complete. On site conditions will not be accepted as a reason for variation at a later date.
- Taken into account all restrictions, procedures, costs, timings and potential difficulties which may affect the performance of the Works; and
- Satisfied themselves as to the correctness and sufficiency of their tender responses, including the pricing structure offered.

All tenderers submitting a Tender agree that:

- A contract is only formed between EFL and the successful tenderer when EFL executes the Contract Agreement, setting out in full the terms upon which EFL has engaged that tenderer to carry out the Works;
- These Instructions, and any provision contained herein, do not give rise to a separate contract between EFL and the tenderer; and
- Nothing in these Instructions, or in the relationship of EFL and the tenderer, imposes any duty of care on EFL, and any such duty of care is expressly excluded.
- All costs incurred by the tenderer in connection with its Tender, these Instructions or any related matters are the sole responsibility of the tenderer.

2.26 Tender Responses

Each tenderer must include the information as required by EFL in these Instructions. Information not specifically required by these Instructions, but believed by the tenderer to be of value in evaluating the

responses, should be included as an addendum. Where there is reference to published manuals, only the relevant extracts should be placed in the addendum.

All tenderers warrant that:

- All information provided in their response is complete and accurate in all material respects;
- Provision of information to EFL, and the use of it by its employees, agents or contractors for the evaluation of responses and the possible subsequent negotiation and implementation of a contract, will not breach any third party's intellectual property rights; and
- EFL is under no obligation to check any tender response for errors. Acceptance of a tender response that contains errors will not invalidate any contract that may be negotiated on the basis of that tender response.
- Tenderers must not, without EFL's prior written consent, consult, communicate or agree with any other tenderer in connection with any Tender, and shall not make any attempt to influence any other tenderer to submit or not submit a Tender or to alter the proposed content of that tenderer's Tender.

2.27 Preferred Tenderer

Should a tenderer be informed that they are a preferred tenderer, such advice does not:

- Constitute an acceptance by EFL nor create a contract:
- Constitute an award of the contract: nor
- Imply or create an obligation on EFL to enter into negotiations with or award the contract to the tenderer

EFL reserves the right to discontinue negotiations at any time.

2.28 Acknowledgement by Tenderer

Each tenderer acknowledges that EFL has reserved to itself certain rights and discretions in these Instructions and agrees that it assumes, at its sole cost, the risk that EFL may at any time exercise any of these rights and discretions. Each tenderer agrees that it shall not have any rights, and further waives any rights it may have, against EFL or any other person arising from the exercise by EFL of its rights and discretions, and agrees not to make any claim, bring any action or otherwise seek to recover from EFL any costs incurred by that tenderer in respect of its Tender or any lost expectation of profits or other benefits which that tenderer may expect to accrue to it from acceptance of its Tender.

2.29 Governing Law

These Instructions shall be construed according to and governed by Republic of the Fiji Islands Law and the tenderers agree to submit to the non-exclusive jurisdiction of the Fijian Courts in any dispute or difference of any kind which may arise concerning the same.

3 SPECIFICATION – PRELIMINARY AND GENERAL

3.1 General

3.1.1 Location

The site of the proposed works is the Wailoa Power Station Viti Levu in the republic of the Fiji Islands. The site is normally accessed by road from the Capital, Suva

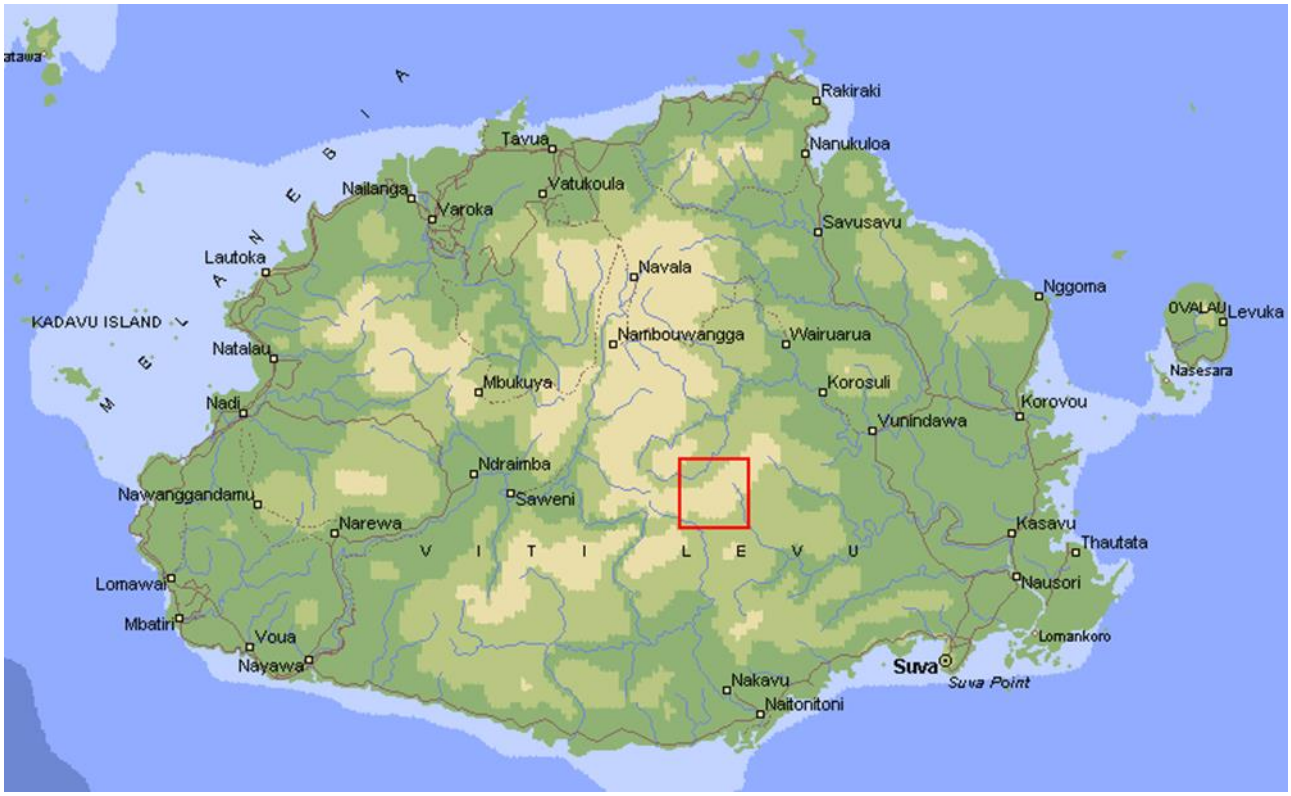

Figure 1 – Viti Levu Island, Fiji. Approximate site location shown in red box

3.1.2 Access

Only construction vehicles will be allowed in the construction zone. All other vehicles shall be parked in the designated contractor staff car parking areas.

3.1.3 Site

The Contractor and his/her staff shall comply with the Employer's requirements for external contractors when working on the Site.

3.1.4 Construction Activities to be provided by the Employer

The Employer will provide the following services and construction work as part of this project;

a. Installation of the replacement 110V DC Systems, including installation of all cabling systems between the 110V DC Systems and other powerhouse systems.

b. Provide accommodation, free of charge for the Contractor's installation supervision and commissioning personnel at Wailoa Camp which is approximately one kilometre from the power station.

3.1.5 Protective Helmets and High Visibility Jackets

The Employer will designate protective helmet areas. All Contractors' employees, sub-contractors employees, visitors and delivery personnel shall wear a hard hat at all times within such designated areas. Contractors must advise all appropriate people. Hard hats are to be replaced every three (3) years and are not to be painted. Only the company logo may be attached.
High visibility jackets shall be worn at all times and in all areas designated by the Employer.

3.1.6 Lighting

The Contractor shall provide artificial lighting when natural lighting becomes inadequate at any walking access-way and construction space. The artificial lighting may be either by the permanent lighting installation or by a temporary installation, which is later removed once the permanent installation is complete.

3.1.7 Radios

No broadcast frequency radios, Walkman's, radio cassettes CD players, MP3 players, or other similar devices shall be permitted on the construction work areas.

3.1.8 Safety Signs

The Contractor's employees shall observe and comply with all safety signs displayed about the Site.
These signs inform personnel both of safety equipment that is required and of the hazards that personnel may encounter in special areas.

3.1.9 Alcohol & Illegal Drugs and Substances

Illegal drugs and substances are not permitted on Site. Alcohol must not be brought on Site or be consumed on Site unless approved by the Site Manager. Personnel reporting for duty or seen on Site under the influence of drugs, substances or alcohol will not be allowed to commence work and will be asked to leave the Site.

3.1.10 Animals

Animals are not permitted on Site.

3.1.11 Children

Children under the age of 15 are not permitted on Site.

3.1.12 Contractor's Responsibilities for Health and Safety

The Employer requires the Contractor to comply with safety regulations detailed herein. Compliance with these safety regulations shall not relieve the Contractor of his obligations under the Contract, The Fiji Health and Safety at Work Act 1996, and any amendments thereto.

The Contractor shall:

- Ensure that Contractor and Sub-contractor employees have the necessary skills, qualifications and are supervised by trained personnel to perform the contracted Works safely;
- Audit the performance of Contractor and Sub-contractor employees to ensure compliance to Health and Safety at Work Act 1996 and Site requirements and report each month in the prescribed form to the Engineer. In addition, the Contractor shall report weekly to the Engineer as to the total number of personnel (including Sub-contractors) employed on Site over the last week;
- Inform the Engineer of Health and Safety hazards presented by the Contractor's or Subcontractor's Works;
- Inform the Engineer of Health and Safety hazards found by Contractor or Sub-contractor whilst undertaking Works;
- Ensure that Health and Safety equipment and clothing is supplied to protect Contractor and subcontractor employees from the hazards their work creates and that all steps have been taken to prevent harm to other people in the area from the hazard created; and
- The Contractor has the responsibility for informing each Sub-contractor of Health and Safety hazards they may be exposed to and the controls in place to protect them including hazards that may be created by other contractors.
- The Contractor shall run minuted toolbox meetings involving all staff working on site.

3.1.13 Fire Regulations

The Contractor shall provide and maintain adequate fire prevention equipment facilities in areas of potential fire hazard, including, but not limited to, portable fire extinguishers, fire protection mats and firewatchers. In the event of any fire, the Contractor shall take all steps necessary to extinguish the fire and contain its effects and shall report promptly in writing to the Engineer the cause and extent of damage resulting there from.

3.1.14 Housekeeping

The Contractor is responsible for keeping all work areas free from accumulated rubbish at all times and shall deposit rubbish in the central rubbish skips.

3.1.15 Responsibility – Employer

The Employer will:

- Document procedures for Contractor and Sub-contractor personnel movements in and out of the Site or nominated work areas;
- Advise the designated Site Health and Safety Officer;
- Facilitate regular Health and Safety meetings with Contractor's Occupational Health and Safety representatives; and
- Undertake Health and Safety Audits.

3.2 Contractor's Administration

3.2.1 Contractor's Supervisor

The Contractor shall appoint a properly qualified and experienced supervisor to control and direct his staff at Site and the appointed supervisor or replacement approved by the EFL Engineer shall be on Site whenever members of the Contractor's staff are working. The supervisor shall not be replaced except by agreement with the EFL Engineer.
The Contractor's supervisor shall be entirely responsible for the direction of employees of the Contractor and shall be given authority to negotiate and agree points arising out of the erection in order to minimize delays. All instructions from the Engineer will be issued to the appointed supervisor.

3.2.2 Meetings

Meetings will be convened by the EFL Engineer at regular intervals which will not be less frequent than monthly and may be weekly at critical periods. The Contractor shall ensure that a senior person conversant with the project and with decision-making authority attends each meeting.

3.3 Co-operation

The Contractor shall co-operate with Site staff, and other contractors on the Site as applicable, to ensure an orderly programme.

3.4 Site Operations

3.4.1 General

At all times the Contractor and his work force shall observe the Employer's requirements in regard to safety and power scheme operating conditions and shall carry out no acts which would, or have the potential to, cause damage or down-time of any Site operations.

3.4.2 Site Specific Entry Conditions

The Contractor is required to ensure that he and all employees and sub-contractors comply with all Site specific entry conditions as may be issued by the Employer from time to time.

3.5 Delivery Procedures

In the event of plant or sections thereof being supplied from outside The Fiji Islands, such plant shall be delivered to a port in the country of manufacture for direct shipment to the specified port in Fiji. Plant must not be shipped on deck unless in containers.

The Contractor shall:

- Arrange for a mutually approved authority to inspect the manufacture, witness testing of the plant and certify that materials, tests and specifications meet the Employer's requirements and comply with the requirements of those codes specified by the Employer;

- Arrange an independent survey certificate verifying that the packing is adequate and sufficient for the required land, ocean and/or air transit to the final destination determined by the Employer certifying in particular that the packing complies with Fiji Government Regulations;
- the wooden packing cases or timber used in packing machinery for shipment are free of bark and/or obvious insect damage, are certified and cleared by the overseas shippers and that all packing is clean and new;
- Supply to the Employer copies of both of these certificates with the shipping documents; and
- Indemnify the Employer against all liabilities, claims, costs and expenses that may result from failure of the Contractor to comply with the above mentioned conditions;

All wooden packing cases or timber used in packing machinery from overseas shall be fumigated prior to delivery to Site and following equipment unpacking it shall be delivered to a nominated Site area for incineration. This material shall not be used on Site for construction activities.

3.6 Manuals and As-Built Drawings

The Contractor shall provide three securely bound sets of Operating and Maintenance Manuals together with three copies of as built drawings including full process and instrumentation diagrams. A full draft manual shall be provided prior to the issue of a Taking-Over Certificate with three copies of the final revision provided, at least one soft copy to be provided to EFL.

The information provided with each manual shall include but not necessarily be limited to:

- Design specifications;
- Serial numbers of the package, the electrical motors and all individual components as applicable;
- All manufacturers' components design specifications, model numbers and information;
- Operating instructions for starting up, running and shutting down of all systems;
- Full instructions for adjustments and settings;
- Full commissioning and test records;
- Full lubrication instructions;
- Full maintenance manuals to enable the Employer to carry out their own maintenance;
- Full plant log and inspection and maintenance schedules;
- Full electrical schematics of the controls including all wiring diagrams;
- Function descriptions and automation software programmes and listings including a copy in electronic form;
- Full spare parts list for the complete package; and
- List of critical and recommended spares.

The final format of all such manuals and drawings shall be agreed with the Engineer prior to their preparation.
Drawings shall also be supplied as hard copies and also in electronic form. All plant layout and P&ID drawings shall be provided in AutoCAD or similar format.

3.7 Existing Equipment

Existing equipment to be reused and where the Contractor and EFL Engineer shall inspect necessary modified by the Contractor jointly. Where the equipment to be reused requires repairs and/or maintenance beyond that which could reasonably have been foreseen by the Contractor, the Contractor and EFL Engineer shall agree the extent of the additional work and the costs thereof. If during the course of the alterations to an item of existing equipment it becomes apparent that repair work is

required, the EFL Engineer and Contractor shall inspect the work and agree the extent of any additional work and the cost.

3.8 Documentation and Approvals

The Contractor shall allow 14 days for the approval by the Engineer of all drawings, schedules and documents as required under this Contract unless the EFL Engineer agrees such lesser time in writing. The Contractor shall allow for up to four copies of each drawing and document necessary for the approval of the proposed plant and for the subsequent operation and maintenance of the plant.
Electronic copies of CAD drawings shall also be provided in AutoCAD format.

3.9 Substitutions

All components and engineering specifications shall comply with the technical specification unless agreed to in writing by the Engineer.
Substitutions of alternative equipment or brands of component types shall be approved by the EFL Engineer in writing prior to commitment and installation.

3.10 Industrial Relations

The Contractor shall keep the Engineer fully informed of all claims made or other industrial relations matters, which may affect the Site or the Employer's activities and shall take all reasonable steps to avoid actions or inactions, which will prejudice the Employer.

The Employer instructs the Contractor not to enter into any specific Site agreement, or redundancy agreements and shall not employ workers at the Site nor specifically for the Site nor specifically for this Contract but for general work at unspecified locations. Any actions in contravention of these preferences are likely to be prejudicial to the Employer and therefore not acceptable.

3.11 Quality Systems and Standard Compliance

The Contractor shall implement full Quality Management System procedures on all aspects of the Work from and including initial design to final documentation.

The EFL Engineer reserves the right to arrange an independent assessment of the Contractor's or Plant Suppliers Quality Management System if quality systems procedures in use on the Contract are considered by the EFL Engineer to be deficient.

3.12 Goods and Contractor’s Plant

All Goods and mechanical plant used by the Contractor in the execution of the Works shall be of such type, size and shall be utilized in such a manner, as the Engineer shall approve. The EFL Engineer's approval to use mechanical plant will not be unreasonably withheld, but if in the EFL Engineer's opinion, circumstances arise which make it desirable that the use of plant be suspended either temporarily or permanently, the Contractor shall change the method of performing the work affected and shall have no cause for claim against the Employer on this account nor shall there be cause for claim if any order by the EFL Engineer results in the mechanical plant having to stand idle for a period of any duration whatsoever or having to be removed.

The Contractor shall use every possible means to prevent noise and annoyance to the inhabitants of the area in which the Works are situated, and all machinery must be of such design and so arranged as to be reasonably free from noise in operation. The Contractor shall have no claim for any charges involved in complying with the requirements of this clause.

3.13 Construction Photographs

Before commencing and during the progress on any part of the Works, the Contractor shall permit and if required, shall render assistance in the taking of such photographs as the EFL Engineer may require.

3.14 Advertising

The Contractor shall treat the Contract and everything within it as private and confidential. In particular, the Contractor shall not publish any information, drawing or photograph relating to the Works and shall not use the Site for advertising purposes except with the written consent of the EFL Engineer and subject to such conditions as the EFL Engineer may prescribe.

3.15 Existing Services

The Contractor is to leave all existing services, in place unless otherwise directed by the EFL Engineer.

3.16 Protection of Works

Where required, the Contractor shall cover and protect the Works and all plant and equipment from inclement weather and damage as the Works proceeds. Any work, materials, plant or equipment suffering damage shall be made good at the Contractor's expense.

3.17 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 up to 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.

4 SPECIFICATION – INTRODUCTION

4.1 Scope of Supply

The Contractor shall furnish all labor, materials, and equipment required to design, supply, install, field test, and pre-commission battery backed up DC and AC UPS systems for the Wailoa Power Station control, protection, SCADA, communications and emergency lighting systems.

Equipment used shall be a type having an established reputation of two years or more of satisfactory and reliable service, designed for auxiliary power and motor control to hydroelectric generators 20 MVA and larger. The requirements of this specification for the design apply to all units.

Equipment and accessories shall be, to the greatest extent practicable, of a type, which is readily available in the domestic market for over 5 years or which can be readily imported from Australia or New Zealand. All equipment and accessories supplied must have service back up for at least 15 years. Replacement parts must be available within this 15 year period. The names of manufacturers of mechanical and electrical auxiliary equipment to be incorporated into the Work, together with performance characteristics, and other significant information, including specification sheets, equipment data, shall be submitted to the Employer for review and acceptance. The Employer shall not incorporate equipment into the Work without prior review and acceptance.

The erection of the 110V DC System shall be performed by EFL under the supervision of the Contractor, field testing and commissioning of the 110V DC System shall be performed by the Contractor. The Contractor shall provide complete erection instructions, field test plans, and pro-forma test record sheets (including acceptance criteria) for the equipment.
The Contractor shall also provide Operating and Maintenance manuals for the equipment, which shall include space for the Employer to insert the field test records once completed.

The Contractor shall provide two (2) one day duration on-site training sessions for the Employers Operating and Maintenance staff.

5 SPECIFICATION – GENERAL REQUIREMENTS

The basic materials and methods shall be in accordance with the common requirements specification.

5.1 Basic Design

The following documents shall be provided:

a) Drawings
   - Single line diagram of DC systems

b) Documents
   - Brochure material for the selected batteries and chargers
   - Type test certificates
   - Manufacturing quality control plan

c) Calculations
   - Battery selection and sizing calculations

d) Standards
   - A list of all design codes and standards being used

5.2 Detailed Design

The following detailed design documents shall be provided:

a. Outline Drawings
b. Detail Drawings
   - Panel front, rear and side views
   - Inside view of equipment arrangements, including terminal blocks and cable entrance details for external cables
   - Conduit and cable entrances connections and bushing details.
c. Schematics
d. Documents
   - Factory acceptance test plan.
   - Erection and commissioning quality control plan
e. Operating and Maintenance manual

5.3 Records and Instructions

The following records and instructions shall be provided:

a) Factory test reports
b) Type test reports

c) Instructions:

- Factory Assembly and testing procedures
- Handling and storage instructions
- Installation Instructions
- Operating and Maintenance Instructions including:
  - A detailed explanation of the operation of the DC system
  - Instructions for routine maintenance
  - Detailed instructions for the repair of the battery chargers and batteries
  - Parts list and parts numbers
  - Schematic electrical drawings of wiring systems, including operating and safety devices, control panel components and instrumentation.
  - Battery disposal procedures
- Field Testing, Pre-commissioning, commissioning procedures of check-out, start-up, initial operation and testing.

d) As built drawings

5.4 References, Standards and Codes

AS 2676.2	Guides to the installation, maintenance, testing and replacement of secondary batteries in buildings – sealed cells
AS/NZS 3000	Electrical installations
AS/NZS 4029.2	Stationary batteries – lead acid – valve regulated type
AS 4044	Battery chargers for stationary batteries
AS/NZS IEC 61439	Low voltage switchgear and control gear assemblies
IEC 60146	Semiconductor converters – general requirements and line commutated converter
IEC 60269	Low Voltage Fuses
IEC 61000	Electromagnetic compatibility (EMC)
IEC 62040	Uninterruptible power systems (UPS)
IEEE 485	Recommended practice for sizing lead-acid batteries for Stationary applications
IEEE 1187	Recommended practice for installation design and installation of valve – regulated lead-acid storage batteries for stationary applications

6 SPECIFICATION – 110V DC SYSTEM DESCRIPTION

The systems shall normally supply 110 V DC and essential 240 V AC to the powerhouse by utilizing the DC output from the battery chargers to feed the 110 V DC switchboard and the 240V AC UPS. When the 415/240 V AC power supply to the battery chargers fails, the battery sets shall provide 110 V DC to the 110 V DC switchboards and to the 240V AC UPS.

6.1 General Requirements

A duplicated 140 Amp 110 VDC power supply is to be provided at the Wailoa power station. It shall consist of:

- Two Battery banks each rated for 50% of station 110V DC load for a period of 48 hours.
- Two Battery chargers, each rated for 100% of station DC load plus the capacity to recharge one battery bank in 8 hours
- One DC distribution boards with two DC busbars and a manually operated bus coupler (normally open)

  One 240V AC UPS system rated at 8kVA with distribution board.
- Interconnecting cabling.

The UPS must include output filtering to ensure a high quality, interference free, supply. The UPS will normally take AC supply from the powerhouse switchboard, upon failure of the AC supply the UPS will switch to a DC/AC inverter supply taken off the 110V DC system.

The Contractor shall provide all necessary associated equipment, special tools, controls and detailed information for the installation, testing, pre-commissioning and operation of the equipment supplied.

The DC system shall be designed to supply a Station DC load of about 70A (including UPS load) for 48 hours.

The Contractor must provide a proven cooling configuration to ensure that the battery chargers and UPS can operate continuously at their rated maximum output without detriment with ambient temperatures up to 40°C.

6.2 Battery Sets

Each battery set shall consist of fifty four (54) individual cells, each rated at 2V nominal.

The batteries shall be designed for a minimum service life of twelve years to 80% remaining capacity. The battery rating shall be increased to allow for an 80% end-of-life capacity (i.e. battery increased by 1.25).

Each battery set shall have a 20-year life expectancy and the capability of being completely discharged to the 1.8 V per cell rating a minimum of 50 times over the 15-year life period.

Each battery cell shall be an identical sealed maintenance free type of heat-resisting and shock-absorbing material, which will not warp, bulge, or lose its shape. The battery cells shall be sealed Valve Regulated Lead Acid Battery (VRLA) type or Nickel. The battery cells shall be designed to be mounted in both vertical and horizontal orientations for normal operation. The battery cell cover shall have flame arrester type vent caps.

Temperature sensors shall be attached to each battery set in order to provide temperature compensation signals to the battery charger.

Each battery set shall be provided with protective fuses mounted on the battery stand. A 'clean' contact fuse blown alarm shall be provided for signaling to the Employers control system.

6.2.1 Battery Rack

The cells shall be located on a battery rack at a convenient height and shall be easily replaceable. The rack shall be of the stepped type with a maximum of 2 steps and made of steel. It shall permit easy maintenance and cleaning of the battery set and the battery room floor. It shall allow a compact assembly of the cells to assure maximum voltage across the battery. The rack shall be painted with 2 coats of acid resisting paint.
The battery stands shall be designed to withstand the seismic forces specified in the Common Requirements Specification without collapsing, or the batteries breaking free.

Note: the battery voltage test point on the battery terminals shall not be higher than 1800mm above floor level.

Note;

- The available Battery Room Space is L = 4500mm x W = 4000mm x H = 2500mm

6.3 Battery Chargers

Each battery charger shall:

- Be modular type with multiple charger modules paralleled to provide the necessary capacity. The battery charger capacity shall be such that the performance requirements can be achieved with one failed module.
- Be housed in a heavy gauge sheet metal cabinet. The cabinet shall be free standing, floor or wall mounted. Access shall be from the front through a hinged door.
- Be designed specifically for charging VRLA batteries and shall include temperature compensation to prevent thermal runaway.
- Be designed for continuous operation in an ambient temperature up to 40°C.
- Be capable of float charging the battery set and simultaneously supplying other loads to its full ampere capacity.
- Operate properly over a ±5% supply voltage frequency variation.
- Be provided with an automatic load limiting feature that will limit the output current to 110% of its rated DC load without tripping the AC or DC breaker or blowing fuses.
- Be capable of picking up a fully discharged battery without tripping. Regulation shall be accomplished by static control circuits. Provision shall be made within the regulating circuits to ensure adequate dynamic response for the impedance characteristics of various battery types and DC loads, to include supplying the DC loads when the battery sets are disconnected for maintenance.
- Have a two or more winding transformer to isolate the AC supply from the DC output.
- Have reverse-current protection to prevent draining the battery in the event of rectifier failure or short circuit.
- Be provided with one set of fuses/circuit breakers for connection to the battery bank.
- Be provided with one set of fuses/circuit breakers for connection to the DC distribution board.
- All DC

The chargers shall have surge suppressors and filters to prevent voltage spikes or other distortion from being fed back into the AC power supply or from affecting the DC output. The filters shall limit the voltage transients to not more than 5% of the fundamental. Output ripple content shall be limited to less than 2% rms.

Each battery charger shall also be equipped with the following:

- Output DC voltmeter
- Output DC ammeter
- Battery DC ammeter
- AC power failure relay, with one normally open and one normally closed contact and a local pilot light.
- DC low and high voltage alarm relays, each furnished with one normally open and one normally closed contact. A local pilot light shall be furnished for each relay.
- DC earth fault relay for remote alarm with local pilot light
- Charger fault relay for remote alarm with local pilot light.
- AC power "ON" pilot light.

6.4 Uninterruptible Power Supply

The Uninterruptible Power Supply shall:

- Have two 110V DC Supplies, one from each DC Main Distribution Board. An automatic changeover contactor shall select between the two supplies.
- Be modular type with multiple modules paralleled to provide the necessary capacity. The UPS shall be such that the performance requirements can be achieved with one failed module.
- Be housed in a heavy gauge sheet metal cabinet. The cabinet shall be free standing, floor or wall mounted. Access shall be from the front through a hinged door.
- Be provided with a single phase distribution board comprising of :
  AC output circuit breakers: One 63Amps 2 Pole MCB, four 32Amps 2 Pole MCB, Six 16Amps 2 Pole MCB, two 10Amps MCBs and ten 6Amps MCBs
- Be designed for continuous operation in an ambient temperature up to 40°C.
- Have a fully isolated output of 240 V AC, single-phase, 2-wire, 50 Hz over a power-factor range of 0.8 lagging to unity.
- Have voltage regulation from zero to full load of less than ±2%.
- Not exceed 5% total harmonic distortion, or greater than 3% on any single harmonic.
- Include a break before make static transfer switch normally switched to the inverter.
- Include a maintenance bypass switch.

The UPS shall be provided with the following clean contact indications for the Employers control system:

1. UPS Trouble
2. Static Transfer Switch – Battery Supplying Load
3. Static Transfer Switch – Alternate AC Source
4. Bypass AC Power Source Available
5. Inverter High temperature

The UPS system shall be provided with the following metering devices:

1. AC inverter output voltmeter
2. AC output ammeter
3. Inverter output frequency meter
4. Bypass source input voltmeter
5. Battery input voltmeter

6.5 DC Main Distribution Board

The Contractor shall provide a Main DC distribution board. The main distribution board shall include:

- Two fully insulated DC busbars, each with an incoming two pole isolator rated not less than 200A DC.
- A two pole tie switch (normally open) to connect the two bus sections. All exposed live parts must be fully insulated.
- Each bus section shall include:
    - A DC ammeter on the incoming supply
    - A DC voltmeter on the bus.
    - 1 x 63A Double pole DC MCBs
    - 5 x 32A Double pole DC MCBs
    - 30 x 16A Double pole DC MCBs
    - All MCBs shall have earth fault detection and protection provision

The distribution board shall be designed and constructed in accordance with AS/NZS 3439.1 and AS 2676.2, as applicable. Where compliance is not relevant, the board shall be designed for the fault rating expected using industry standard components.
All circuit breakers shall be at least two-pole, breaking both the negative and the positive lines. Merlin Gerin's range of DC specific MCCB up to 630A rating are preferred types. All MCCBs shall be fitted with panel-front mounted rotary handles.

Note;

- The available space for the Battery Charger, UPS and Distribution Board Panels is L = 2500mm W = 800mm x H = 2000mm.
- The Circuit Distribution schematic drawing is attached as Appendix 1

6.6 Interconnecting Cabling

The Contractor shall supply cabling for interconnecting the items supplied under the Contract, plus the 415V AC cable for providing AC power to the chargers. Ali cables shall have stranded copper conductors.
The Contractor shall size the cables to limit the voltage drop under full load conditions to 1% of the rated voltage. All cable lugs, nuts, bolts and lock washers required to terminate the cables shall be supplied.

The cables shall include:

1. 1 x 3 phase 4 core, plus earth, 415V Cable for the AC supply to each charger (2 cables in total). Each cable shall be 50m long.
2. 1 x 110V DC 2 core, 110V DC Cable for the DC supply from each charger to the battery banks (2 cables in total). Each cable shall be 20m long.
3. 1 x 110V DC 2 core, 110V DC Cable for the DC supply from each charger to the DC Main Distribution Boards (2 cables in total). Each cable shall be 20m long.
4. 1 x 110V DC 2 core, 110V DC Cable for the interconnecting tie between the two DC Main Distribution Boards (if the Contractors design as each bus section on the Main DC Distribution Board as a separate panel). The cable shall be 10m long.
5. 1 x 110V DC 2 core, 110V DC Cable for the DC supply from each DC Main Distribution Board to the UPS (2 cables in total). Each cable shall be 20m long. 24V DC instrumentation cable between each battery bank and the associated charger. The cable is to be used for the cell

temperature sensors and battery fuse blown alarms. The Contractor shall determine the number of cables and type required. Each cable shall be 20m long.

6.7 Factory Inspection and Testing

The DC system shall be completely assembled in the factory and tested, insofar as practicable.

Tests shall include:

- All control, instrument, CT, VT and relay wiring shall be subjected to a dry dielectric withstand test of 2,500-V to ground for one minute.
- Secondary injection tests to demonstrate correct operation of all protection settings.
- Battery charger 48hr heat run test at rated output with the ambient temperature at 40C.
- Battery charger functionality tests following the manufacturers usual acceptance criteria.

6.8 Installation, Testing and Commissioning

The Contractor shall supervise installation of the DC system and shall conduct testing and commissioning.
All necessary assistance, guidance, software and special tools required for the installation and testing shall be provided.

6.8.1 Battery

The Contractor shall provide all required test equipment and perform the following site tests on each battery set:
a) A capacity test by fully discharging the battery to 1.75 V per cell.
b) Test of inter-cell resistance with a micro-ohmmeter.
c) Infrared thermal imaging test to be conducted at the same time as the capacity test.
d) Measuring and recording of the impedance and voltage of each cell.
e) Measuring and recording the specific gravity of each cell.

6.8.2 Battery Chargers

The input insulation level shall be capable of withstanding a test potential of 1000 V plus 2 times the input line voltage between current-carrying and non-current-carrying parts for 1.0 minute on the power circuits.

The output insulation level shall be capable of withstanding a test potential of 1000 V plus 2 times the input line voltage between current-carrying and non-current carrying parts for 1.0 minute.

The Contractor shall perform the following tests:
a) Four hour heat run at current limiting value.
b) Voltage regulation check from 0 to 100% rated output with ±10% AC line voltage variation.
c) Circuit operation test e.g. AC power loss and restart tests
d) No-load test.
e) Ripple voltage measurement.
f) Temperature compensation tests

A thermal infrared image scan shall be performed on all field terminations and battery cells during the full battery capacity test to check for faulty connections and/or batteries.

6.8.3 UPS

The following tests shall be performed on the UPS:

1. Four hour run at rated KVA output power
2. Voltage regulation test from 0 to 100% rated output with DC voltage input varying from 88-V DC to 132-V DC.
3. Dynamic voltage regulation test.
4. Total output harmonic distortion test.
5. Output frequency variation test over the fullrange of DC and AC bypass input voltages from 0 to 100% rated output.
6. Efficiency test at rated output.
7. Operational test of static transfer switch at rated output, including synchronizing circuitry.
8. Bypass transformer tests per applicable IEC or ANSI/IEE Standards.
9. Three operational tests of the static transfer switch, including the synchronizing circuitry.
10. Operational tests of the maintenance bypass switch, all incoming and outgoing circuit breakers, all metering and indications.
11. Operational test of the pushbutton switch to manually transfer the load from the inverter to the alternate AC source.

6.8.4 Test Results

The contractor is to provide original copies of all test results with the O&M Manuals

6.8.5 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 be done on site prior to putting the equipment into service. The Supplier shall also ensure that its staff are available to provide any kind of technical support during this period.

6.9 Training

The Contractor shall provide a factory-authorized service representative for training that shall cover the following items:

- Installation.
- Operation.
- Testing & commissioning.
- Maintenance practices for the supplied equipment as recommended by the Manufacturer
- Hands on training on periodic adjustment required, and parts replacement procedure.

6.10 Spare Parts

6.10.1 Specified Spare Parts

The Contractor shall include in their Tender, the following Specified spare parts:

- 10 x spare battery cells.
- 10 x spare DC charger modules Plus 5 x Backpane Panels
- 6 x spare AC UPS charger modules Plus 3 x Backpane Panels
- 2 x spare HMI interphase unit (If the HMI is used)
- 2 of each Voltmeter and Amp meters if these are installed on the Panels
- 2 of each type of Switches used in this DC System
- Any other tools and accessories for facilitating assembly and maintenance of the batteries which are normally furnished for this type of battery.

6.10.2 Optional Spare Parts

The contractor shall furnish a list of recommended optional additional spare parts.

6.11 Battery, Battery Charger and UPS Data

Battery		Purchaser's Requirements	Vendor's Response
Manufacturer			
Type or catalogue number			
Number of battery set	ea	2	
Number of cells	ea	54	
Total nominal voltage	V	110	
Total nominal capacity	Ah	1000 (nom)	
Discharge rates for the following times with an initial electrolyte temperature of 25°C			
48 hour	A	25	
Cell voltage at the end of the above discharge periods			
48 hour	V	1.75	
Expected battery life	Yr	> 12	
Guaranteed battery life (Append Warranty)	Yr	12	
Gross weight of battery assembly with rack and	Kg		
Dimensions of Battery and Rack Assembly			
Length of each rack			
Depth			
Cell dimensions, H x W x D			
Battery Charger			
Manufacturer			
Type and catalogue number			
Number of Battery Charger	each	2	
DC Output (rated)			
Current	A	140	
Voltage regulation	%		
Maximum Ripple	rms V		
Audible noise level at rated output		dB	
AC Input (rated)			
Current	A		

Voltage	V		
Maximum supply voltage variation for output regulation listed above	%		
Maximum allowable frequency variation for output regulation listed above	%		
Temperature compensated		Yes	
Overall Dimensions			
Height	mm		
Width	mm		
Depth	mm		
Uninterruptible Power Supply			
Manufacturer			
Model Number			
Number of Uninterruptible Power Supply	each	1	
Rated capacity	kVA	10	
Nominal Expected load	kVA		
Output Power rating over a power factor range of 0.8 lagging to unity		kVA	
DC input voltage range	V	88 - 132	
Nominal DC input voltage	V	110	
AC output voltage range	V	240	
Output frequency	Hz	50	
Voltage regulation from zero to rated load at unity to 0.8 lagging power factor	%	< ± 2%	
Total Output Harmonic Distortion under any operating condition	%	< 5%	
Maximum single harmonic distortion	%	< 3%	
Transient Voltage protection			
Common mode noise attenuation from source	dB		
Output Frequency over the full-range of DC and AC input voltage, load, and temperature	%		
Inrush current limit	%		
Efficiency at rated load	%		
Efficiency at expected load	%		
Overall Dimensions			
Height	mm		
Width	mm		
Depth	mm		
Cables			
Manufacturer			
415V charger supply cable cross sectional area	mm^2		
110V DC battery charger cable cross sectional area	mm^2		
110V DC charger – DC Main Board cable cross sectional area	mm^2		
110V DC Main Board tie cable cross sectional area	mm^2		

110V DC Main Board – UPS cable cross sectional area	mm^2		
Instrument cable type and number of cores			

DC System Data Sheet

Date: _____

SCHEDULE A: LIST OF EXPERIENCE, PERSONNEL & FINANCIAL STATEMENTS

A.1 Previous Experience

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

Client	Project Scope and Description	Approx. Project Value	Year Completed

Authorized Signatory of Tenderer:

Signature: ……..

Name: ……..

Date: ……..

A.3 Financial Statements

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

SCHEDULE B: PRICE AND PAYMENT SCHEDULE

Currency of Tendered Price: ……

Component	Unit Price	Quantity	Total Price
Supply of Battery Bank with Charger and UPS		1	
Install and Commission			
(Tenderer to add other items as required)			
Total			

Supply to state all Mandatory Spares that are required separately. EFL reserve the right to either include or not to include the spares cost in the contract.

Mandatory Spares	Unit Price	Quantity	Total Price
(Tenderer to add other items as required)			
Total			

The Payment Schedule shall be as per the table below:

Milestone	Percentage	Amount in Dollars
Receipt of Goods by EFL	50%	
Installation and Commission of the DC System	40%	
Retention Expiry of Warranty period (12 months after receipt of Goods)	10%	

Total Contract Price (in Words):

……

……

Authorized Signatory of Tenderer:

Signature: ……..

Name: ……..

Date: ……..

Note: Tenderer shall also provide unit prices for critical components as listed on Clause xxxx (such as charger etc.)

7 APPENDIX A – CURRENT EXISTING 110VDC SYSTEM

The below system is only to act as a guide and bidders are invited to propose the latest technology and design available on the market for these 110V DC Station system

7.1 EXISTING Battery Banks A & B

The existing batteries consist of two banks (A & B) at 110VDC per bank. The existing batteries are VRLA Stationary Battery

7.2 Specifications of Battery Charger

Battery Chargers and their mounting racks / enclosures shall be designed to the service conditions detailed under these specifications. The existing battery chargers has the following specifications and we recommend a similar design be provided along with the latest models for the rectifier and inverter that will be available in the market over the next 15 years.

AC – DC system (A + B)	**DC – AC system (Inverter)**
AC Distribution	**DC Distribution**
Input Voltage: 415 V AC (Three Phase)	**Power on voltage**: 110V DC
Input circuit breaker: 3 Pole 50Amp x 2	**DC Voltage operated range**: 93.5V DC – 143V DC
Frequency range: 45 to 65 Hz	**Low voltage warning**: 98V DC
Power factor: 0.99(>51% load)	**Inverter input circuit breakers**: 63 Amps 2 pole x 1
Efficiency: >92 (rated input : full load)	**Bus tie MCCB**: 100Amps *NM8-250) 2 pole x 1
C surge protection: In = 20KA(8/20µs), Imax = 40KA(8/20µS) x 2	**AC Distribution**
Module rectifier control circuit breaker: 32Amps single pole breakers	**AC bypass MCCB (with lock):** 100Amps(NM8-250) 2 Pole x 1
	C surge protection: In=20kA(8/20µs), Imax = 40kA(8/20µs)
DC Distribution	**AC nominal output voltage**: 240V AC (Single phase)
Nominal Output voltage: 110V	**Voltage variation**: Max ± 2%
Output voltage range: 90 – 150V	**Output frequency**: 50Hz ± 0.1%
Maximum output current: 300A	**Maximum output Power**: 4KVA
Maximum output power: 36kW	**Wave form:** Pure sine wave
Battery breaker (MCCB): 200Amps(NM8-250) 2 Pole breaker x 2	Power Factor: 0.8

Load breaker (MCCB): 200Amps(NM8-250) 2 Pole breaker x 2 **Load branch breakers:** 63Amps 2 Pole x 1 32Amps 2 Pole x 5 16Amps 2 Pole x 30 The above is x 2 for each load branch A & B **Shunt**: 300Amps/75mv x 2 **Modular Rectifier**: Needs to be latest module proposed by Bidder **Supervisory Module**: Needs to be latest module proposed by Bidder 2 x common alarm relay (Normally closed) **Environmental** **Operating temperature**: -25 to +65 °C (Maximum output power is derated above 55 °C) **Humidity**: 5 – 95%RH (Non-condensing)	Efficiency: Max 90% AC output circuit breakers: 63Amps 2 Pole x 2 32Amps 2 Pole x 4 20Amps 2 Pole x 4 16Amps 2 Pole x 6 **Inverter module:** Needs to be latest module proposed by Bidder **Supervisory Modular**: Needs to be latest module proposed by Bidder Sub rack: Needs to be latest module proposed by Bidder **Operation temperature**: -10 to + 40 °C (de-rating above 40°C) **Storage temperature**: -40 to + 85 °C **Relative humidity:** 0 ~ 95% max, non-condensing **Cooling**: forced air Vertical angle: No vibration and hanging angle less than 5 degrees 1 x common alarm relay (normally closed)

The available space dimensions are stated in Clause 6.5 above and bidders are requested to provide panel design to fit this existing location so to allow the use of existing cables.

NOTE: The cable entry needs to be available from top and bottom entry on the battery charger panel

Battery chargers shall be capable of continuous operation whilst supplying rated output current at maximum temperature compensated float charge voltage, with a minimum design life of 25 years in the above-specified environmental conditions. All battery charger panel shall be installed with robust surge protectors on incoming AC supply to protect the chargers from any or all surges

Each component shall be individually protected by appropriately selected and designed MCBs. MCBs shall be clearly marked and identified in coordination with schematics and manuals.

Battery chargers shall be designed for rapid repair by replacement on a modular component basis. Similar components shall be used across all battery chargers to minimise the holding of spares. Fault finding and replacement of components shall be possible from the front of the panel. It is preferable that the power modules be hot pluggable.
The design and construction of the battery charger shall have indication, metering and alarm facilities

8 APPENDIX B – DC EXISTING LOAD

Loads as Per Distribution Box

BANK A DC LOADS

No.	Rating (A)	Cable #	Designated	Unit
1	16	1B-301	1CHA20	1
2	16	1B-303	1CJA20	1
3	32	1B-318	1MEY11-1	1
4	16	1B-309	1MKC01-2	1
5	16	1B-308	1MKC01-1	1
6	16	1B-310	1MKC04	1
7	16			SPARE
8	32			SPARE
9	63			SPARE
10	16	1B-312	Transformer T1	Station
11	16	1B-311	Transformer T1	Station
12	16			SPARE
13	32			SPARE
14	16	1B-300	1CHA10	1
15	16	1B-302	1CJA10	1
16	16	1B-319	1MEY11-2	1
17	16			SPARE
18	32		Rectiverter Panel 2	G2 & G4
19	63			SPARE
20	16	3B-312	Transformer T3	Station
21	16			SPARE
22	16	3B-301	3CHA20	3
23	16	3B-303	3CJA20	3
24	16	3B-303	3MEY11-1	3
25	16	3B-308	3MKC01-1	3
26	16	3B-309	3MKC01-2	3
27	16	3B-310	3MKC04-1	3
28	16	3B-300	3CHA10	3
29	16			SPARE
30	32	3B-319	3MEY11-2	3
31	16	2B-311	Transformer T2	Station
32	16	4B-320	Oscillation	4
33	16	2B-312	Transformer T2	Station
34	63	0B-301	Station Control	Station
35	16	1B-321A	SCADA	1
36	16	1B-321A	T1 & T3 Isolator	

BANK B DC LOADS

No.	Rating (A)	Cable #	Designated	Unit
1	16	2B-301	2CHA20	2
2	16	2B-303	2CJA20	2
3	32	2B-318	2MEY11-1	2
4	16	2B-309	2MKC01-2	2
5	16	2B-308	2MKC01-1	2
6	16	2B-310	2MKC01-3	2
7	16		Test bench Electrical	
8	32	4B-318	4MEY11-1	4
9	32		Rectiverter Panel 3	G1 & G3
10	16			SPARE
11	16	4B-326	4BHA10	4
12	16	2B-312	2BHA10	2
13	32	4B-319	4MEY11-2	4
14	16	2B-300	2CHA10	2
15	16	2B-302	2CJA10	2
16	16	2B-319	2MEY11-2	2
17	16	3B-311	Transformer T3	Station
18	32		Rectiverter Panel 1	
19	16	4B-312	Transformer T4	Station
20	16	0B-301	SCADA	
21	16	0B-302	SCADA	
22	16	4B-301	4CHA20	4
23	16		T2&T4 Isolator	
24	16	4B-302	4CJA10	4
25	16	4B-308	4MKC01-1	4
26	16	4B-309	4MKC01-2	4
27	16	4B-310	4MKC01-3	4
28	16			SPARE
29	16	4B-303	4CJA20	4
30	32	4B-300	4CHA10	4
31	16	1B-320B	SCADA	
32	16		415V Dsitribution close control	
33	63			SPARE
34	63			SPARE
35	16		415V Dsitribution TRIP	
36	16		415V Distribution control	

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UPS AC LOADS

No.	Rating (A)	Cable #	Designated
1	10	1BHA10	10P-512
2	10	2BHA10	20P-512
3	10	3BHA10	30P-512
4	10		SPARE
5	10		SPARE
6	10		SPARE
7	10		Control Room Lights
8	10	OP-503	Control Room GPO Front
9	16	OP-502	Control Room GPO Back
10	16		SPARE
11	16	4BHA10	40P-512
12	16		SPARE
13	16		SPARE
14	16		SPARE
15	6		SPARE
16	6		SPARE
17	32		SPARE
18	32		SPARE
19	32		SPARE
20	63		SPARE

Important Instructions for Bid Submission

Description: Dear Valued Suppliers,

This is a reminder to all suppliers to ensure that your bid submissions are made under the registered name of your business, as per your official business registration. This is important to avoid any confusion related to business identity. If there have been any changes to your business name or registration details, kindly update the information accordingly in your TenderLink user profile.
For local suppliers, please double-check your pricing calculations, including both the detailed breakdown and the total bid amount. Also, clearly indicate whether your prices are inclusive or exclusive of VAT. The prices should be received on your company letter heads, or put a company stamp.
For overseas suppliers, kindly state the currency in which you intend to submit your bid, along with the applicable Incoterm. This will assist us in accurately analyzing your submission.
Before submitting your bid, please ensure that all required documents have been uploaded to avoid incomplete submissions. Please upload valid Tax compliance, Valid FNPF Compliance and Valid FNU Levy Compliance for local bidders.

Lastly, please ensure that the Tender Submission Checklist is completed in full, including:

Company name: _____

Names of directors: _____

Contact phone number: _____

Email address: _____

These details are essential for us to reach out for any required clarifications.

Kindly ensure that you upload your tenders at least one hour before the closing time to avoid any last-minute internet or technical issues.

Thank you for your cooperation.

Kind regards,
EFL Supply Chain

TENDER CHECKLIST

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

Tender Number_____

Tender Name _____

1. Full Company / Business Name: _____

   (Attach copy of Registration Certificate)

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

I declare that all the above information is correct.

Name: _____
Position: _____
Sign: _____
Date: _____

Tender submission

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

This is due to COVID 19 restrictions on movements. Therefore, 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 10th September, 2025.
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.

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.