ENERGY FIJI LIMITED
INVITATION TO TENDER

Supply, Installation and Commissioning

Battery Energy Storage System (BESS)

for

4MWp Agrophotovoltaic Project in Bureta Ovalau

Tender No: MR 307/2025

Invitation to Tender

Date: 05/12/2025
Tender No: MR 307/2025

Energy Fiji Limited (EFL / the "Employer") invites sealed tenders from reputable firms (the "tenderer") for the Engineering, Procurement, and Construction (EPC) of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau

The tenderer is required to submit a tender for:

> The complete engineering design, procurement and delivery of materials and equipment, full construction and installation, testing & commissioning, and training for the BESS of required capacity as per technical specifications, located at Bureta, Ovalau,

All tenders for the contract shall be submitted on the appropriate tender forms provided and shall include the completed guarantees, price schedule, technical schedule and schedules of experience etc. relevant copies of which are included. The tender shall be on the basis of a lump sum contract based on firm price for the required parts, and with firm price per unit for optional extensions.

Tenderers may obtain further information from, inspect and acquire the tender documents and arrange for a site visit from:

Mr. Jitendra Reddy
The Manager, Procurement, Inventory & Supply Chain
Energy Fiji Limited
Private Mail Bag,
Suva –FIJI
Telephone: (+679) 3224360 Fax: (+679) 3311882
E-mail: tenders@efl.com.fj

There are Pre-bid meeting and site Visits planned for **16th December 2025**. All the interested bidders are required to meet at the project site, at 10.00am. It is mandatory for bidder to attend the pre-bid meeting and site visit. Proof of attendance is to be attached to the bid failing which the bid is liable for rejection. Deadline for submission of tenders shall be **16:00 (local Fiji time) on Wednesday 21st January 2026**.

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

Disclaimer

The views expressed in this Invitation to Tender (including all sections, annexes, and addendums) do not necessarily represent those of the Korea International Cooperation Agency (KOICA) or Energy Fiji Limited (EFL).

The content of this Invitation to Tender (including all sections, annexes, and addendums) offers an explanation and provides the instructions to tenderers, contract information, general and technical information, employer's requirements, concept design, schedules, and required forms. All relating to the Works to establish a BESS (Battery energy storage system). This Invitation to Tender is intended to provide general guidance for tenderers to prepare their tender submissions for the Works to be performed under an Engineering, Procurement and Construction (EPC) contract following the guidelines of the International Federation of Consulting Engineer (FIDIC). The information provided in this Invitation to Tender, including requirements and concept design, should be used only as a reference, and shall not be considered the final engineering design or used for the procurement and/or construction of the renewable energy system, as a detailed final design, equipment selection, and procurement shall be provided by the Tenderer under the Contract. The Tenderer is advised to perform its own due diligence and exercise own professional judgment and to consult the relevant current building and utility regulations and standards, health & safety and environmental regulations, and other applicable guidelines as constituted in the jurisdiction of the Republic of Fiji. The Tenderer shall ensure a safe and operable system (Permanent Works), and as such adequately consult with technical manuals and data sheets form suppliers for equipment proposed and supplied under the Contract.

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Contents

1.Section 1: Instruction to Tenderers

This Invitation to Tender is conducted to allow for contracting of an EPC project, and is conducted under the framework set out in the document “Conditions of Contract for EPC/Turnkey Project”, 2nd Edition 2017 (the 2017 Silver Book), published by the International Federation of Consulting Engineers (FIDIC). It is expected as a part of this Invitation to Tender that all tenderers shall have obtained and made reference to this document when submitting a tender to the Employer. The document can be obtained (at the tenderers expense) in both paper and electronic copy at the FIDIC website bookshop. http://fidic.org/bookshop

1. Scope of Tender
   1.1. Energy Fiji Limited (hereinafter referred to as "the Employer"), wishes to receive tenders from reputable firms or joint ventures (the “Tenderer”) for **Supply, Installation & Commissioning of a Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Ovalau** as defined in these Invitation to Tender documents (hereinafter referred to as "the Works").
   1.2. The successful tenderer will be expected to complete the Works within 285 Days from the Commencement Date.

2. Source of Funds
   2.1. The Employer has secured funds for the Contract through a grant made available by the Korea International Cooperation Agency (“KOICA”) for which this Invitation to Tender is issued.

3. Eligible Tenderers
   3.1. This Invitation to Tender is open to reputable firms, or joint ventures, who have the qualified experience of the BESS system works. For the avoidance of doubt this tender is open to tenderers who are not registered businesses in Fiji, though due to both building and electrical code requirements in Fiji, it is encouraged to include the participation of Fijian businesses and/or professionals.
   3.2. Tenderers shall provide such evidence of their continued eligibility satisfactory to the Employer as the Employer shall reasonably request.
   3.3. Tenderers shall not be under a declaration of ineligibility for corrupt or fraudulent practices in their countries of operation, or the World Bank Listing of Ineligible Firms & Individuals.
   3.4. Bidder’s net worth for the last year, calculated as the difference between total assets and total liabilities, shall be positive.
   3.5. Participation in at least two contracts that have been successfully completed, or substantially completed in the last ten years that are similar to the Works proposed in these specifications, and to IEC/Australia/New Zealand standards.
   3.6. Experience in battery design, integration, supply, testing and commissioning (for similar equipment offered – grid stability BESS of at least 1MW/4MWh capacity using lithium-ion chemistry).

4. Eligible Materials, Equipment, and Services
   4.1. Any materials, equipment, and services to be supplied in the process of completing the Works and Contract shall have their origin from reputable companies from various countries and all expenditures made under the Contract will be limited to such Works. At the Employer's request, tenderers may be required to provide evidence of the origin of materials, equipment, and services.

   Asbestos materials, materials or insulants containing PCB’s, or other materials prohibited by the laws of Fiji shall not be used in the Works.
   4.2. For purposes of 4.1 above, "services" means the Works and all project-related services including design services.

4.3. For purposes of 4.1 above, “origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided.

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

5. Qualification of the Tenderer

5.1. To be qualified for award of Contract, tenderers shall:

a) submit a written power of attorney authorizing the signatory of the tender to commit the tenderer; and

b) specify joint venture memberships, financial capability, technical capability, supply and installation facilities with comparable technical parameters, not black listed, and current litigation.

c) Submit proposals regarding work methods, scheduling and resourcing which shall be, provided in sufficient detail to confirm the tenderer’s capability to complete the works in accordance with the specifications and the time for completion.

5.2. Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements:

a) the tender, and in case of a successful tender, the Contract Agreement, shall be signed so as to be legally binding on all partners;

b) one of the partners shall be authorized to lead the joint venture; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners in the tender documents submitted to the Employer;

c) the partner in charge shall be authorized in writing to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture and the entire execution of the Contract. All contract payments to be made by the Employer will be remitted to the authorized partner in charge, and it shall be their responsibility to disburse the payments to the other partners;

d) all partners of the joint venture shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the authorization mentioned under (b) above as well as in the Letter of Tender and the Contract Agreement (in case of a successful tender); and

e) A copy of the agreement entered into by the joint venture partners shall be submitted with the tender.

5.3. Tenderers shall also submit proposals of work methods and schedule in sufficient detail to demonstrate the adequacy of the tenderers’ proposals to meet the Employer's Requirements and the completion time referred to in Point 1.2 above. Clause

6. One Tender per Tenderer

6.1. Each tenderer shall submit only one tender either by itself, or as a tenderer partner in a joint venture. A tenderer who submits, or participates in a joint venture, in more than one tender will cause all those tenders to be rejected. Note that suppliers / manufactures of materials and equipment for the Works are not subject to this restriction. As well firms or individuals performing third party testing or certification as required by the regulations and codes in Fiji as may be applicable are not subject to this restriction.

7. Cost of Tendering

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

8. Site Visit

8.1. The Tenderer is advised to visit and examine the Site of the Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the tender and entering into the Contract with the Employer for the completion of the Works.

The costs of visiting the Site shall be at the tenderer's own expense. The site can be visited on the following date and locations at:

a) The identical one-day Site visits will start at 10:00am (local Fiji time) at the Site.

b) The Tenderer shall give notice to the Employer (person listed in the invitation to tender) of its personnel or agents attending either of the one-day Site visits, and this notice shall be given seven business-days prior to the date of the Site visit.

8.2. The tenderer and any of its personnel or agents will be granted permission by the Employer and the Government of Fiji to enter upon the Site (its premises and lands) for the purpose of such inspection, but only upon the express condition that the tenderer, its personnel and agents, will release and indemnify the Employer and the Government of Fiji and its personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of the inspection.

9. Content of Invitation to Tender Documents

9.1. The Invitation to Tender documents is those stated below, and should be read in conjunction with any Amendment issued in accordance with Point 11 (below):

- Letter of Invitation to Tender
- Instructions to Tenderers
- From of Letter of Tender
- Conditions of Contract: General and Particular
- General Information and Data
- Technical Information and Data
- Employer's Requirements
- Concept Design
- Required forms of Agreement, Securities, and Guarantees
- Schedules Required from Tenderers

9.2. The Tenderer is expected to examine carefully the contents of the Invitation to Tender documents. Failure to comply with the requirements of tender submission will be at the Tenderer's own risk. Pursuant to Point 26, Tenders which are not substantially responsive to the requirements of the Invitation to Tender documents will be rejected.

10. Clarification of Invitation to Tender documents

10.1. A prospective Tenderer requiring any clarification of the Invitation to Tender documents may request a clarification of the Employer in writing by email at the Employer's email address indicated in the Invitation to Tender. Copies of the Employer's response, including a description of the inquiry, will be posted on the Employer's website for this Tender - Tender link for the Invitation to Tender (http://efl.com.fj/contractors-suppliers/tenders/).

10.2. Any clarification request of the Employer shall be submitted to the Employer at the latest twenty (20)days prior to the deadline for submission of tenders.

11. Amendment of the Invitation to Tender Documents

11.1. At any time prior to the deadline for submission of tender, the Employer 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 amendments. Such amendments will be issued through Addendum published on Tender ink Website.

11.2. Any amendment thus issued shall be part of the Invitation to Tender documents pursuant to Point 9.1, and will be posted on the Employer's website for the Invitation to Tender (http://efl.com.fj/contractors-suppliers/tenders/).

11.3. To afford prospective tenders reasonable time in which to take an amendment into account in preparing their Tenders, the Employer may extend the deadline for submission of Tenders, in accordance with Point 17.

12. Language of Tenders

12.1. The tender, and all correspondence and documents related to the Tender, exchanged between the tenderer and the Employer shall be written in the English language only.

13. Documents Comprising the Tender

13.1. The Technical Proposal shall contain the following:

- Letter of Tender signed (indicating “AVAILBLE IN FINANCIAL PROPOSAL” in the lump sum price fields, e.g. without the price indicated);
- Power of Attorney to authorizing the person signing the Letter of Tender;
- Letter of Confirmation of Eligibility of the Tenderer (own statement of eligibility);
- Schedules on Qualifications of the Tenderer;
- Executive Summary of the proposal
- Construction Schedule
- Schedule of Key Contractors Personnel;
- Schedule of Description of the Proposed Works (and any preliminary drawings);
- Schedule of Proposed Major Items (Completed plant technical specification including manufacturer of major;
- Schedule of Tenderers Proposed Management and Timelines;
- Tender Security: There is no Tender Security for this Tender.
- Parent Company Guarantee (if applicable);
- Any other materials required to be completed and submitted by Tenderers in accordance with these Instructions to Tenderers (without any costs indicated);
- Electronic version of the above documents uploaded to the appropriate folder in the EFL’s Online Tender Portal (only as PDF, MS Word, MS Excel, JPEG).

13.2. The Financial Proposal shall contain the following:

- Letter of Tender signed (with the price indicated);
- Schedule of Prices (including costs of optional extensions);
- Electronic version of the above documents uploaded to the appropriate folder in the EFL’s Online Tender Portal (only as PDF, MS Word, MS Excel, JPEG).

14. Tender Form and Schedule of Prices

14.1. The Tenderer shall complete the Letter of Tender and the appropriate Schedule of Prices furnished in the Invitation to Tender documents in the manner and detail indicated therein, following the requirements of Points 15 and 16.

15. Tender Price

15.1. Unless specified otherwise in the Employer's Requirements, tenderers shall quote for the entire Works on a “single responsibility" basis such that the total tender price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the Invitation to Tender documents in respect of the engineering, procurement, and construction of the Works. This includes any subcontracting, and the delivery, installation, test and commissioning of materials and equipment by suppliers / manufactures. This includes all requirements under the Contractor's responsibilities for testing, pre-commissioning and commissioning of the Works and, where so required by the bidding documents, the acquisition of all permits, approvals and licenses, etc., operation & maintenance and training services, environmental management, and such other items and services as may be specified in the bidding documents, all in accordance with the requirements of the Conditions of Contract.

15.2. Tenderers shall give a breakdown of the prices in the manner and detail called for in the Schedules of Prices.

15.3. In the Schedules, Tenderers shall give the required details and a breakdown of their prices which shall include all taxes, duties, levies…etc., which are applicable in and outside of Fiji,

and which apply to the delivery of the Works. In relation to prices, the following shall apply in additional to the previous sentence:

a) Any equipment and materials supplied from outside the Employer's country shall be quoted on a DDP[1] to Site, including estimated ocean freight charges, local transport, insurance, and import duties, levies and taxes.

b) Works for installation and civil works shall be quoted separately and shall include rates or prices for all labour, contractor's equipment, Temporary Works, materials, consumables and all matters and things of whatsoever nature, including local transportation, operations and maintenance services, the provision of operations and maintenance manuals, training, etc. were identified in the bidding documents, as necessary for the proper execution of the Works.

c) Any amounts of Value Added Tax shall be indicated separately.

d) Tenderers are strongly advised to check with the Fiji Revenue & Customs Service (https://www.frcs.org.fj/), regarding employment related taxes, income tax, With Holding Tax, corporate tax, Value Added Tax, duties, and levels which may become payable in Fiji, and to make particular note of arrangements and procedures which are necessary because of the existence or non-existence of taxation agreements between Fiji and other countries. Noting incentive for renewable energy (https://www.frcs.org.fj/incentives/). Tel No. (679) 3301551 Fax No. (679) 3315537.

15.4. Prices quoted by the Tenderer shall be on a fixed lump sum basis with no forex exchange variation and shall not be adjusted for changes in the cost of labour, material or other matters except only for changes in legislation in accordance to Sub-Clause 13.16 of the General Conditions.

16. Tender Currency

16.1. Prices shall be quoted in United States Dollars (USD), and in Fiji Dollars (FJD).

17. Tender Validity

17.1. Tenders shall remain valid for a period of 180 days after the date of opening of Tenders specified in Point 23.

17.2. In exceptional circumstances, prior to expiry of the original Tender validity period, the Employer may request that the Tenderers extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing or by email. A Tenderer may refuse the request without forfeiting its Tender Security. A Tenderer agreeing to the request will not be required or permitted to modify its Tender, but will be required to extend the validity of its Tender Security for the period of the extension.

18. Format and Signing of Tender

18.1. The Tenderer shall upload the Tender's Technical Proposal to the appropriate folder in EFL's Online Tender Portal. The version uploaded in to EFL's Online Tender Portal will be considered the original. Tenderer shall upload the Tender's Financial Proposal to the appropriate folder in EFL's Online Tender Portal. The version uploaded in to EFL's Online Tender Portal will be considered the original.

18.2. All copies of the tender shall be printed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Tenderer, pursuant to Points 5.1 (a) or 5.2 (b), as the case may be. All pages of the tender where entries or amendments have been made shall be initialed by the person or persons signing the Tender.

18.3. The Tenderer shall contain no alterations, omissions or additions, except those to comply with instructions issued by the Employer, 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 Tender.

[1] The term DDP shall be governed by the rules prescribed in the current edition of "Incoterms", published by the International Chamber of Commerce, Paris.

18.4. The Tenderer shall furnish information as described in the Letter of Tender on commission or gratuities, if any, paid or to be paid relating to this Tender, and to Contract execution if the Tenderer is awarded the Contract.

19. Sealing and Marking of Tenders

19.1. The Tenderer shall upload the Tender's Technical Proposal and Financial Proposal to the appropriate folder in EFL's Online Tender Portal, Tenderlink. The version uploaded in to EFL's Online Tender Portal will be considered the original.

20. Deadline for Submission of Tender

20.1. Tenders must be received by the Employer (e.g. EFL's Online Tender Portal) not later than 16:00 (local Fiji time) on **21st January 2026**.

20.2. The Employer may, at its discretion, extend the deadline for submission of Tenders by issuing an addendum in accordance with Point 11, in which case all rights and obligations of the Employer and the Tenderers previously subject to the original deadline will thereafter be subject to the deadlines extended.

21. Late Tenders

21.1. Any Tender received by the Employer after the deadline for submission of Tenders prescribed in Point 20 will be rejected and returned unopened to the Tenderer.

22. Modification and Withdrawal of Tenders

22.1. The Tenderer may modify or withdraw its Tender after Tender submission, provided that written notice of the modification or withdrawal is received by the Employer prior to the deadline for submission of Tender.

22.2. The Tenderer's modification or withdrawal notice shall be prepared, sealed, marked and submitted in accordance with the provisions of Point 20, additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate.

22.3. No Tender may be modified by the Tenderer after the deadline for submission of Tenders.

23. Opening of Tenders

23.1. The Employer will open the Tenders Technical Proposal (online version and printed copies), including modifications made pursuant to Point 22, at the earliest suitable date and time after closing of the Tenders, at the following location:

Energy Fiji Limited, 2 Marlow st, Suva, Fiji

The Financial Proposal (online version and printed copies) will only be open after the Technical Proposal has been evaluated pursuant to Points 26, 27, and 28.

24. Process to be Confidential

24.1. Information relating to the examination, clarification, evaluation, and comparison of Tenders 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 the Employer's processing of Tenders or award decisions may result in the rejection of the Tenderer's Tender.

25. Clarification of Tenders and Contacting the Employer

25.1. To assist in the examination, evaluation and comparison of Tenders, the Employer may, at its discretion, ask any Tenderer for clarification of its bid. The request for clarification and the response shall be in writing or email, but no change in the prices or substance of the Tender shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tender in, accordance with Point

25.2. Subject to Point 26.1, no Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the Contract is awarded.

26. Preliminary Examination of Bids and Determination of Responsiveness

26.1. Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender (i) has been properly signed; (iii) is accompanied by the required securities; (iv) is substantially responsive to the requirements of the tendering documents; (v) is conforming to Point 15; and (vi) provides any clarification and/or substantiation that the Employer may require pursuant to Point 25.

26.2. A substantially responsive Tender is one which conforms to all the terms, conditions and requirements of the tendering documents, without material deviation or reservation. A material deviation of reservation is one (i) which affects in any substantial way the scope, quality or performance of the Works; (ii) which limits in any substantial way, inconsistent with the bidding documents, the Employer's rights or the bidder's obligations under the Contract; or (iii) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.

26.3. If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

27. Correction of Errors

27.1. Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Arithmetic errors will be rectified on the following basis. If there is a discrepancy between the unit rate and the total cost that is obtained by multiplying the unit rate and quantity, the unit rate shall prevail and the total cost will be corrected unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit rate, in which case the total cost as quoted will govern and the unit rate corrected. If there is a discrepancy between the total Tender amount and the sum of total costs, the sum of the total costs shall prevail and the total Tender amount will be corrected.

27.2. The amount stated in the Letter of Tender will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of bid, its bid will be rejected..

28. Evaluation and Comparison of Tenders

28.1. The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Point 26.

28.2. The Employer will carry out a detailed evaluation and scoring of the Tenders in order to reach such a determination leading to the award of the Contract, the Employer will examine the information supplied by the Tenderers and other requirements in the bidding documents, taking into account the following factors and scoring methodology. Noting that the Tender will only be considered in final combined scoring if it meets (is affirmative to) the Qualifications and receives at least 60 points out of 70 in the Technical Score.

28.2.1. Qualification (Affirmative or Not-Affirmative)

a) The determination will take into account the information provided in the Schedules on Qualifications of the Tenderer and Schedule of Key Personnel, and any annexed information to the Schedules. To include the (i) Tenderer's experience with similar projects, (ii) financial status, (iii) plans for financing the Works – without indicating price, (iv) experience of key personnel, and (v) the proposed Plant and/or Permanent Works meeting minimum functional guarantees; it will be based upon an examination of the documentary evidence submitted by the Tenderer, pursuant to Point 5.1, as well as such other information as the Employer deems necessary and appropriate; and an affirmative determination will be a prerequisite for the Employer to continue with the evaluation of the Tender; a negative determination will result in rejection of Tender.

28.2.2. Technical Score (maximum score of 70 points)

a) The determination will take into account the information provided in the Schedule of Description of the Proposed Works (and any preliminary drawings), the Schedule of Proposed Major Items of Equipment, the Schedule of Tenderers Proposed Times of Milestones and Completion, and the Schedule of Contractor Health, Safety, and

Environmental Management Plan, the Schedule of Deviations from Employer's Requirements, and any annexed information to the Schedules.

b) The technical score methodology is as follows:

- [A | max. 20 Points] The overall completeness and compliance with the Employer's Requirements and time for completion of the Works;
- [B | max. 20 Points] The overall completeness, quality, and appropriateness of the Description of the Proposed Works (e.g. preliminary design);
- [C | max. 20 Points] The overall completeness, quality, and appropriateness of the Proposed Major Items of Equipment;
- [D | max. 10 Points] The overall completeness, quality, and appropriateness of the proposed Health, Safety, and Environmental Management Plan;

TTS = Total Technical Score

TTS = A + B + C + D

28.2.3. Commercial Score (maximum score of 30 points)

a) Only the substantially responsive, qualified, and technically complete (e.g. scoring at a minimum 75%) Tenders will be considered in the commercial score.

b) The total Tender amount as offered in the Letter of Tender for the required capacities as defined in the Employer's Requirements, or as corrected by the Employers in accordance with Point 28, shall be used.

c) The commercial score methodology is as follows:

LTT = Lowest total Tender amount of all the Tenders

TTT = the Tenderers total Tender amount

FCS = Final Commercial Score

FCS = 30 x (LTT / TTT)

28.2.4. Final Score (FS | maximum score of 100 points) is determined as follows:

FS = TTS + FCS

28.3. Pursuant to Point 28.2, the following evaluation methods will be followed:

28.3.1. Contractual and commercial deviations: The evaluation of contractual and commercial deviations shall be based on the evaluated cost for fulfilling the Contract in compliance with all commercial, contractual and technical obligations under the Invitation of Tender documents. The Employer will make its own assessment of the cost of any deviations for the purpose of ensuring fair comparison of Tenders.

28.3.2. Time Schedule: The Works are required to be completed within the period specified in Point 1.2. Tenderers submitting bids which deviate from period specified in Point 1.2 will the penalizes in the Technical Score, or possibly rejected by the Employer, as the Employers discretion.

28.3.3. Functional Guarantee of the Plant and/or Permanent Works: (i) Tenderers shall state the functional guarantees (e.g. performance and efficiency) of the proposed Plant and/or Permanent Works in response to the Employer's Requirements. Plant and/or Permanent Works offered shall have a minimum (or a maximum, as the case may be) level of functional guarantees specified in the Employer's Requirements to be considered responsive. Tenders offering Plant and/or Permanent Works with functional guarantees less (or more) than the minimum (or maximum) specified may be rejected by the Employer.

28.4. Any adjustments in price which result from the above procedures shall be added, for purposes of Comparative evaluation only, to arrive at an "Evaluated Bid Price". Bid prices quoted by Tenderers shall remain unaltered.

28.5. The Employer reserves the right to accept or reject any variation, deviation or alternative offer which are in excess of the requirements of the Invitation for Tender documents or otherwise result in the accrual of unsolicited benefits to the Employer shall not be taken into account in bid evaluation.

28.6. If the Tender amount stated in the Letter of Tender of the successful Tenderer is substantially below the Employer's estimate for the Contract, the Employer may require the Tenderer to produce detailed technical information and cost analyses to demonstrate the internal consistency of preliminary design and the total cost of the Works. After evaluation of the detailed technical information and cost analyses, the Employer may require that the amount of the Performance Security set forth in Point 34 be increased at the expense of the successful bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract.

29. Domestic Preference

29.1. No preference shall be given for a domestic firm or joint venture partners.

30. Award of Contract

30.1. Subject to Point 33, the Employer will award the Contract to the Tenderer whose bid has been determined to be substantially responsive to the bidding documents and who has offered the Best Value for Money, e.g. the highest score as defined in Point 28.2, provided that such Tenderer has been determined to be (i) eligible in accordance with the provisions of Point 3; and (ii) qualified in accordance with the provisions of Point 5.

30.2. At the discretion of the Employer the Tenderer may be required to attend meetings at the Employer's office, and communicate in writing or electronically, for techno-commercial discussions prior to the signing of the Contract at no cost to the Employer. It is noted that these techno-commercial discussions may include the addition of Optional Capacity Extensions to Works and the Contract, which are additional to the Required Capacities. In the case of including the addition of to the Works, the Tender amount stated in the Letter of Tender shall be adjusted upwards by the cost of Optional Capacity Extensions indicated in the Schedule of Prices of the Tender and the mutually agreed upon between the Tenderer and the Employer.

31. Employer's Right to Accept any Tender, to Reject any or all Tenders

31.1. Notwithstanding Point 30, the Employer reserves the right to accept or reject any Tender, and to annul the Invitation to Tender process and reject all Tenders, 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 Employer's action.

32. Notification of Award

32.1. Prior to expiration of the period of Tender validity prescribed by the Employer, the Employer will notify the successful Tenderer by signed letter by e-mail that its Tender has been accepted. This letter (hereinafter called the "Letter of Acceptance") shall name the sum defined in the Letter of Tender which the Employer will pay the Contractor for the Required Capacities in consideration of the execution and completion the Works by the Contractor as prescribed by the Conditions of Contract.

32.2. After the issuance of the Letter of Acceptance, the sum named in the Letter of Acceptance may be adjusted in accordance with Point 30.2 to a new sum. A singed letter (hereinafter called the "Letter of Contract Price") will be issued by the Employer to the Tenderer by email, naming the "Contract Price" as either the sum stated in the Letter of Acceptance, or the new sum in accordance with Point 30.2. The Contract Price shall then constitute that as defined in the Conditions of Contract.

32.3. The auction result scores and rankings of other bidders other than awarded contractors are not disclosed.

33. Signing of Contract Agreement

33.1. At the same time that the Employer issues the Letter of Contract Price to the successful Tenderer, the Employer will send the Tenderer the Contract Agreement provided in the

Invitation to Tender documents, incorporating all agreements between the Employer and the successful Tenderer.

33.2. Within 14 days of receipt of the Contract Agreement, the successful Tenderer shall sign the Contract and return it to the Employer.

34. Performance Security

34.1. Within 28 days of the mutually signed Contract Agreement, the successful bidder shall furnish to the Employer a Performance Security from a reputable Fijian bank in an amount equal to 10% (ten percent) of the Contract Price in accordance with the Conditions of Contract. The form of Performance Security provided in Invitation to Tender documents shall be used.

34.2. Failure of the successful Tenderer to comply with the requirements of Points 35 or 36 shall constitute sufficient grounds for the annulment of the award and forfeiture of any Tender Security.

35. Corrupt or Fraudulent Practices

35.1. The Employer requires that the Tenderer / Contractor observe the highest standard of ethics during the procurement process under this Invitation to Tender, and the Execution of the Contract. and execution of such contracts. In Pursuance of this policy, the Employer defines, for the purposes of this provision, the terms set forth below as follows:

a) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

b) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition;

35.2. The Employer will reject a proposal for award if it determines that the Tenderer / Contractor recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

35.3. Furthermore, bidders shall be aware of the provision stated in Sub-Clauses 1.12 and 15.5 in the Conditions of Contract, and Particular Conditions Part B.

2. Section 2: Form of Letter of Tender

NAME OF CONTRACT: Supply, Install and Commission Battery Energy Storage System (BESS) for 4MWp Agro-photovoltaic Project in Ovalau, Levuka, Fiji (no. MR307 /2025)

TO: Jitendra Reddy

The Manager - Procurement, Inventory & Supply Chain

Energy Fiji Limited

2 Marlow Street, Suva, FIJI.

We have examined the Conditions of Contract, Employer's Requirements, Schedules, the Contract Data and Addenda Nos. _____ for the above-named Contract and the words and expressions used herein shall have the meanings assigned to them in the Conditions of Contract. We have examined, understood and checked these documents and have ascertained that they contain no errors or other defects. We accordingly offer to design, execute and complete the Works and remedy any defects therein, in conformity with such documents and our enclosed Tender (including this letter), for the lump sum price of:

_____

[currency and amounts in figures]

_____

[currency and amounts in words]

We agree to abide by this Tender until 180 days after the Deadline for Submission of Tenders and it shall remain binding upon us and may be accepted at any time before that date.

If this offer is accepted, we will provide the specified Performance Security, commence the Works as soon as is reasonably practicable after the Commencement Date, and complete the Works in accordance with the above-named documents within the Time for Completion. We guarantee that the Works will then conform with the Schedule of Performance Guarantees.

We understand that you are not bound to accept the lowest or any tender you may receive.

Signature _____ in the capacity of _____

duly authorised to sign tenders for and on behalf of _____

Address: _____

Date: _____

3. Section 3: Conditions of Contract

3.1 3a: General Conditions

Notes on the Conditions of Contract

The Conditions of Contract comprise two parts: Part I – General Conditions (Section 2 of this document), and Part II – Conditions of Particular Application (Section 3 of this document).

Copies of the FIDIC Conditions of Contract can be obtained from:

FIDIC Secretariat
P.O. Box 86
1000 Lausanne 12
Switzerland
Facsimile: 41 21 653 5432
Telephone: 41 21 653 500

For the General Conditions of Contract the Tenderer shall refer to the "Conditions of Contract for EPC/Turnkey Project", 2nd Edition 2017 (the 2017 Silver Book), published by the International Federation of Consulting Engineers (FIDIC). The document can be obtained (at the tenderers expense) in both paper and electronic copy at the FIDIC website bookshop. http://fidic.org/bookshop

3.2 3b: Particular Conditions Part A – Contract Data

Contractor to fill out parts Underlined.

1.1.17.		Where the Contact allows for Cost Plus Profit, percentage profit to be added to the Cost:		Not Applicable
1.1.24.		Defects Notification Period (DNP):		365 Days
1.1.30.		The Employer's Representative:		Name & Company (KOICA Consultant) AND Name & Company (EFL Consultant)
1.1.76		Time for Completion		285 Days
1.3(a)(ii)		agreed methods of electronic transmission:		Email acknowledges by the receiving party
1.3(d)		address of Employer for communications:		Energy Fiji Limited 2 Marlow Street, Suva, FIJI Email address of EFL representative
1.3(d)		address of Employer's Representative for communications:		Energy Fiji Limited 2 Marlow Street, Suva, FIJI Email address of EFL representative AND Post Address of KOICA representative Email address of KOICA representative
1.3(d)		address of Contractor for communications:		Contractor to fill out Name, Company, post address, email address
1.4		Contract shall be governed by the law of:		Republic of Fiji
1.4		ruling language		English
1.4		language for communications:		English
1.8		number of additional paper copies of Contractor's Documents,		One copy
1.14		total liability of the Contractor to the Employer under or in connection with the Contract.		Fill out the value of the Contract Price in numbers and writing after award
2.1		After the Contract comes into full force and effect, the Contractor shall be given right of access to all or part of the Site within		14 days
2.4		Employer's financial arrangements		EFL to state the financial arrangements/sources to pay the Contractor
4.2		Performance Security (as percentages of the Contract Price in Currencies):		10 %

				Fill out the value of the Performance Security in numbers and writing after award
4.4(a)		maximum allowable accumulated value of work subcontracted (as a percentage of the Contract Price)		50 % (not including equipment supplier)
4.4(b)		parts of the Works for which subcontracting is not permitted.		Project Management Supervision on Site Training & Commissioning (except if performed by equipment supplier)
4.4		(i) Subcontractors for which the Contractor shalt give Notice before appointment (ii) Subcontractors for which the Contractor shall give Notice before commencement of work (iii) Subcontractors for which the Contractor shall give Notice before commencement of work on Site		Civil works Mechanical & electrical works Testing & survey Community outreach
4.19		period of payment for temporary utilities		Contractor responsible for temporary utilities Utility works shall include all utility works required for construction, including installation of drinking water, toilets, etc., in accordance with relevant laws and regulations, and shall be installed and installed in accordance with relevant laws and regulations.
4.20		number of additional paper copies of progress reports.		Three copies
6.5		normal working hours on the Site		07:00 to 17:00
8.3		number of additional paper copies of programmes		Three copies
8.8		Delay Damages payable for each day of delay.		US$ 3,000
8.8		maximum amount of Delay Damages		US$ 300,000
13.4(b)(ii)		percentage rate to be applied to Provisional Sums for overhead charges and profit		10%
14.2		total amount of Advance Payment (as a percentage of the final Contract Price)		Nil
14.2		currency or currencies of Advance Payment		USD
14.2.3		percentage deductions for the repayment of the Advance Payment		Nil
14.3		period of payment		30 days
14.3(b)		number of additional paper copies of Statements,		One copy

14.3(ii)		percentage of retention		10%
14.3(iii)		limit of Retention Money (as a percentage of Contract Price)		10%
14.4		The schedule of payments		10% upon approved final engineering design before the start of construction (20%) upon completion of Site preparation for the installation of Plants and Materials (40%) upon the delivery to Site of all Plants and Materials 20% upon completed Test on Completion 10% upon completed Take-Over Certificate
14.5(b)(i)		Plant and Materials for payment when shipped.		Not applicable
14.5(c)(i)		Plant and Materials for payment when delivered to the Site		Not applicable
14.6.2		minimum amount of interim payment.		25% of Advance Payment or USD 240,000. Whichever amount is lower.
14.7(b)(i)		period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 [Interim Payment].		56 days
14.7(b)(ii)		period for the Employer to make interim payments to the Contractor under Sub-Clause 14.13 [Final Payment]		42 days
14.7(c)		period for the Employer to make final payment to the Contractor		56 days
14.8		financing charges for delayed payment (percentage points above the average bank short-term lending rate % as referred to under sub-paragraph (a)).		0%
14.11.1(b)		number of additional paper copies of draft Final Statement.		One copy
14.15		currencies for payment of Contract Price.		USD and FJD
14.15(a)(i)		portions or amounts of Local and Foreign Currencies are: Local Foreign		Not Applicable
14.15(c)		Currencies and proportions for payment of Delay Damages.		USD and FJD
14.15(g)		Rates of exchange		Not applicable
17.2(d)		forces of nature, the risks of which are allocated to the Contractor		Tropical storms Tropical cyclones Sea surges

19.1		Permitted deductible limits: insurance required for the Works insurance required for Goods insurance required for liability for breach of professional duty, insurance required against liability for fitness for purpose (if any is required). insurance required for injury to persons and damage to property. insurance required for injury to employees other insurances required by Laws and by local practice: _____ _____		Contractor to fill out the values, will be subject to Employer agreement.
19.2(1)(b)		additional amount to be insured (as a percentage of the replacement value, if less or more than 15%)		15%
19.2(1)(iv)		List of Exceptional Risks which shall not be excluded from the insurance cover for the Works		Tropical storms Tropical cyclones Sea surges
19.2.2		extent of insurance required for Goods, amount of insurance required for Goods.		Full value of Goods
19.2.3(a)		amount of insurance required for liability for breach of professional duty		Contractor to fill out the value of the Contract Price in numbers and writing after award
19.2.3(b)		insurance required against liability for fitness for purpose		Yes
19.2.3		period of insurance required for liability for breach of professional duty		730 Days from the Commencement Date.
19.2.4		amount of insurance required for injury to persons and damage to property		Contractor to fill out the their insured amount but not less than USD 1,000,000 for personal injury and USD 750,000 for damage to property
19.2.6		other insurances required by Laws and by local practice		As applicable in the Fiji for construction projects
21.1		time for appointment of DAAB		28 days
21.1		the DAAB shall comprise		3 members
21.1		list of proposed members of DAA proposed by Employer proposed by Contractor		To be proposed by the Employer and Contractor upon written notice of a dispute
21.2		Appointing entity (official) for DAAB members		

3.3 3c: Particular Conditions Part B – Special Provisions

Sub-clause 3.1	Add to Sub-clause 3.1 the following: "The Employer's Representative shall obtain the specific approval of the Employer before taking action under the following clauses of the General Conditions. (a) approving sub-contracting of any part of the Works under Sub-Clause 4.4. (b) certifying additional cost to the Contract Price. (c) granting an extension of time for completion under Sub-Clause 8.5. (d) suspending progress of part or all of the Works under Sub-Clause 8.10. (e) issuing a variation under Clause 13. (f) issuing Taking-Over Certificate for the whole of the Works under Sub-Clause 10.1. (g) issuing Performance Certificate for the Works under Sub-Clause 11.9. (h) Before commencing the work, prepare the drawings for construction and obtain the approval of the employer, and carry out the construction. (i) All materials must be produced after obtaining the approval of the employer by preparing a documents for manufacture. (All materials must be packed and stored on site before delivery and storage to avoid damage during transportation and storage.) Notwithstanding the obligation to obtain approval as set out above, if in the opinion of the Employer's Representative, an emergency occurs affecting the safety of life or of the Works or of adjoining property, it may, without relieving the Contractor of any of its duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Employer's Representative be necessary to abate or reduce the risk. The Contractor shall forthwith comply with the instructions of the Employer's Representative despite the absence of approval of the Employer. The Employer's Representative shall determine the extra cost to the Contractor for carrying out of such instruction and obtain the Employer's approval for an addition to the Contract Price."
Sub-Clause 4.1	Add the following sentence to precede the existing text under Sub-Clause 4.1: "The Contractor shall provide the Design in accordance with Clause 5."
Sub-Clause 4.2.1	Replace the first paragraph of Sub-Clause 4.2.1 with: "The Contractor shall deliver the Performance Security to the Employer within 28 days after both Parties have signed the Contract Agreement. The Performance Security shall be in the form of a bank guarantee from a commercial bank and not Financial Service Institution, issued either (a) by a bank located in the country of the Employer or a foreign commercial bank through a correspondent bank located in the country of the Employer, or (b) directly by a foreign bank acceptable to the Employer. The performance security shall be denominated in the types and proportions of currencies in which the Contract Price is payable. When providing such security to the Employer, the Contractor shall notify the Employer's Representative of so doing."

Sub-Clause 4.20	The following shall be added to Sub-Clause 4.20: In addition, the Contractor shall provide to the Employer's Representative, "Weekly Status Update Reports" on a weekly basis, of 2 to 4 pages in length. Which proves an update to the progress made in the completion of the Works, from the period ending in the previous week's report.
Sub-Clause 5.1	The following shall be omitted from Sub-Clause 5.1: (d) portions, data and information which cannot be verified by the Contractor, except as otherwise stated in the Contract.
Sub-Clause 7.9	Add Sub-Clause 7.9 "Restriction on Eligibility": "Any materials, equipment, services or design services which will be incorporated in or required for the Contract, as well as the Contractor's Equipment and other supplies, shall have their origin from reputable source countries acceptable to the Employer. (b) For the purpose of this clause, "services" means the Works and all project-related services including Design services. (c) For the purposes of this clause, "origin" means the place where the materials and equipment were mined, grown, produced, or manufactured, or from which the services are provided. (d) The origin of Goods and Services is distinct from the nationality of the Supplier."
Sub-clause 16.13	Add Sub-Clause 16.13 "Foreign Staff and Labour": "The Contractor may import such staff, and labourers as are required in order to execute the Works. The Contractor must ensure that all and such staff and labour are provided with the required visas and work permits. The Contractor shall be responsible for the return to the place where they were recruited or to their domicile of all persons whom the Contractor recruited and employed for the purpose of or in connection with the Contract and the cost of all business visa requirements. The Contractor shall be responsible for such persons as are to be returned until they shall have left the Site or, in the case of foreign nationals who have been recruited outside the Country, shall have left it.
Sub-clause 16.14	Add Sub-Clause 16.14 "Measures against Insect & Pest Nuisance": "The Contractor shall at all times take the necessary precautions to protect all staff and labour employed on the Site from insect and pest nuisance, and to reduce the dangers to health and the general nuisance occasioned by the same. The Contractor shall provide its staff and labour with suitable prophylactics for the prevention of malaria and dengue fever and take steps to prevent the formation of stagnant pools of water. The Contractor shall comply with all the regulations of the local health authorities and shall arrange to spray thoroughly with approved insecticide all buildings erected on the Site. Such treatment shall be carried out at least once a year or as instructed by such authorities."
Sub-clause 16.15	Add Sub-Clause 16.15 "Epidemics" "In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities, for the purpose of dealing and overcoming the same."
Sub-clause 16.16	Add Sub-Clause 16.16 "Alcoholic Liqueurs or Drugs" "The Contractor shall not import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or suffer any such

	importation, sale, gift, barter or disposal by his Subcontractors, agents staff or labour."
Sub-clause 16.17	Add Sub-Clause 16.17 “Arms and Ammunition” "The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer to the same as aforesaid.”
Sub-clause 16.18	Add Sub-Clause 16.18 “Festivals and Religious Customs” “The Contractor shall in all dealings with his staff and labour and local community have due regard to all recognized festivals, days of rest and religious or other customs.”
Sub-clause 16.18	Add Sub-Clause 16.18 “Burial of the Dead” “The Contractor shall make all necessary arrangements for the transport, to any place as required for burial, of any of his expatriate employees or members of their families who may die in the Country. The Contractor shall also be responsible, to the extent required by local regulations, for making any arrangements with regard to burial of any of his local employees who may die while engaged upon the Works.”
Sub-clause 16.19	Add Sub-Clause 16.19 “Corrupt or Fraudulent Practices” “The Employer requires that the Contractor observe the highest standard of ethics during the procurement process under the Invitation to Tender, and the execution of the Contract. In pursuance of this policy, the Employer defines, for the purposes of this provision, the terms set forth below as follows: (a) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and (b) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition. If in the judgment of the Employer the Contractor has engaged in corrupt or fraudulent practices, the Employer may, after having given 14 days’ notice to the Contractor, terminate the Contractor’s employment under the Contract and expel the Contractor from the Site, and the provisions of Clause 15 shall apply as if such expulsion had been made under Sub-Clause 15.2.”
‘Sub-clause 14.1	Add to Sub-clause 14.1 the following: “(d) The Contract Price shall include all taxes, duties and other charges imposed outside the Employer’s country on the production, manufacture, sale and transport of the Contractor’s equipment, Plant, materials and supplies to be used on or furnished under the Contract, and on the services performance under the Contract. (e) The Contract Price shall include all customs duties, import duties, with Holding Tax, business taxes, income and other taxes that may be levied in accordance to the laws and regulations in being as of the date 28 days prior to the closing date for submission of bids in the Employer’s country on the Contractor’s Equipment, Plant, materials

	and supplies (permanent, temporary and consumable) acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the Contract shall relieve the Contractor from its responsibility to pay any tax that may be levied in the Employer's country on profits made by it in respect of the Contract." (f) The Contractor shall pay for all customs and import duties including clearing, handling charges, port dues and demurrage. (g) Customs and import duties if any in respect of the Contractor's Equipment shall be borne by the Contractor. (h) Notwithstanding Sub Clauses 14.1 (d) through 14.1 (g) above, the Contractor shall ensure that all customs and import duties and taxes are paid on time. For the avoidance of doubt the Contractor shall not be entitled to any extension of time as a result of any delayed payments of import duties and taxes which was within its control."
General	Any costs for guarantees, bonds, or securities under the Tender and Contract shall be borne by the Contractor.

4. Section 4: General Information and Data

Ovalau, an island off the east coast of Fiji's main island, Viti Levu, is the chosen locale for the project. The project, with a capacity of 4MWp solar power station to be developed by others, aims to establish a replicable model of sustainable energy production that does not compromise agricultural output. The addition of a 6.5MWh Battery Energy Storage System ("BESS") is a key component of this project, set to enhance the stability and reliability of the power supply from the solar power station. The BESS will be required to provide spinning reserve, grid forming capabilities ramping capabilities to absorb fluctuations from solar generation and to avoid starting of another diesel generator, minimising diesel use by maintaining longer periods where the system can run in the lower diesel schedule. The BESS will operate in parallel with the diesel generators and solar generation (when it is available).

4.1 Description of Proposed Site

The lot that this area is located on is freehold land described as portion of Lot 3, DP 10111-CT 40510, in the district of Bureta, Lomaiviti. The original custodians of the land are ancestors of the people who currently reside in Bureta village.

The proposed 4MWp Solar Photovoltaic (PV) Project will be established on approximately **17 acres of land** located in **Bureta, Ovalau**. The project site comprises land leased from the surrounding villages through formal lease agreements. The solar PV arrays will be installed using ground-mounted structures designed to optimize solar energy capture and ensure efficient spatial utilization of the site.

In alignment with sustainable land-use practices, the project incorporates an agri-voltaic component, whereby agricultural activities will be undertaken beneath and between the solar panel arrays. This arrangement will enable local communities to engage in the cultivation of root crops and vegetables, ensuring continued agricultural productivity on the leased land.

This dual-purpose land-use model is intended to deliver both renewable energy generation and socioeconomic benefits to the host communities. It promotes local participation, enhances food security, and supports livelihood development while contributing to Fiji's broader renewable energy and rural development objectives.

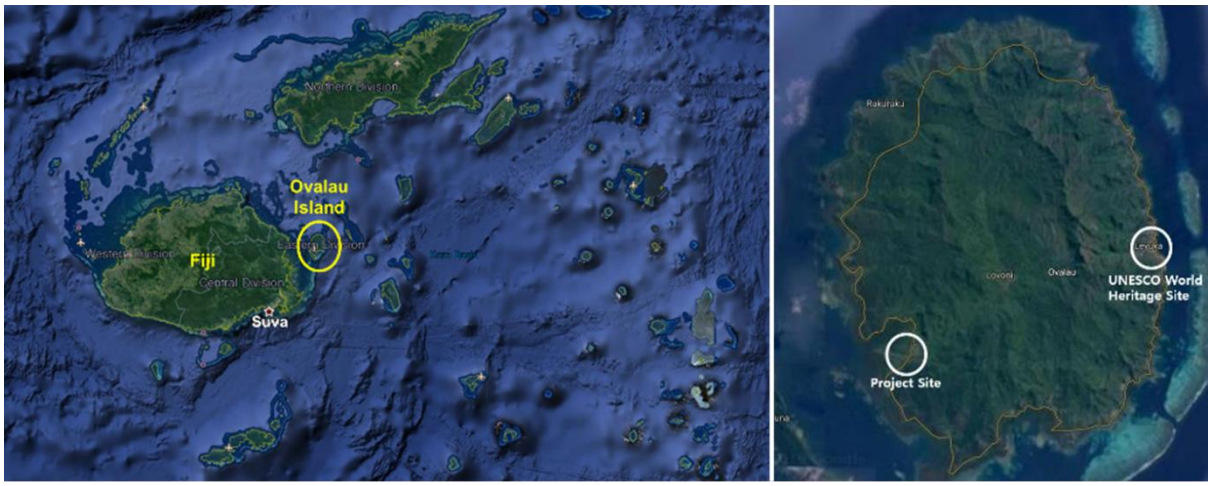


Figure 1: Aerial Image of Levuka Island

5. Section 5: Employers Requirements

Disclaimer

The content of this Employer's Requirements provides the purpose of for which the Works are intended, specifies Key Personnel, the scope and performance for the Works, and technical criteria under the Contract. It also provides reference to context for which the Tenderers tender will be evaluated under the Evaluation and Comparison of Tenders.

EFL, does not make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information or process disclosed, or represent that the further use of information in the Employer's Requirements report would not infringe on privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favouring for the EPC project. The authors of this Employer's Requirements report, and the Government of Fiji and KOICA and EFL, do not assume responsibility and expressly disclaims liability for loss, injury, damage, expense or inconvenience sustained by any users of this document or in relation to any information or data contained in it.

The Contractor is advised to perform its own due diligence and exercise its own professional judgment and to consult the relevant current building and utility regulations and standards, health & safety and environmental regulations, and other applicable guidelines as constituted in the jurisdiction of the Republic of Fiji. The Contractor shall ensure a safe and operable system (the "Permanent Works"), and as such adequately consult with technical manuals and data sheets form suppliers for equipment proposed and supplied to the EPC project.

5.1 Purpose for the Works

The Works under this Contract include both Permanent Works and Temporary Works, each including both mechanical and civil works, and peripherals, which have the intended purpose for the Contractor to deliver all necessary Works (includes Plant, Materials, and Workmanship), commissioning, testing, and training for the installation and operation of a fully operational renewable energy system consisting of a:

A. BESS of required capacity of 6.5MWh, ±2.6MW capacity located at Bureta Ovalau.

Under the Contract the Contractor shall provide the fully operational system as described above, in accordance with conditions for Engineering, Procurement and Construction (EPC).

5.2 General Requirements

This contract is on a turnkey basis & includes the site survey, design, manufacture, inspecting and testing, insurance, packing for export, shipment, clearing from port, delivery to site, unloading, complete erection, finishing, painting, site testing, training and commissioning of the Plant described herein.

The Contractor shall be responsible for making good for any defective material design or workmanship for a period of twelve months after taking over. The Contractor is to co-operate with other contractors (if any) and EFL operating staff as may be necessary.

The Contractor is responsible for design, supplying and erecting all plant such that the complete function is guaranteed, without necessity for any additional works to be initiated by the Engineer, unless specifically excluded in these Bidding Documents or agreed upon in writing. That includes among others e.g.: protection and other studies, manufacture, type tests, testing at factory and at site, insurance, packing, transportation and delivery to site, erection and commissioning.

Works must fully interact with each other in every respect. Additionally, they must properly interact with any other Contractor's work as far as an interfacing is specified or mentioned herein.

In case the Contractor finds any parts of these Specifications incomplete, contradictory or defective, he shall be responsible to immediately bring this to the notice of the Employer and make a proposal for the Employer's approval, for making good such incompleteness or defect at the stage of bidding. No additional cost to the Employer shall arise out of such rectification.

5.2.1 Associated Plant Details

The given particulars elsewhere in this document are those anticipated for plant being provided under other Contracts or already existing and should be used in the preparation of the Bid. They are, however, subject to confirmation and where they are considered to have an effect on the final design of equipment being provided under this Contract, the Contractor is to obtain figures from the Engineer before proceeding with designs.

Main design data given in these Specifications and general layouts of the Power Station are available in the Drawings.

5.2.2Type Test Certificates

Copies of Type Test certificates for all plant and equipment shall be furnished as evidence in support of compliance with the specification. Type tests shall have been completed within 10 years of Deadline for Submission of Bids. The Employer reserves its right to disqualify any equipment that has been offered and does not meet this type test requirement.

The Contractor shall furnish copies of certificates of all routine tests, inspection tests and any other type tests, which would have to be performed at a later stage. Templates and sample inspection and test plans shall be provided with the bid.

5.2.3Site Conditions

The tenderer is required to ascertain for himself the Site Conditions, including limitations of space, geographical, climatic or other considerations. The tenderer shall satisfy himself of the suitability of the Sites for the erection of the plant and equipment to be supplied.

5.2.4Site Office

Site office shall be temporary as requested in scope of work. Contractor shall provide all, services, and shall maintain up to the date of handing over the project. This site office shall be erected immediately and shall be available at the time of mobilising in a position as directed by the Employer's Representative outside the chain link fence. If contractor is delayed to provide permanent site office at the time of mobilization he should provide temporary site office to the satisfaction of the Employer's Representative.

The permanent site office shall be as per the given drawing**.** The site office either permanent or temporary shall be provided with all the services water, Electricity, Air conditioning and Telephone facilities to the satisfaction of the Employer's Representative. Service connections to be provided for all the facilities. Toilets shall be draining to a suitably sized septic tank with overflow to an enclosed soak away. The office building shall have a damp-proof floor and be provided a roof. It is to have opening windows fitted with sunblind. The office and toilet facilities and all services shall be provided and maintained to the Employer's Representative's satisfaction. The services and maintenance shall be provided until the taking over date of the work. Contractor shall provide two executive tables four chairs two cupboards for Employer's Representatives rooms, one conference table six chairs, and all the equipment for pantry as requested by the Employer's Representative.

5.2.5Packing

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

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

Instruments and fragile items shall be packed separately. All items, which include delicate equipment, shall be sealed in polythene sheeting and silica gel desiccant or vapour corrosion preventive shall be inserted within the polythene packing. Straw shall not be used as packing material. The packaging should be neatly labelled to allow customs clearance if EFL has to clear the equipment. The signage on the packaging will be discussed at the time of award.

5.2.6Insurance

The Contractor shall provide for 100% insurance cover for the equipment supply, transport and contractor's personnel, including third-party liabilities and Contractors All Risk (CAR) insurance for the equipment scope and consequential damage insurance to existing facilities due to contractor activity/negligence. They shall include the EFL and their representatives as co-insured and hold them harmless from all liabilities and claims.

5.2.7Change Orders

The EFL may at any time, by written order given to the Contractor, make changes within the general scopeof the Contract any one or more of the following:

a) Drawings, Designs or Specifications.
b) Where the goods that are to be furnished under the Contract needs to be modified by the EFL.
c) The method of shipment or packing.
d) The place of delivery.

If any such change causes an increase or decrease in the cost of, or the time required for the Contractor's performance of any part of the work under the Contract Price or Delivery Schedule, or both, the Contract shall accordingly be amended. Any claim by the Contractor for adjustment under this Clause must be issued to the EFL within thirty (30) days from the date of the Contractor's receipt of the EFL's change order.

5.2.8Delays in the Supplier's Performance

Delivery of the Goods, installation & commissioning shall be made by the Contractor in accordance with time schedule specified by the Contractor in his tender.

An unexecuted prolonged delay by the Contractor in the performance of his delivery obligations shall render the Contractor liable for any or all of the following sanctions, damages, forfeiture of its performance security, and/or termination of the Contract for default.

If at any time during the performance of the Contract, the Contractor should encounter conditions impacting timely performance of the work. The Contractor shall immediately notify the EFL in writing of any delays, its likely duration and its cause(s). As soon as practicable after receipt of the Contractor's notice, the EFL shall evaluate the Contractor's case and determine if an extension in time for performance of the contract is justifiable. Any extension granted shall be ratified by both parties by an

amendment to the Contract. Unless the extension and changes in performance has been duly authorized by the EFL in writing, the delay shall be at the Contractors risk.

5.2.9Termination for Default

The EFL may, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Contractor, terminate this Contract on the following grounds:

a) If the Contractor fails to deliver any or all of the Goods within the time period(s) specified in theContract, or any extension thereof granted by the EFL.
b) Fails to perform any other obligation(s) under the Contract.
c) If the Contractor fails to comply within a period of ten days (or any such period as the EFL may give in writing) after receipt of default notice from the EFL.

5.2.10Warranty

The Contractor warrants that all Goods supplied, installed and commissioned under this Contract shall have no defect arising from material used, workmanship or from any act or omission of the Contractor, that may develop under normal use of the supplied Goods in the conditions prevailing in the country of final destination.

The Contractor shall clearly specify the Warranty period of the installed and commissioned Goods supplied under this contract and such period shall be referred to as the Warranty and shall not be any period less than 12 months or 8,000 machine operating hours, whichever comes first from the date of commissioning (Formal or Official acceptance of the completed installation by the EFL). The contractor shall ensure that the equipment supplied under this Contract shall operate within specified guaranteed performance levels during the warranty period. Because the power system is evolving, in practice, it is expected that initial BESS throughput will be lower, increasing over time, and there may be instances where the total daily throughput exceeds energy storage capacity rating. As such, this specification requires that the BESS and its warranties robustly achieve the required performance and longevity over a wide range of usage scenarios.

The EFL shall promptly notify the Contractor in writing of any claims arising under this Warranty. Upon receipt of such notice, the Contractor shall, with all reasonable speed, repair or replace the defective Goods or parts thereof, including transport, duty, and local Fiji charges, without any cost to the EFL.

5.3 Electrical Design Criteria

5.3.1System Conditions

System Particulars for 33kV & 11kV system applicable in Fiji Islands are stated below:

	11 kV
Normal system voltage	11 kV
System Highest voltage	12 kV
Frequency	50 Hz
Earthing of Neutral point	Directly earthed with or without resistor

5.3.2Service Conditions

The Service Conditions applicable in Fiji Islands, at the location of substation site are given below:

Daily average ambient temperature 32^0C

Max ambient temperature	40^0C
Annual average ambient temperature	30^0C
Minimum ambient temperature	5^0C
Relative Humidity	90%
Altitude	100m
Maximum Wind Speed (under cyclonic conditions)	90m/sec - gusting (under cyclonic conditions)
Isokeraunic Level	50
Seismic Level	7 on the open ended Richter scale
Average Rainfall per year	2663mm

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.

5.3.3Power supply for electrical operation

1.0 Control /alarm /emergency	DC Voltage	110 V
2.0 Supply voltage of auxiliary equipment	AC Voltage	415/240V
3.0 Supply voltage for auxiliary equipment	DC Voltage	110V

5.3.4 Minimum Substation Clearances

Air insulated outdoor and indoor busbars and connections shall have electrical clearances as listed in the following table: -

Highest system voltages between phases	**36 kV**
Minimum clearance between live metal and earth	325 mm
Minimum clearance between live metal of different phases	325 mm
Minimum safety clearance between the nearest point not at earth potential of an insulator to ground(Pedestrian Access)	2300 mm
Minimum safety clearance between live metal and positions to which access is permissible with other conductive equipment	2625 mm

5.3.5 Maintainability

All plant and equipment supplied under this contract shall be maintainable. The contractor in adequate number of copies shall provide all necessary tools and equipment and operations and maintenance manuals required for this purpose. All special tools shall be supplied by the Contractor in 2 sets.

While selecting materials and their finishes, due regard shall be given to the humid, saline, tropical conditions under which equipment is to operate. Material specifications, including grade or class shall be shown on drawings submitted for approval. The BESS shall incorporate all necessary passive corrosion protection sufficient to achieve the design life in the site environmental conditions. Corrosion protection will include all internal systems (taking into account levels of atmospheric moisture, salt, dust, etc). Corrosion protection will not require major maintenance, such as replacement of major components or surface protections (sacrificial materials designed for replacement is acceptable). Electronic equipment should be suitably coated.

Any evidence of corrosion, degradation or leakage during defects liability period will be treated as a defect if it has potential to impact expected life or may introduce O&M challenges or additional work.

5.3.6 Ventilation

Kiosks, cubicles and similar enclosed compartments shall be adequately ventilated to restrict condensation. All contactors, relay coils, etc. shall be suitably protected against corrosion and fully tropicalized.

5.3.7 Risk of Fire

All apparatus, connections and cabling shall be designed and arranged to minimize the risk of fire and any damage, which might be caused in the event of fire.

5.4 Quality of Materials and Workmanship

All materials used under this contract shall be new and of the quality and class most suitable for working under the conditions specified and shall withstand the variations of temperature, atmospheric conditions arising under working conditions without distortion or deterioration or the setting up of undue stresses in any part and also without affecting the strength and suitability of the various parts of the work which they have to perform.

All work shall be carried out and completed in a neat and professional manner to the approval of the Employer's Representative.

The Contractor shall carry out the Works in all respects in accordance with the requirements of a quality plan, meeting the Quality System Standard to demonstrate compliance with the requirements of the Contract. Such plan shall be prepared by the Contractor and submitted to the Employer's Representative for approval within 2 Weeks of the effective date of the Commencement Date. Such plan shall identify, primarily, the 'Inspection and Test Plans' (ITPs) covering the checks, inspections and tests to be carried out by or on behalf of the Contractor, in order to ensure proper performance in the carrying out of the Works. No responsibility is assumed by the Employer for any delay in the approval of the Quality Plan to meet the required parameters.

5.5 Standards

IEC Standards are to be adopted in general. British or Australian standards too may be applied wherever necessary. Any other national or international standard may be used if such standards are not less exacting than corresponding IEC Standard. In all instances a copy of the relevant standard adopted should be forwarded to the Engineer. All civil works should be carried out in conformity with Fiji Building Code.

The Works shall be constructed in accordance with the laws of Fiji and associated Acts and Regulations. These include:

The Electricity Act (2017) and Electricity Regulations (2019)
Building Code of Fiji
Health and Safety at Work Act – 1996
Environment Management Act and subsidiary Regulations
Australian Standard AS 2067

In order to achieve Regulatory compliance under the Electricity Act, the Works shall comply with the Electricity Regulations, AS 2067-2016 and AS/NZS 3000:2018 "Wiring Rules".

In the absence of specific standards being nominated in the specifications, the following standards shall apply:

Australian/New Zealand Standards

AS/NZS	1170	Structural Design Actions
AS/NZS	1768	Lightning Protection
AS	1824	Insulation coordination – Definitions, principles and rules
AS	1940	The storage and handling of flammable and combustible liquids
AS/NZS	2312	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS/NZS	2373	Electric cables – Twisted pair for control and protection circuits
AS/NZS	3000	Wiring Rules
AS/NZS	3008.1.1	Electrical installations – Selection of cables – Cables for alternating voltages up to and including 0.6/1 (1.2) kV.
AS	3011.2	Electrical installations – Secondary batteries installed in buildings, Part 2: Sealed cells
AS/NZS	3080	Telecommunications installations - Generic cabling for commercial premises
AS/NZS	3155	Approval and test specification - Electric cables - Neutral screened - For working voltages up to and including 0.6/1 kV
AS/NZS	3191	Electric flexible cords
AS/NZS	3439.1	Low voltage switchgear and control gear assemblies
AS/NZS	3439.2	Low-voltage switchgear and control gear assemblies - Particular requirements for busbar trunking systems (busways)
AS/NZS	3835	Earth potential rise - Protection of telecommunications network users, personnel and plant
AS/NZS	3947	Low voltage switchgear and control gear, (all relevant parts)
AS	4024.1	Safety of machinery, (all relevant parts)
AS/NZS	4026	Electric cables - For underground residential distribution systems
AS	60529	Degrees of protection provided by enclosures (IP Code)
AS/NZS	60898	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Circuit-breakers for a.c. operation
AS	HB101	Coordination of power and telecommunications - Low Frequency Induction (LFI): Code of practice for the mitigation of hazardous voltages induced into telecommunications lines.
AS	1345	Identification of the contents of pipes, conduits and ducts
AS/NZS	2053	Conduits and fittings for electrical installations (all parts)
AS	2700	Color standards for general purpose

International Electrotechnical Commission (IEC)

IEC	11801	Information technology – Generic cabling for customer premises
IEC	14763	Information technology – Implementation and operation of customer premises cabling
IEC	24702	Information technology – Generic cabling – Industrial premises
IEC	60269	Low-voltage fuses
IEC	60304	Standard colours for insulation for low frequency cables and wires
IEC	60364	Electrical installations of buildings
IEC	60934	Circuit breakers for equipment
IEC	61009	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)
IEC	61089	Round wire concentric lay overhead electrical stranded conductors
IEC	61232	20SA/A Aluminium clad wires for electrical purposes
IEC	61683	Photovoltaic Systems – Power conditioners – procedure for measuring efficiency
IEC	61000	Electromagnetic compatibility
IEC	60068	Environmental Testing
IEC	62933	The Global Standard Guiding Energy Storage Systems
IEC	62619	Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications

IEC	62485	Safety requirements for secondary batteries and battery installations
IEEE	2800	Interconnection and Interoperability of Inverter-Based Resources (IBRs) Interconnecting with Associated Transmission Electric Power Systems

British Standards (BS)

BS	EN ISO	1461 Hot dip galvanized coatings on fabricated iron and steel articles
BS	6231	Specification for PVC-insulated cables for switchgear and control gear wiring
BS	6651	Protection of structures against lightning.
BS	7354	Code of Practice for Design of high-voltage open-terminals stations, Section 7: Earthing.
BS	7430	Code of Practice for Earthing

5.6 Inspection and Testing

Type test certificates shall be furnished for all items of plant and equipment with the tender. The Contractor at his cost shall carry out all routine tests as per relevant IEC or Australian standards.

The preparation of a list of commissioning tests for each item of plant and equipment will be agreed upon with the Employer's Representative at a later stage of the project. All costs of carrying out commissioning tests shall be borne by the Contractor.

The Contractor shall provide all facilities for such tests or inspections to be carried out by the EFL's representatives, and the Contractor shall meet all such costs.

5.7 Spares and Tools

The tenderer shall forward a list of manufacturer's mandatory spare parts and tools required for operation and maintenance of the plant and equipment supplied under this contract for a period of 3 years from issuance of Taking Over Certificate. The cost of supply of these spare parts and tools shall form part of the contract. The tenderer shall also forward a list of optional spare parts which shall not form part of the contract but should be shown in a separate price schedule.

The successful contractor shall ensure the availability of commissioning spare parts and spare parts for operation and maintenance of all the items of equipment for the initial Ten (10) years following the Project Take-Over Date.

The Contractor will hold locally a quantity of additional spares during commissioning. These will be selected to prevent long delays during commissioning.

All supplied spare parts shall be of same material/workmanship and interchangeable with the corresponding parts of the executed work, protected against corrosion, have identification labels and marked "Approved for Use". Provision shall be made within the BESS to store any spare parts that require a controlled environment for adequate longevity, such as spare cell modules.

Supplied tools shall be of high quality and fit for purpose. The following tools shall be supplied:

1. All tools and accessories required for the maintenance of the system
2. Any customary and special tools, as well as auxiliary devices, i.e., lifting devices, ropes etc. necessary for assembly and disassembly of all parts
3. Special tools designed and supplied for the Project

Supplied tools can be used by the Contractor during installation and commissioning, however, they must be handed over to the Employer in good working condition without any wear and tear.

5.8Technical Literature – Operations and Maintenance Manuals

Tenderers shall furnish all technical literature, including catalogues, test certificates etc. in support of plant and equipment offered by him with the tender. The successful tenderer is to interface existing and new equipment drawings and a set of original drawings.

Successful contractor shall forward 6 copies of all operations and maintenance manuals, spare parts catalogues, detailed schematic and wiring diagrams and all other documents required for satisfactory operation and maintenance of plant. The originals of the drawings in AutoCAD format are required to be handed over. As built drawings are required to be furnished in 6 copies before the works are taken over.

During the design and manufacture stage the contractor shall submit all design calculations, design drawings, technical submissions at each stage of design or manufacture for the approval of the Employer's Representative.

The manuals shall include the following sections:

5.8.1Plant Specification and Description

The Plant Specification and Description Section shall include the specification and description of each plant item and system.

5.8.2Installation and Commissioning

The Installation and Commissioning Section shall include step-by-step procedures for the unloading, unpacking, transport, handling, assembly, erection, adjustment, alignment, preparation for service and testing of the plant.

5.8.3Operation

The Operation Section shall describe in detail the procedures for the preparation into service, setting, adjusting, checking before and during operation, routine testing and operating of the plant to be supplied. It shall provide complete information on operating limitations, allowable rates of temperature change, allowable temperature differentials and any other information required by operating staff to ensure the safe and efficient operation of the plant.

5.8.4Maintenance

The Maintenance Section shall contain sufficient detail to enable maintenance personnel to maintain the plant in good working condition. It shall describe and include pictorial representation of step-by-step procedures for dismantling, reassembly, alignment, replacement and adjustment of all components of the plant. This Section shall also include standards of workmanship, tolerances, air gaps, electrical resistance values, limits of wear, periodic adjustments, material specifications including special procedures (e.g. heat treatment), weights of large items, details and uses of special tools, test equipment, jigs, gauges and tightening torque values for bolts.

The Tenderer shall set down recommendations for preventive or condition based maintenance, including frequency of inspection and guidance in locating and rectifying faults and condition monitoring or diagnostic testing which may be performed on a regular basis.

5.9 Engineering Design Requirements

The detailed Design of the Works (including Temporary Works, Permanent Works, Plant, Materials and workmanship) to meet the Purpose of the Works shall be carried out by the Contractor in accordance with standards and codes of practice as required by the laws of Fiji (or better).

Notwithstanding the Purpose of the Works and these Employer Requirements, the successful Contractor shall be fully responsible for ensuring that the design, manufacture or construction of all items of Works under this contract to be fully functional, compatible with each other technically and otherwise, complying with Fijian codes and acts[2], IEC and/or other relevant standards, and other safety regulations applicable, and to have the installation complete in all respects including finishing, painting, labelling etc.

The successful Contractor shall from the commencement of his contract submit to the Employer's Representative, his conceptual design, detailed design, technical submissions, manufacture and construction drawings, etc. for approval at each stage until the completion of the Contract.

The Contractor shall deliver to the Employer the proposed content and schedules for the training as a part of the Design. At the bidding stage, the bidder shall present the detail items that conduct on-site training and the period of training. The BESS, EMS, PC, BMS, Control and SCADA System should be included in the basic training items. (All costs necessary for on-site training shall be included in the bid).

The Employer's Representative will ensure that any revisions required, or in the absence of any such revisions the approval for such drawing's technical submissions, designs or proposals shall be notified to the Contractor within a reasonable time period. The system design and equipment for the BESS System shall be of proven technology, in accordance with best industry practice and with a strong track record in similar tropical maritime environments experience at the site. Equipment should have a design life of 25 years.

The Contractor shall employ a Civil Engineer as part of its Design team, who is registered to practice in Fiji and who shall sign off on all civil and structural designs. The Civil Engineer shall also be an approved engineer by the Insurance Association of Fiji. The Civil Engineer shall also conduct regular inspections of the construction works, and provide progressive inspection reports which shall be appended to the Contractor's monthly reports and submitted to the Employer.

5.9.1 Safety in design

a) The Contractor shall ensure that the principles of Safety in Design (SID) are implanted and consider all phases of the Works through to decommissioning. All design and construction works must abide with the requirements for SID.

b) SID activities shall include:

- Systematic identification and minimisation of potential hazards that could present a risk to personnel carrying out construction, operation, maintenance or cleaning activities
- Systematic identification and minimisation of potential hazards that could present a risk to the Works during construction, operation or maintenance

[2] Including but not limited to the Health and Safety at Work Act 1996, the Electricity Act 2017, Environmental Act 2005, National Building Code, Fiji Standards (AS standards) including AS 1170 latest in series, and AS 3000: 2007 .etc.

- Communication with stakeholders to identify the most appropriate design and mitigation strategies to minimise hazards during construction, operation and maintenance, and identification of residual risks
- Formal risk register shall be created and used to record the identified hazards, level of risk and the risk control methods to be employed.
- The Contractor shall facilitate and document a SID workshop with the Employer at the Employer's premises. The purpose of the workshop is for the supplier to understand the installation and operational requirements for the BESS and the Employer to understand the design and engineering aspects of the BESS. Each party shall be responsible for their costs involved with attending the workshop.

5.9.2Reliability and availability

a) The Employer expects that any BESS Primary Component will be designed for high availability. The design and equipment selection must be such that this requirement can be achieved over the entire Design Life.

b) The expected design life and reliability for any Primary Component the supplier intends to supply shall be provided in the tender response schedule

a) Areas of the Works where no published standards exist shall be done in accordance with Good Industry Practice with consideration given to related published codes, standards and practices.

b) Where a conflict exists between local requirements and Australian standards and the relevant IEC standard, the IEC standard may prevail if compliance with such does not cause a mandatory requirement of the local regulation or Australian Standard to be breached.

c) For special electric components for which no IEC standards are available, the supplier shall propose applicable recommendations to the Employer for review and approval.

d) The Supplier shall pay all fees and charges legally demandable in relation to approvals and consents applicable to the delivery of its scope of works.

5.9.3 Particular tests, simulations, and certifications

The following are particular tests, simulations, and certifications required or recommended of the Contractor in the Design.

Geotechnical Investigations

The Contractor shall carry out geotechnical investigations to assess and confirm the ground conditions, and foundation design for all structures shall be accordingly prepared.

Certified Structural Design of BESS System

The Contractor shall provide the Employer's Representative with a structural analysis of the BESS System foundation certified by a reputable structural engineer, in accordance with structural standard AS 1170, and including AS 1170.2-2011 for Wind Region D and AS 1170.4-2007, or equal structural standard.

Structural Design Certificate

The Contractor shall provide a Structural Design Certificate ensuring that the buildings and foundation systems for the structures have been designed in accordance with the relevant Codes and Standards. The Design Certificate is to be submitted to the relevant Local Authorities for development approvals.

Cyclone Engineers Certificates

Cyclone Engineers Certificates shall be issued for all built structures which are a part of the Works. A list of approved engineers to issue Cyclone Engineers Certificates by the Insurance Council of Fiji can be found at the link below.

https://engineersfiji.org.fj/wp-content/uploads/2018/11/icf-list-2015.pdf

Simulation of Grid System Harmonic Levels and Interoperability

After the equipment and materials are determined under the Design, it is recommended that the Contractor perform a computer simulation, using reputable software, to ensure that the supplies Works will not lead to harmonic levels exceeding those capable for the Ovalau grid to sustainable operate. Included in this should be a simulation of interoperability of final equipment and materials are determined under the Design with the Ovalau grid and other power stations and power side equipment.

Peer Review of BESS Designs

The Contractor shall have the BESS Designs peer reviewed by Power Research and Development Consultants Pvt Limited of India, for suitability to specifications and system conditions. A peer review report shall be submitted to the Employer from the nominated peer reviewer. The peer review cost shall be clearly itemised in the price schedule of the bid and shown separately, but be included in the total bid price.

Modelling, Commissioning and Integration

The Contractor shall provide power system modelling data and fully function model of the BESS system. The Contractor shall also be responsible for having a protection study conducted for the integration of the BESS in the EFL network and the suitability of the protections settings, and required changes. For modelling and simulation work, and commissioning review, the Contractor shall use Power Research and Development Consultants Pvt Limited of India.

Factory Acceptance Tests / Certificates

All main components (batteries, inverters, PCS, control cables, cabinets, AC protection systems, DC protection systems) shall have a Factory Acceptance Test / Certificate. In lieu of a Factory Acceptance Test / Certificate models for inverters BESS may be accepted (at the Employer's sole discretion) if approved by the Fijian Competition and Consumer Commission based on the IEC standards. Where such conformance acceptance requires any testing by the Fijian Competition and Consumer Commission, then cost of such testing shall be borne by the Contractor, within the same Contract sum.

Independent Acceptance Testing shall include, but not be limited to:

- A review of all required documentation submitted;
- A visual inspection of all components to confirm:
- General quality of electrical and civil works;
- Compliance with relevant standards, the specification, and approved design drawings.
- Earth continuity testing of all BESS frames;
- DC isolator operation under full load;
- Insulation resistance testing of all cables;
- Loss-of-communications control test;
- Infra-red imaging of relevant electrical components.

System performance is to be monitored by the Contractor and the Owner's Engineer (either remotely or on-site) for minimum 360 hours; the Performance Monitoring Period. The Contractor will be required to demonstrate that the system is capable of maintaining power quality while undergoing all control operations over the Performance Monitoring Period:

- Connecting to the network;

- Disconnecting from the network;
- Limiting active power to a set point;
- Providing ancillary services
- Grid Following Mode
- Grid Forming Mode/ Black start Mode

The **Final Acceptance Performance Test** (FAC Test) shall be conducted within 12 months of operation and shall be carried out in accordance with this Schedule.

All Tests shall be performed in accordance with the Test Procedures approved by the Employer

1. Metering

1. The Contractor shall install a power export meter at the 11kV interconnection that stores data onboard and also interfaces with EFL's communications network for data export. It must be capable of logging data on a per second basis. It will record at a minimum; voltage, frequency, current, real and active power and power factor of the plant generated electricity.

2. Control System and SCADA

1. Through the use of an inverter manager or inverter controller the BESS shall be able to be monitored and controlled. The BESS must be capable of receiving and executing the following commands:
   - Connecting to the network;
   - Disconnecting from the network;
   - Limiting active power to a set point;
   - The ability to control the ramp up rate of active power generation will be considered an advantage;
   - The ability to inject and consume reactive power will be considered an advantage.
   - Grid Following Mode
   - Grid Forming Mode
2. The BESS shall have a user interface integrated with the EFL communication system at the Levuka Power Station, allowing remote control and remote monitoring of the BESS systems using EFL's SCADA system. Remotely monitored data must also available via the internet.
3. A SCADA system shall be integrated in the plant to view data from the plant in real time and download at a minimum 15minute averages. Data shall be collected from;
   - Inverters (DC voltages, currents, AC voltages, currents and power factor, frequency)
   - Transformers (temperatures, levels, alarms, etc)
   - Meters (KVar, KVAh, kWh)
   - BMS -Battery Management System
   - PCM
4. The plant SCADA system shall be integrated into EFL's SCADA platform.

5.9.4 Environmental and social management

Construction Environment Management Plan

The Contractor shall prepare a Construction Environment Management Plan (CEMP) as a part of the Design, after the technical part of the design are completed. The CEMP will be required before the start of civil works / construction can begin. The CEMP guidelines of Fiji can be found at the link below.

https://www.sprep.org/attachments/VirLib/Fiji/eia-guidelines.pdf

Such plan shall identify the measures and sequences of operations to be adopted by the Contractor in order to satisfy the applicable regulations and constraints. No responsibility is assumed by the Employer for any delay in the approval of the CEMP to meet the required parameters.

Operational Environment Management Plan

The Contractor shall prepare an Operational Environment Management Plan (OEMP) prior to commencing operation of the Plant. The OEMP guidelines of Fiji can be found at the link below.

https://www.sprep.org/attachments/VirLib/Fiji/eia-guidelines.pdf

Environmental and Social Management System

The Contractor is encouraged to work with the Employer (e.g. to provide qualified input) for the formulation of an Environmental and Social Management Systems (ESMS) under guidance of the IFC Performance Standards on Environmental and Social Sustainability. Guidance to the ESMS can be found at the link below.

https://www.ifc.org/wps/wcm/connect/22dc7500483774689335f7299ede9589/ESMS+Handbook+General+v2.1.pdf?MOD=AJPERES

5.9.5 Plant and equipment to be supplied.

Standards and Codes

For Civil Works except where specifically stated in the Specification, the Works shall be designed and constructed to comply with the latest version of all relevant New Zealand and Fiji Standards and any other standards adopted or endorsed by Standards New Zealand.

Attention is drawn to the following list of New Zealand (and related) Standards, Codes of Practice and other documents. This is not intended to be an exhaustive list. These documents shall be adhered to wherever appropriate.

- AS/NZS 1170 - Structural design actions
- AS 3798 - Guidelines for earthworks for commercial and residential developments
- AS/NZS 1112 - High strength steel bolts with associated nut and washers for structural engineering
- AS/NZS 9002 - Quality Systems – Model for quality assurance in production, installation and servicing
- NZS 3101 - The Design of Concrete Structures
- NZS 3109 - Concrete Construction
- NZS 3112 - Methods of Test for Concrete – Part 1: Tests relating to fresh concrete
- NZS 3113 - Chemical admixtures for concrete
- NZS 3114 - Concrete Surface Finishes
- NZS 3121 - Water and Aggregate for concrete
- NZS 3122 - Portland and Blended Cements (General and Specific Purpose)
- NZS 3402 - Steel Bars for the reinforcement of concrete
- NZS 4203 - General structural design and design loadings for buildings
- NZS 4402 - Methods of Soil Testing for Civil Engineering Purposes
- Occupational Safety and Health Service (OSH) publication: Guidelines for the provision of facilities and general safety in the construction industry.

For Mechanical (electrical) Works the Electricity Regulations in Fiji shall be applied, including but not limited to AS 3000.

For equipment the IEC standards are to be adopted in general. British, IEEE, US or Australian standards too may be applied wherever necessary. Any other national or international standard may be used if such standards are not less exacting than corresponding IEC Standard. In all instances a copy of the relevant standard adopted should be forwarded to the Employer's Representative.

5.9.6 Insulation Co-ordination

The design of Plant and Materials shall be such that insulation co-ordination is provided not only between different items of plant such as transmission line, surge arrestors, transformers, circuit breakers, but also between different components of items within a particular item of equipment.

5.9.7 Inter-Changeability

Corresponding items or parts shall be interchangeable as far as possible.

5.9.8 Documentation

The Contractor shall furnish all technical literature, including catalogues, test certificates etc. in support of Plant and Materials of the Permanent Works. The successful tenderer is to interface existing and new equipment drawings and a set of original drawings.

The Contractor shall provide Documentation as stipulated in the Contract, to include, but not limited to:

- Detailed project management plan for the execution of the Works, including a time schedule (Gantt chart) roles and identified responsibilities. The milestones should at a minimum include: Commencement Date, Delivery of Design, Start of Civil Works, Start of Mechanical Works, Employer/Contractor on-going Meetings, Community Consultations, End of Civil Works, End of Mechanical of Civil Works, Commissioning, Training (Item and period of on-site training), Testing on Completion, Date of Completion, As-built Design, Remedying Defects, Issuance of Performance Certificate, Return of the Performance Security. This shall be reviewed on monthly basis.
- Detailed quality management plan prior to submitting the Design documents prior to construction, including: responsible persons, scope of QA/QC, QA procedures, QC procedures, procedures of response to defects and errors. The Contractor shall demonstrate that it has ISO 9001 accreditation, and its major suppliers shall also possess ISO 9001 certification.
- Health & Safety manual prior to construction including: including responsible persons, scope of the H&S, safe work procedures, personal protective equipment, site access, site security and barriers, warnings, storage & disposal, emergency procedures, training, monitoring & incident reporting, attach any ISO 45001 or equal certificate.
- Design documents prior to construction including: all design calculations, design drawings, equipment lists, equipment data sheets, installation manuals and specifications, certifications, permits, test results, Construction Environment Management Plan (CEMP), project management plan & schedule, list of Contractor personnel, and required documentation for the import of goods and materials. The above shall be provided in five (5x) hard copies and one (1x) electronic copy as PDF / DWG / DOC / XLSX as the case may be.
- Design documents after construction including (e.g. As-Built Records): all design calculations, design drawings, equipment lists, spares lists, equipment data sheets, installation manuals and specifications, certifications, permits, test results, Operational Environment Management Plan (OEMP), project management plan & schedule, list of Contractor personnel, and documentation received from the import of goods and materials, and taxes & duties paid. The above shall be provided in five (x5) hard copies and one (1x) electronic copy as PDF / DWG / DOC / XLSX as the case may be.
- Training materials for all equipment and systems (including software) in five (x5) hard copies and one (1x) electronic copy as PDF. The final number of copies to be submitted will be determined by the number of educators and should be supplied after discussion at the time. The following are the items for site training that should be trained in the field, and the training documents should be compiled for each training item.

- BESS, Inverter and PC
- Control system and SCADA

- Operation & Maintenance (O&M) manuals, provisional and final, of all equipment and systems (including software) in five (x5) hard copy and one (1x) electronic copy as PDF.

- All manufacturer Guarantees and Warranties, transferred to the Employer, in one (1x) hard copy and one (1x) electronic copy as PDF.
- Factory acceptance tests / certificates in one (3x) hard copy and one (1x) electronic copy as PDF

Maintainability

All Plant, Materials and workmanship supplied under the Contract shall be maintainable. The Contractor in adequate number of copies shall provide all necessary tools and equipment and operations and maintenance manuals required for this purpose. All special tools shall be supplied by the Contractor.

5.10Conditions of the Site

The Tenderer / Contractor is required to ascertain for itself the conditions of the Site, including limitations of space, geographical, climatic or other considerations. The tenderer shall satisfy itself of the suitability of the sites for the completion of the Works.

5.11 Civil Works Requirements

The below requirements for the civil systems for the BESS located at Bureta Ovalau plot are not an all-inclusive list of equipment needed for a fully operational Works under the Contract. The below requirements are only for the general requirements for the above mentioned parts of the fully operational renewable energy system (Plant and Materials) under the Works. Thus, the Contractor shall ensure the delivery of a fully operational renewable energy system, which includes (but it not limited to) the main civil components specified for the above mentioned parts, which are indicated in the following sub-sections, plus any additional peripherals and components required (but no listed) to ensure a fully operational renewable energy system under the Works (e.g. Temporary and Permanent Works).

5.11.1 Design Considerations

5.11.1.1 Design Principles

All structures and their components shall be capable of withstanding the worst practicable combinations of dead, imposed, surge, braking, lurching, centrifugal, wind, seismic, soil, water, ground water, vibration, erection, impact, traffic and maintenance loads and temperature, creep and shrinkage effects, without exceeding acceptable deflection and stress limits.

The design methodology for structures, generally shall be consistent with AS/NZS 1170 – Structural Design Actions. All structures shall be designed to facilitate erection according to the Contractor's proposed erection sequence and they shall also be designed to be stable at all stages during the construction.

The dimension of all structures shall provide adequate space for the safe installation and proper operation and maintenance of all plant and equipment.

5.11.1.2 Design Actions

Design Actions will generally be in accordance with AS/NZS 1170 series. The following parameters will be used as minimum requirements for the derivation of the design loads:

- Wind Loading – Region D
- Seismic and Wind - Importance Level 2
- Considering salinity condition

5.11.1.3 Geotechnical Information

Geotechnical investigations have been carried out and the extent of the investigations and the data produced shall be provided to the Tenderers. This data is provided for the Tenderers' and Contractors'

information and interpretation. Provision of this information shall not be deemed a representation of warranty of its accuracy or completeness.

The contractor shall allow for and undertake any other investigations and testing it deems necessary to adequately confirm the design parameters for the foundation system it has selected for the various different elements of the works. A geotechnical interpretive report, prepared by a qualified geotechnical engineer, shall be submitted by the Contractor to the Employer's Representative for review. The geotechnical report shall be prepared and submitted prior to the preparation and submission for review of the Design Report and Engineering calculations for the Works.

5.11.2 Main components for the BESS System (Bureta Solar Farm plot)

The following are the requirements for the main civil components of the BESS System with a required capacity of 6.5MWh located on Bureta Solar Farm plot. The Contractor shall prepare all required regulatory documentation to allow for the start and completion of civil works, to include but not be limited to environmental and building approvals, permissions, and plans.

5.11.2.1 Clearing

The clearance at site shall be undertaken by others, but the Contractor shall identify and notify the Employer within fifteen days of Notice of Commencement the area that needs to be cleared, provided such area is within the plot. The Contractor shall make allowance for fifteen (15) days for such vegetation clearance to be completed. Late notification by Contractor shall be treated as Contractor's failure and shall not form the basis of any claims associated with any delays.

5.11.2.2 Grading and leveling

Grading and leveling will be required at the Site. This should be done for areas of no less than 10m distance away from any Temporary or Permanent Works, excluding the new entrance and new onsite assess road which may have a shorter safe distance. However, building codes and site conditions may require greater distance. Noting that all structures shall be placed above the 10m mean sea level mark. Any filling of earth, compaction and raising of site to a level acceptable by the Employer will be carried out by Others, but the Contractor shall be responsible for providing a finished surface acceptable to the Employer. To protect against flooding and seismic activity, the contractor shall perform embarkment works of at least 1 meter followed by compaction on the prepared site. Thereon, a reinforced Concrete Foundation with a height of not less than 30cm shall be constructed with sufficient area to accommodate the 11KV Switchyard and BESS equipment. These works shall be included in the requirements of Section 5.14 Civil Works.

Grading and leveling for foundations for fixed structures will ensure grades of no more than 2%, and appropriate compaction, to ensure flat foundations for structures.

Grading and leveling in the area for the installed BESS System will depend on the supplier recommendations.

All earth works should include protection for runoff during construction and work to prevent an increase of particles and sedimentation in drainage and waterways.

Permanent open drains of at least 1% grade will be prepared around the perimeter of the built structures and leading to the existing roadside drain. A 600 Ø RCRRJ culvert is needed under the new onsite assess road.

5.11.2.3 Onsite Access roads

An onsite access road is required on the plot, which must allow for traffic of heavy trucks with 40' containers. The road is expected to consist of 250mm thick compacted high-density gravel and be of

4m width. In additional a short entrance from the existing coastal main road will be needed. The expected length of the heavy gravel road is 250m on Bureta Solar Farm.

5.11.2.4 Fencing & Gates

Metal fencing shall be placed all around the perimeter of the area holding the BESS System, grid connection system, control building, and laydown yard, as per requirements of AS 2067. The fencing should consist of chain-linked metal and metal posts and have a height of at least 200 cm, with at least two access points with 4m wide metal gates. All metal materials shall be able to withstand the local environment, and prevent human and animal entrance into the Site.

5.11.2.5 Security

Security shall consist of the fencing and gates indicated above, and a CCTV security system with at least cameras placed at strategic points including the site entrance, office building, and control building. The number of cameras to be installed at the plant should be suggested by the bidder at the bidding stage. The CCTV shall be LAN / hard-wire or wireless connected and allow for storage of video footage with at least 4 TB storage capacity. Any cameras shall have a minimum protection class of IP67 and have night vision (illumination), with preference of in camera SD memory of at least 32 GB.

All building and structures shall meet fires codes in Fiji and have installed fire system(including alarms).

5.11.2.6 Foundations for Equipment and Structures & Buildings

All foundations for equipment and buildings, shall meet the AS 1170 series of standards for structural loads, and consist of reinforced concrete. Specific care should be placed on the wind loads AS 1170.2-2011 Wind Region D, and salinity conditions as the site is close to the sea. It is noted that if concrete is used, aggregate for concrete must be delivered to Ovalau, to avoid environmental damage it is suggested to the limited use of concrete.

5.11.2.7 Structures & Buildings

Structures should include a switch gear building of at least a minimum 4m x 4m, and 6m x 4m reinforced masonry block office building with a washroom (including waster/sewage and electricity). Both structures include common electrical installations for 240v power supply and lighting & ventilation. All buildings and structures shall meet Fiji building codes, and include at least fire alarms and portable fire extinguishing equipment. Any structures shall have Cyclone Engineers Certificates.

5.11.2.8 Structural Design Integrity

Independent laboratory analysis of soil suitability and corrosion potential. The BESS mounting structure, with equipment installed, shall be designed and certified by a suitably qualified engineer, to resist wind gusts of at least 85m/s (in accordance with AS/NZS 1170.2:2011 for wind zone D, Terrain category 2) The design of the BESS mounting structure should be such that parts are pre-cut at the factory and do not need to be cut in the field. This is so that any corrosion-resistant coatings (e.g. anodization or galvanic layer) on the mounting structure's members are not compromised by being cut.

All sharp edges are to be removed at the factory, to prevent injury during construction, and to prevent damage to cabling. Protruding members (e.g. module rails) are to be capped to prevent injury to passing maintenance personnel. BESS installation manuals are to be provided, showing that the mounting system used complies with the module manufacturer's requirements (e.g. location and spacing of mounting clamps battery frames).

5.12 Mechanical and Electrical Works Requirements

The below requirements for the mechanical and electrical systems for the BESS and associated electrical and mechanical systems located at the Bureta solar power station plot, and systems for grid interoperability, are not an all-inclusive list of equipment needed for a fully operational Works under the

Contract. The below requirements are only for the general requirements for the three above mentioned parts of the fully operational renewable energy system under the Works.

Thus, the Contractor shall ensure the delivery of a fully operational renewable energy system, which includes (but it not limited to) the main components specified for the three above mentioned parts, which are indicated in the following sub-sections, plus any additional peripherals and components required (but no listed) to ensure a fully operational renewable energy system under the Works (e.g. Temporary and Permanent Works). In addition, the Contractor shall ensure the communication and electrical compatibility of all system components as per manufactures recommendations.

The basic and detailed engineering of the BESS system for the Agrophotovoltaic plant shall aim at achieving high standards of operational performance, especially considering the following:

The BESS system shall be designed and engineered with safety and stability as the top priority, followed by performance optimization under real-world conditions.

The design will be based on worst-case condition, but the performance can be optimized based on actual operation.

Selection of PCS with proven reliability and minimum downtime. The ready availability of requisite spares.

Careful logging of operational data / historical information from the Data Monitoring Systems and periodical analysis of the same to identify any abnormal or slowly deteriorating conditions.

The plant and equipment shall be designed in order to have a sustained life of 25 years with minimum maintenance efforts. For battery life cycle, refer to 1.2 Energy storage in this document.

The BESS system should be UL9540A (Thermal Runaway) Test Certified for safety purposes.

BESS and other equipment (lightning protection system, fire protection system, earthing system, communications cables, etc.) will comply with Australian Standard. If the system cannot comply with Australian Standards, then IEC standards can be used. In addition, all the systems shall be in compliance with Fijian Law and Regulations.

Quality System and Occupational Health and Safety Requirements

- ISO 9001 certification for Quality
- ISO 45001 for Occupational Health and Safety
- ISO 14001 for Environmental Management

Service Conditions and Environmental Considerations

Seismic Disturbances

BESS and associated fittings must be designed to withstand the effects of shock waves and earth movements resulting from earthquakes without failure. Provide calculations which show the forces applied to the BESS and its fittings under earthquake conditions in accordance with AS 1170.4, including:

- Overturning and sliding forces
- Bending moments at base of bushings
- Force on container of equipment
- Details of fixing main container to concrete plinth and strength of fixing.

BESS Rack system must have seismic rating of 6.5 or higher and be tested by ISO 17065 accredited testing laboratory.

Wind Loads

Demonstrate with calculations that the BESS and associated fittings can withstand the pressure associated with the specified maximum wind gust as specified in AS/NZS 1170.2.

Noise

The noise emission from any BESS primary Component shall not cause an environmental nuisance to any nearby sensitive receptors. Any BESS Primary Component it should comply with a maximum noise emission level of 75dBA measured at 3m. Details of mitigation options that can be applied to the equipment should be recommended and applied if any of the components is unable to comply with this level. It is required to provide noise levels at full-rated power.

5.12.1 Mechanical and electrical systems for the BESS

The following are the requirements for the main components of the Battery Energy Storage System (BESS) of at least 6.5 MWh located at Bureta solar power station plot.

5.12.1.1 Battery Energy Storage System (BESS)

The Battery Energy Storage System (BESS) must be capable of, and warranted for, the following performance parameters at the end of the design life of the system (25 years). The functionality of the BESS shall also include:

- Operation of the BESS (its inverter and all associated systems) with the diesel generators and solar generation (when it is available)
- Charge and discharge of real and reactive power to support the loads on the grid and manage frequency and voltage
- Ensuring smooth and reliable operation of the power station with target levels of renewable penetration
- Metering and monitoring performance and operation of the BESS
- Management of all internal system functions required for operation
- Ease of maintenance and long operational life
- Communication with the SCADA, National Control Centre and Levuka Power Station control
- Functions to minimise parasitic load while the BESS is in standby mode or not in use.

These parameters shall be assessed at the point of connection. These parameters shall take into account of all losses, including but not limited to those associated with wiring, inverters and transformers.

a) Minimum usable energy capacity of 20% of its energy rating;
b) Minimum Round-Trip Efficiency of 80%, including auxiliary power requirements and parasitic loads;
c) Minimum one full charge-discharge cycle every day for the design life of the battery (25 years);
d) Capable of reduced rate charging and reduced rate discharging;

The BESS shall have the primary function to act in frequency regulation mode, and secondary function for backup storage and discharge. Under primary function of frequency regulation, the BESS power output should be at a minimum equal to 15 minutes of nominal output from the solar PV power station or diesel power station.

The BESS shall be both operationally modular and physically modular. The BESS should be supplied in one or more physical enclosures of weight and dimensions suitable for transport to site. The enclosures shall provide the required protection from the environment and be simply installed on footings prepared on site. Where there is more than one enclosure, an electrical and communication connection only shall be made between enclosures.

The BESS is required to operate in true grid-forming mode, in conjunction with the existing diesel generators. Grid forming is as follows:

- The BESS must have a full grid forming inverter (voltage-controlled operation) irrespective of number of online diesel generators. It should not change the control mode to current-controlled during normal operation or any other network faults conditions. This will be the main mode of operation for this BESS facility. Contractor shall provide sufficient documentary or modelling evidence to support the above requirement.
- BESS must be capable of operating parallel with other diesel generation
- BESS must be capable of receiving real power. Reactive power, power factor any voltage set points or targets for charging/discharging or reactive power control while in grid forming mode

Speed response is pivotal to the successful operation of the BESS.

Islanded grids have very low inertia compared to traditional grids and can become unbalanced in timeframes of tens of milliseconds. The BESS is required to operate robustly to meet this characteristic and rapidly react to regulate the system.

The BESS should be designed to allow for safe and easy maintenance by local operators, through following principles:

- Major equipment of BESS shall have plug and play capability, allowing for replacement of faulty components by local staff by following O & M manuals and without requiring onerous removal of other components for access. Except in rare circumstances, all components must be replaceable through a standard procedure of shut-down, isolation, disconnection, removal, replacement, reconnection, removal of isolation and start-up.
- Maintenance processes must be designed for completion by local staff with appropriate training
- The BESS should have the capacity to identify all potential warning and fault events and communicate these to the EFL SCADA system in a standard format
- Troubleshooting and fault rectification processes must be clearly laid out in system operation manuals
- Complete and comprehensive labelling of all electrical components, wiring and connections to be provided in English for ready reference to system schematics and electrical drawings
- Comprehensively support isolation, lock and tag procedures
- Safe access, such as equipment that is designed for arc flash and eliminating exposed live equipment (including within cabinets if they need to be opened without first being isolated)

The BESS shall contain a battery management system that monitors and maintains the integrity of the battery storage modules. This system shall operate with an ethernet based communication system. This system shall provide battery health information, charge status, alarms etc.

The BESS shall consist of a minimum: (1) lithium batteries, (2) bi-directional inverters with inverter management system, (3) charge / energy controller & software, (4) auxiliary power systems, and (5) communications interface to external power systems.

Lithium batteries shall be UL-1642, 1973, 9540, or IEC 62619 certified (or equal), and have at minimum a power to energy (kW/kWh) delivery ratio under frequency regulation mode of 0.80, and under backup storage and discharge 0.50. The total manufacturer's stated net energy efficiency under normal conditions shall be at a minimum 80% for both primary and secondary functions. The system shall be able to sustain operation at ambient temperatures up to 40 °C (max. 50 °C), and contain internal cooling. The Lithium batteries cabinets shall have a protection class equal to or greater than IP65, and be mountable on the pads and shall have lifting lugs.

The bi-directional inverters must be UL – 1741, IEEE 1547, or IEC 62116 certified (or equal), and allow for AC power input and output range of 400V 3P ~ 600V 3P. The bi-directional inverters shall have a

protection class equal to or greater than IP65, mounted standalone in-field/outdoor, or in a cabinet on the pads or equal in-field/outdoor mounting with lifting lugs.

The communications interface to external power systems, including network switches and must be IEEE 1547 certified (or equal), and allow for communication and optimization with the power generation and control systems on Ovalau. There shall be provision for future inclusion of another power station in the communications network design.

The BESS shall have at least a 10-year performance warranty of 70% energy (kWh) retention after ten years, and a 5-year product warranty. The Contractor shall provide a year-by-year degradation chart and guarantee the degradation rate does not exceed certain parameters per annum. This would be considered a significant aspect of performance evaluation of the product offering as part of Bid Evaluation by the Employer.

The supplier of the used lithium batteries shall have a programme for take back the used lithium batteries from the customer (the Employer) and recycle the lithium batteries at the supplier's facilities. For the absence of doubt, this means a programme to ship the used lithium batteries out of Fiji territory and safely recycle the lithium batteries at the supplier facilities (home country) in an environmentally friendly way. The Contractor must deliver as a part of the Tender a letter or certificate from the BESS supplier that they have an operational take back and recycle programme. For the absence of doubt, the Contract is not responsible for the costs of the take back and recycle of the BESS.

5.12.2 Batteries for Energy Storage

A utility-scale, field-proven lithium-ion chemistry shall be adopted. Acceptable chemistries are:

- Lithium-Iron-Phosphate ($LiFePO_4$, "LFP"), or
- Lithium-Nickel-Cobalt-Manganese Oxide (Li-Ni-Co-MnO_2, "NCM/NMC")

The cell and module manufacturer shall be a Tier-1 supplier and the offered product shall comply with the minimum technical requirements specified herein. Any battery solution shall be designed for:

- Safe operation within the environment in which it is located
- Compatibility with the inverter
- Capability to meet the requirements of this Specification and the standards specified herein
- Flexibility and expansion to meet a variety of technical and commercial requirements

All real and reactive power losses from the ESS Battery, including auxiliary power consumption, shall be accounted for in the power capacities guaranteed. For stable operation condition, the battery system shall be designed in two (or three, if applicable) separate systems.

The table below summarizes minimum technical specifications of the battery energy storage system (BESS).

Description	Minimum Technical Requirement
Rated output	Max -2.64MW (charge) to 2.64MW (discharge) (Continuous discharge measured at output)
Energy	As per requirement for 5.25MWh capacity of being utilized. (DoD 80%) -> 6.5MWh*.8 = 5.25MWh
Type	As stated in these specifications
Allowable capacity	See Note 1 below table
Discharging capacity	See Note 1 below table

Round-trip AC energy efficiency (including auxiliaries) at 11kV system	>80%
Warranty	Minimum 10 years (for 70% SOH)

Note: – Charging and discharging requirements shall meet the requirements of the worst case solar smoothing requirements, full charge and full discharge: the PV output at the site indicates a quick drop from 818kW to 5kW (for a 1MW unit, 1/4 of the total 4MW unit) in 0.1 second.

Battery Module/Tray

Battery module shall consist of many battery cells connected in series/parallel. Module/tray battery management system (BMS) shall be provided. Automatic module balancing shall be provided. Module/tray cooling system shall be provided.

Battery Rack

Battery modules shall be connected in series/parallel in the battery rack so that the nominal voltage of the DC is more than 480V, suitable for PCS DC voltage.

Rack BMS with battery fuse, DC current measurement devices and contractors shall be provided. Electrical connection shall be at rack front side. Many racks shall be connected in parallel to total capacity required for this project. At least 525 kWh, or 10% of the batter capacity (whichever is higher) spare space for rack extension shall be provided.

Battery Protection

Due to the safety reason, the battery system shall be modular and divided into at least three individual storage system (modular container type). That three individual storage system including PCS shall located in separate housing and if not applicable, one housing with isolating divider. The following protections shall be provided for each storage system:

- Over-charge protection
- Over-discharge protection
- Over-temperature protection
- Over-current protection
- Ground-fault detection
- Internal battery fault detection
- Cell balancing
- Protective devices should include for DC-side protection:
- Battery fuse for each battery cell and module (preferred)
- DC contactor for each battery rack

Cycle Life

If the product is sensitive to depth of discharge, the manufacturer must state the limitations and the product should be sized such that the depth of discharge corresponds to the required cycle life. In any case, the State of Charge shall not exceed 80%, or go below 20%, for safety reasons. Only in emergencies, and for no more than 5% of the time in year, the battery shall be allowed to operate outside this State of Charge. The impact on battery life and performance shall be provided by the manufacturer.

For purposes of estimating and demonstrating cycle life, cycles are defined in the same manner as system efficiency.

For lifetime assessment the supplier should provide a graph that displays the relationship between depth of discharge and the corresponding number of cycles available within the system's life.

Results of charging and discharging varies depending on battery manufacturer and the battery manufacturer should be approved by the Energy Fiji Limited (EFL).

Software

Management software license for Power Management System (PMS) / Energy Management System (EMS), BMS, PCS and etc shall have no expiry date and service level support shall also be provided at no additional cost.

Local Panel for control power distribution

Separate panel for providing control power is required.

Installation of an isolation monitoring device between the battery and PCS is required to monitor the insulation value of the battery at all times and save the log, and disconnect the battery and PCS if the insulation value is abnormal

The battery system must be equipped with a fire suppression system by water or fire extinguishing material in case of fire in the tray/rack section. The Contractor shall provide a test report for this (test by a test center certified to ISO 17026).

Each battery tray should be equipped with a glass sensor to extinguish a fire and a valve for spraying water.

The container which houses the battery shall be designed for suction and forced exhaustion by installing an active vent to prevent the internal pressure from causing a rare explosion in case of emergency.

Equipped with a water inlet on the outside to supply external fire water to the internal fire extinguishing system in case of fire.

5.12.3 Battery Management System ("BMS")

General

A BMS shall be used to monitor, protect, maintain safety and optimal operation of each battery cell, module, and rack. BMS consist of: Module/tray BMS, rack BMS and system BMS.

Minimum Functions of Module/Tray BMS shall include the following:

- Metering and monitoring
- Battery cell voltage (all cells)
- Battery module voltage
- Battery cell temperature (at least one or several measured locations in battery module/tray)
- Battery module current
- Cell balancing
- Module/tray BMS should balance voltage of cells Safety protection
- Module/tray BMS should protect the battery cells and module/tray from:
- Over and under voltage
- Over current
- Short circuit current
- Over and under temperature
- Data communication: all metering items and contactor status shall be provided for rack BMS control and monitoring system.

Minimum Functions of Rack BMS shall include the following:

- Metering and monitoring
- Battery rack voltage

- Battery rack current
- Battery rack temperature (one or several locations in battery rack) *
- Battery SOC of battery modules
- Module/tray balancing
- Balancing battery modules/trays scheme
- Safety protection
- Rack BMS should protect the battery rack from:
- Over and under voltage
- Over current
- Short circuit current
- Over and under temperature
- Data communication: all metering items and contactor status shall be provided for system BMS control and monitoring system.

Minimum Functions of System BMS shall include the following:

- Metering and monitoring
- Battery system voltage
- Battery system current
- Battery rack voltage
- Battery rack current
- Battery rack temperature (one or several locations in battery rack) *
- Battery SOC of each rack and battery system
- Battery SOH (state of health) of each rack
- Safety protection
- System BMS should protect the battery system from:
- Over and under voltage
- Over current
- Short circuit current
- Over and under temperature
- Data communication: all metering items and contactor status shall be provided for PCS control and monitoring system by a standard protocol, e.g., Modbus RTU or Modbus TCP protocol. Data sampling rate should be configured based on process requirement but not more than 2 seconds.
- Preferred functions of system BMS: Controlling individual battery rack
- BMS data communication: All metering items and contactor status shall be provided for PCS control and monitoring system by a standard protocol, e.g., Modbus RTU or Modbus TCP protocol.

Warranty

The complete Power Conditioning System shall be warranted for minimum of 3 (three) years against all material/ manufacturing defects and workmanship.

Tests

Type Tests

All the type test certificates as per the standards mentioned above shall be submitted for approval.

Battery system

UL9504 Test Report for Fire Safety

Electrical Safety Certificate and EMI/EMC Test report (ISO 17065 Certified Institution)

PCS

Safety certification and test report (ISO 17065 Certified Institution)

Routine Tests

Routine tests and acceptance tests shall be as per the Quality Assurance Plan (QAP) witnessed and approved by EFL and KOICA for the key BESS component.

5.12.4Power Conditioning System (PCS)

The Power Conditioning System ("PCS") shall comply with at least the specified standards and codes as enlisted in these specifications, and shall be designed to operate with at least the following parameters.

Parameter	Specification
Rated AC power	As per design
Maximum input voltage	1000 V / 1500 V
Rated AC output voltage	As per design
Tolerance on rated AC output voltage	+/-10%
Rated frequency	50 Hz
Operating frequency range	47.5 Hz to 52 Hz
Power factor control range	0.8 leading~0.8 lagging
Efficiency	Round trip > 95%
Maximum loss in Sleep Mode	0.05% of rated AC power
Total Harmonic Distortion	Less than 5% at 100% load
Degree of protection	IP 20 (Indoor) / IP 54 (Outdoor)

The rated/name plate AC capacity of the PCS shall be AC power output of the PCS at ambient temperature 40°C.

Considering Ovalau Island's isolated grid, The BESS is required to have grid-forming capability with black-start or independent operation capability. Both frequency ride-through and voltage-ride through are required, In addition, the BESS shall incorporate grid-following features to ensure seamless synchronization and stable operation when connected to the grid.

The PCS shall employ a **hot-swappable modular design** in which multiple identical *Power Assembly Modules (PAMs)* are connected in parallel on a common DC/AC bus.
• The loss or isolation of any single PAM shall not interrupt service; the remaining modules shall continue operating automatically to secure system redundancy.
• Each PAM shall feature plug-and-play power, control, and cooling interfaces, enabling replacement or addition of a module without shutting down the entire PCS
• After any hot-swap event, the PCS controller shall automatically re-balance current sharing and maintain synchronisation among the active modules.

Construction

Due to the safety reason, two/three individual PCS system including relevant battery system shall locate in two/three separate housing (modular container) and if not applicable, one housing with isolating divider. The modular container(s) must be marked with KOICA logo visible from outside)

Power Conditioning Unit (PCS) shall consist of an electronic three phase inverter along with associated control, protection, filtering, measurement, and data logging devices.

Every DC input terminal of PCS shall be provided with fuse of appropriate rating. The combined DC feeder shall have suitably rated isolators for safe start up and shut down of the system.

Type-II surge protective device (SPD) conforming to IEC 61643-11 shall be connected between positive/ negative bus and earth.

In case external auxiliary power supply is required, UPS shall be used to meet auxiliary power requirement of PCS, BMS, SCADA etc. It shall have a backup storage capacity of 24 hours.

Circuit Breaker of appropriate voltage and current rating shall be provided at the output to isolate the PCS from grid in case of faults.

The PCS shall be tropicalized, and the design shall be compatible with conditions prevailing at site. Suitable number of exhaust fan with proper ducting and air intake shall be provided for cooling, keeping in mind the extreme climatic condition of the site as per the recommendations of OEM to achieve desired performance and life expectancy. The Contractor shall submit CFD analysis for ventilation requirement. The air intake should consider the rainy season and prevent moisture from flowing in.

All the conducting parts of the PCS that are not intended to carry current shall be bonded together and connected to dedicated earth pits through protective conductor of appropriate size. DC negative terminal shall be grounded.

Dedicated communication interface shall be provided to monitor the PCS from Energy Fiji Limited (EFL)'s SCADA.

PCS front panel shall be provided with LCD/LED to display all the relevant parameters related to PCS operation and fault conditions. It shall include, but not limited to, the following parameters.

(i) DC input power

(ii) DC input voltage

(iii) DC input current

(iv) AC output power

(v) AC output voltage (all the 3 phases and line)

(vi) AC output current (all the 3 phases and line)

(vii) Frequency

(viii) Power Factor

Operating Modes

Operating modes of PCS shall include, but not limited to, the following modes. These operating modes and conditions for transition are indicative only. The Contractor shall provide the detailed flow chart indicating the various operating modes and conditions for transition during detailed engineering.

Standby Mode

The PCS shall continuously monitor the input DC voltage and remain on Standby Mode until it reaches the pre-set value.

MPPT Mode

When the input DC voltage is above the pre-set value and AC grid connection conditions are fulfilled, the PCS shall enter into MPPT mode.

Sleep Mode

When the AC output power/DC input voltage decreases below the pre-set value for pre-set time delay, the PCS shall switch into Sleep Mode.

Hunting Mode

The BESS control system shall not go hunting mode when operated in parallel with the EFL's diesel generator control systems.

Grid Forming Mode /Black Start Mode:

Providing emergency power to restart the grid after a blackout, ensuring quick recovery.

Grid Following Mode:

Adjusting charging or discharging to match fluctuations in load demand, stabilizing grid frequency and voltage

Protection Features

The PCS shall include appropriate self-protective and self-diagnostic feature to protect itself and the PV array from damage in the event of PCS component failure or from parameters beyond the PCS's safe operating range due to internal or external causes. The self-protective features shall not allow signals from the PCS front panel to cause the PCS to be operated in a manner which may be unsafe or damaging. Faults due to malfunctioning within the PCS, including commutation failure, shall be cleared by the PCS protective devices.

The PCS shall provide protection against the following type of faults, among others.

(i) DC/AC over current

(ii) DC/AC over voltage

(iii) DC reverse polarity

(iv) DC earth fault

(v) AC under voltage

(vi) AC under frequency/over frequency

(vii) Islanding

(viii) Over temperature

(ix) Lightning surges

Grid Support Functions

Active power regulation: the PCS shall be able to limit the active power exported to the grid based on the set point provided through PCS front control panel.

Reactive power control: the PCS shall be able to inject / absorb reactive power to/ from the grid based on the set point provided through PCS front control panel.

Local Panel for control power distribution: separate panel for providing control power is required.

The Contractor shall supply and install one (1) earthing transformer (EARTHING TR) to provide a solid reference neutral for the 11 kV BESS–MV switchgear bus, thereby limiting system over-voltages during single-line-to-ground faults and ensuring correct operation of protection relays.

5.12.5Power Management System (PMS)

General

PMS shall consist of "PMS Server" and "Driver HMI Server" All application software used on each server must be licensed and all software licenses including PMS must be provided.

The PMS server shall consist of a Main PMS server that measures the amount of photovoltaic power generation and performs a control algorithm for charging and discharging control of BESS, and a Local

PMS server that controls the lower PCS by connecting to PCS, BMS, batteries, etc., and the Local PMS server shall keep a Data-log containing the following items for at least one year.

- Main PMS control signal, PCS output, fault history, etc
- Battery status, etc

Driver HMI server monitor photovoltaic power generation and the entire BESS

Performance

The communication protocol between PMS and PCS should provide Modbus TCP, a standard power industry protocol, and should operate normally without errors or delays in performing tasks such as control and monitoring regardless of communication cable connection distance.

PMS should provide real-time data monitoring, existing operation details, and performance data inquiry, and an automatic SOC management function that can control PCS charging and discharging according to the SOC should be provided.

The input/output points of the PMS shall have a sufficient quantity for PCS overall control. The access rights of PMS HMI should be separated into monitoring mode and controllable mode to enable step-by-step security.

Key data such as operation records, log files, trends, etc. should be equipped with a storage device that can be stored for at least 3 years, and the scan period of data should be stored in units of 1 second by default but should be set by specifying minutes. For all I/O, I/O should be able to select I/O in groups, and stored data should be called out so that trends can be viewed in analog form.

UPS should be installed so that power can be supplied for 30 minutes without voltage drop even if PMS power is lost, and PMS server, Ethernet Switch, and Time Server should be duplicated with UPS power and AC power.

PMS shall include the function of diagnosing in advance and alerting in real time what may occur in the system, and the alarm shall be able to display the date of occurrence, the content of the failure, and alarm status in the form of a list.

Monitoring of system operation, general status, alarm data, etc. should be available.

Provide a system that controls the PCS output through an operating algorithm for the power/power amount received from the photovoltaic generator.

Data Storage / Historical Storage and Retrieval

- Storage and trend configuration of PCS and Battery Data
- Includes data discovery, reporting, and performance calculations PMS shall be connected to EFL's SCADA for remote monitoring & control.

<u>Testing</u>

Testing is carried out in accordance with the relevant specifications and is not necessarily limited to the following items

Type	Testing & Inspection Item	Method		Remark
		FAT	SAT	
General Test	Structure and exterior inspection	O	O	Testing Report
Performance Test	1. Basic monitoring test	O	O	
	2. Basic control test	O	O	
	3. Functional test	O	O	

	4. Output command function test	O	O	
	5. Schedule operation function test	O	O	
	6. Remote monitoring and control test	O	O	Remark 1

Remark 1) Test to check whether real-time monitoring and charging/discharging control are possible in remote monitoring control facilities, and the operation is verified through simulation of the relevant conditions.

5.12.6 Inverter and Control Solution Requirements

General

Any ESS Inverter solution shall be designed for:

- Safe operation within the environment in which it is located
- Compatibility and compliance with the EFL electrical network
- Capability to meet the requirements of this Specification
- Flexibility and expansion to meet a variety of technical and commercial requirements

Any ESS Inverter solution shall be capable of providing voltage support in accordance with the requirements of IEEE 2800. Voltage support functionality shall be remotely configurable.

Any ESS Inverter shall be capable of, but not limited to, performing the following operational functions, energy arbitrage, Frequency Control Ancillary Services (FCAS), and demand response.

- Functionality such as grid-forming, virtual inertia and black-start, virtual synchronous condenser, etc. Where capable, details are to be provided. All real and reactive power losses from the ESS Inverter, including auxiliary power consumption, shall be accounted for in the power capacities guaranteed.

ESS Inverter Design

The ESS Inverter solution design life shall be a minimum 10 years. Where the design life can be extended by replacement of specific subcomponents the Supplier shall provide details and cost.

Each ESS Inverter unit shall have dedicated Low Voltage (LV) circuit breakers. The low voltage circuit breaker shall be capable of safely operating at full load and fault current limits. The low voltage circuit shall have a set of normally open contacts that could be used as status indication for SCADA.

The ESS Inverter solution supplied shall consist of bi-directional inverters and ancillary equipment to convert the current between DC and AC.

ESS inverter units shall be rated to match the connected battery module size plus an allowance for additional reactive power output.

Each inverter unit shall be capable of operating in all four quadrants by providing or absorbing real and reactive power.

The design power capacities shall relate to continuous operation.

The ESS inverter solution shall be suitable for use with a range of battery manufacturers and configurations.

The ESS inverter solution shall be equipped with all hardware for control, monitoring, protection, data collection and communication. The ESS inverter solution shall be capable of interfacing to the ESS control and monitoring system.

The ESS inverter solution shall be able to ride through faults and remain connected to the network during network disturbances. The ESS inverter solution shall be capable of providing reactive power support during voltage excursions. The ESS inverter solution shall be certified to relevant Australian and international standards.

Control and monitoring system

The ESS Inverter solution shall include or make allowance for a control and monitoring systems to monitor and control the ESS and to achieve its functional requirements. The control and monitoring system shall integrate with the EFL's SCADA system and other Primary Components as necessary. Details shall be provided as to communications standards supported by the control and monitoring solution.

The control and monitoring system shall ensure safe, flexible and efficient operation and control consistent with the applicable codes, standards, and requirements of this Specification.

The control and monitoring systems shall allow EFL to monitor system performance to the lowest practical measurement point.

Data provided to the EFL SCADA system shall include data from the battery modules, inverters, and auxiliaries to achieve a complete picture of current state, performance, and health of the ESS.

The control and monitoring system shall include hardware, software, documented processes and risk assessment to ensure high level of Cyber security.

The ESS inverter shall be capable of integration with the local SCADA system for monitoring, operational and alarming purposes.

5.12.7Diesel Generator (DG)

Codes and Standards

Diesel Generator (DG) shall comply with the specified edition of the following standards and codes.

Standard	Description
IEC 60034	Rotating Electrical Machines
IEC 60085	Thermal Evaluation and Classification of Electrical Insulation
IEC 60529	Degrees of Protection provided by Enclosures (IP Code)
ISO 10816	Specification for Mechanical Performance Vibration
ISO 3046	Specification for Reciprocating Internal Combustion Engines

System Description

The need for an independent, reliable, standby AC source arises when the main power supply fails for safe and smooth running of the units and other essential services required for safety and plant maintenance during prolonged failure of AC supply.

Technical Specifications

One DG set of 200 kW, 50 Hz, 3 Phase, 4 wire, 415/240V shall be installed

Diesel Engine

The diesel engine shall comply with the specified International IEC Standards or an equivalent international standard and shall be of the four-stroke, multi-cylinder, water-cooled, cold start, direct fuel injection, compression ignition, and preferably turbo-charged type.

Speed Governor

The diesel engine shall be fitted with a speed governor capable of accuracy to Class A2 of ISO 3046/IV. The governor is to be fitted with speed control facilities to enable the engine speed to be adjusted from the local control panel.

Shutdown System

The engine shall be fitted with a mechanically operated device which will shut off the fuel supply to engine when any of the specified alarm conditions occur.

Cooling System

The cooling system shall be filled with chemically treated water mixture by the equipment supplier. Rotating parts shall be guarded against accidental contact in accordance with standard requirements.

A vertical fan cooled sectional radiator, rated for the tropical site conditions shall be mounted at the end of the combined under base and driven from the diesel engine. The radiator shall be arranged to cool the engine jacket water and lubricating oil. The radiator must be generously sized to permit operation at full load and overload in the specified ambient conditions. The radiator shall integral with the generating set. The radiator shall be provided complete with fan claw and guards.

Pumps

Cooling water, lubricating and fuel oil pressurizing pumps shall be provided and mounted on the engine and shall be gear driven from the crankshaft.

Lubrication

Lubrication shall be by means of an engine-driven gear pump and the system shall include full flow oil filters with replaceable elements.

Safety Guards

All moving parts shall be adequately guarded, in order to prevent danger to personnel.

Fuel

The engine shall be designed for operation on diesel fuel. The Diesel Generator Set (DGS) shall be integrated with a diesel fuel storage tank installed adjacently, utilizing pipelines and shut-off valves. The tank shall be housed within an oil dike and sited proximal to the primary site access road for logistical replenishment efficiency.

Lubricating and Fuel Oil Filters

The lubricating and fuel oil filters shall be of the fuel flow type.

Air Filters

Air filters shall be suitable for use in the environmental conditions which are likely to arise locally, and the service condition.

Starting System

The set shall be supplied with a completely self-contained starting system consisting of an engine driven dynamo, a lead acid battery and battery charger.

The starting system shall be designed such that at engine speeds in excess of the minimum firing speed it shall be impossible to complete the starting circuit. The starting system shall preclude excessive consecutive starting attempts.

Automatic Transfer Switch (ATS)

The ATS shall be capable of automatically transferring the electrical load from the utility supply to the standby generator and vice versa during blackout or power outages. It must ensure smooth and reliable switching without interruption to critical loads. The ATS should include:

- Automatic sensing of utility power failure and generator availability.
- Electrically and mechanically interlocked system to prevent simultaneous connection of both sources.
- Manual override for maintenance and testing.
- Indicators for source status and transfer position.
- Compliance with relevant international standards (Australia/ NZ) for safety and performance.

Exhaust System

The engine shall be efficiently silenced and be complete with primary and terminal silencer arrangements.

Warranty

Warranty period shall be two years / 1000 hours operation which ever occur first

5.12.8Power and Control Cables

AC cabling between the Combiner Cabinets and Main Switchboard shall be sized for the load and shall be at a minimum consist of 4 x 1c 500 mm^2 (of 8 x 1c 250 $mm^{2)}$ copper cables (for the scenario assuming there are only two combiner boxes). It shall handle a minimum nominal AC voltage rating of 0.6/1 kV as per AS/NZS 5000.1 or equal.[3] The AC cabling shall be certified by the manufacturer as flame retardant, weather/UV-resistant, ozone-resistant, and halogen-free. Any exposed AC cabling shall be protected against damage from insects and animals.[4]

5.12.8.1 Cabling between Main Switchboard and Transformer

AC cabling between the Main Switchboard and Transformer shall be sized for the installation conditions, load and fault withstand and shall be at a minimum consists of 4 x 2 x 1c 500 mm^2 copper conductor per phase in a 3P + N system.[5] (Bidders should consider the application of bus ducts to account for excessive current capacity). It shall handle a minimum nominal AC voltage rating of 0.6/1 kV as per AS/NZS 5000.1 or equal.[6] The AC cabling shall be certified by the manufacturer as flame retardant,

[3] Final selected cable dimensions and make shall be in accordance with the national directives and standards of Fiji for the dimensioning of cables, and the required the minimum wire size derive from these directives and standards.

[4] The EPC contractor shall ensure electrical compatibility of the electrical system components as per manufactures recommendations.

[5] The EPC contractor shall ensure electrical compatibility of the electrical system components as per manufactures recommendations.

[6] Final selected cable dimensions and make shall be in accordance with the national directives and standards of Fiji for the dimensioning of cables, and the required the minimum wire size derive from these directives and standards.

weather/UV-resistant, ozone-resistant, and halogen-free. Any exposed AC cabling shall be protected against damage from insects and animals

5.12.8.2 Transformer

Codes and Standards

Transformer shall comply with the specified edition of the following standards and codes.

Standard	Description
IEC 60076	Power Transformers
IEC 60296	Insulation Oil Specifications

Technical Specifications

Parameters	Specifications
Rated Power	As per design
Primary Voltage (Grid side)	11kV
Secondary Voltage	As per inverter rated voltage
Frequency	50Hz
Vector Group	Dyn11 or as required by inverter manufacturer
No. of Phase	3
Cooling Method	ONAN and ONAF

5.12.9 RMU

A 11 kV Ring Main Unit (RMU) will be installed by others for connecting the BESS to the EFL grid system on Ovalau. The Contractor shall be responsible for installing power cables, control cables and other interfacing equipment necessary to interface the BESS to the 11kV RMU.

5.12.9.1 Cabling between Inverter Transformer to 11kV RMU

AC cabling between the transformer to RMU and between RMU to the Grid Connection Point shall be at a minimum consists of 11 kV 3c 185 mm^2 aluminium conductor cables with a screen rating of 10 kA/1s.[7] The AC cabling shall be certified by the manufacturer as flame retardant, weather/UV-resistant, ozone-resistant, and halogen-free. Any exposed AC cabling shall be protected against damage from insects and animals.[8]

[7] Final selected cable dimensions and make shall be in accordance with the national directives and standards of Fiji for the dimensioning of cables, and the required the minimum wire size derive from these directives and standards.

[8] The EPC contractor shall ensure electrical compatibility of the electrical system components as per manufactures recommendations.

5.12.9.2

5.12.10Auxiliary Power

The Contractor shall arrange with EFL to supply auxiliary Power connection from the existing 11 kV grid via a suitable step-down transformer. The Auxiliary Power Supply shall be 415 V 3P+N for power during construction works. and for Auxiliary Power after construction.

Alternatives for power during construction (e.g. portable generator) can be proposed if the existing 11 kV OHL is not operational at the start of construction, however Auxiliary Power connection must be installed upon testing and commissioning of the BESS. For the absences of doubt the Contract shall supply this with the Contract Price.

EFL desires a highly reliable ac and or dc auxiliary power supply, with the intention to maintain the power supply to auxiliary systems in the event of grid disconnection for a prolonged period.

Where relevant, the Contractor shall provide detail of the auxiliary systems associated with the primary component(s) supplied and shall work with the Employer to determine the specific power supply requirements for each Primary Component supplied.

5.12.11 Earthing system

General Requirements

Earthing system shall be designed based on system fault current and soil resistivity value obtained from geo-technical investigation report. Earth grid shall be formed consisting of number of earth electrodes sufficient to dissipate the system fault current interconnected by earthing conductors.

The earth electrode shall be made of high tensile low carbon steel rod, molecularly bonded by high conductivity copper on outer surface with coating thickness not less than 250 microns as per relevant standards. Suitable earth enhancing material shall be filled around the electrode to lower the resistance to earth. Inspection chamber and lid shall be provided as per relevant Standards and Codes.

Earth conductors shall be made of copper bonded steel or galvanized steel of sufficient cross section to carry the fault current and withstand corrosion.

Earth conductors buried in ground shall be laid minimum 600 mm below ground level unless otherwise indicated in the drawing. Back filling material to be placed over buried conductors shall be free from stones and harmful mixtures. Earthing conductor shall be buried at least 1000 mm outside the fence of electrical installations.

Earth electrodes shall not be situated within 1.5m from any building whose installation system is being earthed. Minimum distance between earth electrodes shall be two times the driven depth of the electrode.

BESS Power Station fence shall be connected to the earth grid by one Grounding System flat and gates by flexible lead to the earthed post.

All welded connections shall be made by electric arc welding. For rust protection the welds should be treated with red lead compound and afterwards thickly coated with bitumen compound.

PCS Earthing

DC negative bus bar of the PCS shall be earthed to avoid Potential Induced Degradation (PID). DC negative bus bar and PCS equipment earth shall be bonded to the PCU earth bus and connected to earth electrodes through flexible copper cable of sufficient cross section as mentioned by the manufacturer. The interconnection of PCS earth electrodes with DC earth grid shall be as per PCS manufacturer recommendation.

Transformer Earthing

Inverter transformer neutral shall be floating, not to be earthed. However, recommendation of inverter manufacturer shall also be taken into account.

, Cable box, marshalling box and all other body earth points shall be earthed.

Inverter transformer shield shall be earthed separately using minimum two no. of earth electrodes. Earthing conductor between shield bushing and earth electrodes shall be copper flat of suitable size not less than 25 x 6 mm. Neutral and body of the auxiliary transformer shall be earthed.

Main Control Room Earthing

Metallic enclosure of all electrical equipment inside the inverter room and main control room shall be connected to the earth grid by two separate and distinct connections.

Cable racks and trays shall be connected to the earth grid at minimum two places using galvanized steel flat. SCADA and other related electronic devices shall be earthed separately using minimum two no. of earth electrodes.

Switchyard Earthing

The metallic framework of all switchyard equipment and support structures shall be connected to the earth grid by means of two separate and distinct connections.

Tests

On completion of installation, continuity of earth conductors and efficiency of all bonds and joints shall be checked. Earth resistance at earth terminations shall be measured and recorded.

The earth plate shall be provided to facilitate its identification and for carrying out periodical inspection.

5.12.12 Lightning Protection System

Lightning Protection System (LPS) for entire plant against direct lightning strokes shall be provided as per IEC 62305:2010 or NFC 17-102:2011 and NFPA 780.

Protection level for the entire plant shall be Level-III.

LPS as per IEC 62305

Location of air terminals shall be designed as per rolling sphere method.

LPS as per NFC 17-102

Lightning Protection System shall consist of following accessories.

(i) Early Streamer Emission (ESE) air terminal
(ii) Highly insulated poly-plastic adaptor to fix the ESE air terminal with the FRP mast
(iii) Fiberglass Reinforced Plastic (FRP) mast
(iv) Coupler to connect FRP mast with GI mast
(v) Galvanized Iron mast with base plate and guy wire kit
(vi) Down-conductor: PVC insulated flexible copper cable of suitable size complying with EN 50164-2 or equivalent standard. It shall be routed along the mast with suitable fixings and connecters
(vii) Test joint with each down conductor
(viii) Lightning event counter complying with EN 50164-6 or equivalent standard. It shall be fixed at suitable height in series with the down conductor.
(ix) Earth termination system in accordance with NFC 17-102. Earth electrodes shall comply with the EN 50164-2 or equivalent standard. Earth enhancing compounds complying with EN 50164-7 or equivalent standard, may be used where soil resistivity is higher and making it impossible to achieve system resistance within specified limit.

Accessories listed above are indicative only and any other fittings or accessories, which are usual or necessary for satisfactory operation of the lightning protection shall be provided by the Contractor without extra charges.

Necessary foundation/anchoring for holding the lightning mast in position to be made after giving due consideration to shadow on PV array, maximum wind speed and maintenance requirement at site in future.

The product shall be warranted for minimum of 2 (two) years against all material/ manufacturing defects and workmanship.

Type test reports as per IEC 62305:2010 or NFC 17-102:2011 shall be submitted during detailed engineering for approval.

5.12.13 Communication Cables

Optical Fibre Cables

Optic Fibre cable shall be 4/8/12 core, galvanized corrugated steel taped armoured, fully water blocked with dielectric central member for outdoor/ indoor application so as to prevent any physical damage.

The cable shall have multiple single-mode or multimode fibres on as required basis so as to avoid the usage of any repeaters.

The outer sheath shall have Flame Retardant, UV resistant properties and are to be identified with the manufacturer's name, year of manufacturing, progressive automatic sequential on-line marking of length in meters at every meter on outer sheath.

The cable core shall have suitable characteristics and strengthening for prevention of damage during pulling.

All testing of the optic fibre cable being supplied shall be as per the relevant IEC, EIA and other international standards.

The Contractor shall ensure that minimum 100% cores are kept as spare in all types of optical fibre cables.

Cables shall be suitable for laying in conduits, ducts, trenches, racks and underground buried installation.

Spliced/ Repaired cables are not acceptable. Penetration of water resistance and impact resistance shall be as per IEC standard.

Communication Cable (Modbus)

Data (Modbus) Cable to be used shall be shielded type with stranded copper conductor. Cable shall have minimum 2 pair each with conductor size of 0.5 Sq.mm. Cable shall be flame retardant according to IEC 60332-1-2. Cable shall be tested for Peak working voltage of not less than 300 V and shall be suitable for serial interfaces (RS 422 and RS 485). Communication cable shall be laid through underground with suitable HDPE ducts. Unless stated otherwise, the communication shall meet the EFL's communication standard.

CCTV Camera

CCTV Cameras along with monitoring stations (sufficient numbers) and all other accessories required for its proper operation must be installed to have complete coverage of following areas for 24 hours.

- Control Rooms: Covering Entry/Exit
- Switchyard

Monitoring stations of the CCTV Network shall be installed in Main Control Room.

The CCTV system shall be designed as a standalone IP based network architecture. System shall use video signals from different cameras at defined locations, process the video signals for viewing on monitors at control room and simultaneously record all video streams using latest compression techniques. Camera shall be colour, suitable for day and night surveillance (even under complete darkness) and network compatible. It shall be possible to control all cameras i.e., PTZ auto/ manual focus, selection of pre-sets, video tour selection etc. The software shall support flexible 1/2/4 windows split screen display mode or scroll mode on the display monitor for live video. The system shall support video analytics in respect of the following:

- Video motion detection
- Object tracking
- Object classification

Camera server shall be provided with sufficient storage space to storage recordings of all cameras at HD mode for a period of 15 days. All recordings shall have camera ID, location, date and time of recording.

5.12.14 Fire Fighting System

Standards and Codes

Standard/Code	Description
NFPA 10	Standard for Portable Fire Extinguishers

Contractor shall ensure the compliance of fire detection and alarm system as per relevant standards and regulations. The installation shall meet all applicable statutory requirements and safety regulations of local fire department/body or any other competent authority in terms of fire protection.

Contractor shall submit the plan for firefighting system for the EFL and KOICA's approval. The Contractor shall ensure that any fire system proposed will also be approved by the National Fire Authority, where such approval is required.

Testing Instruments

The Contractor shall provide the following set of instruments for on-site testing.

1.1 Insulation tester

Parameter	Specification
Display	Backlit LCD or LED display
Insulation Test Range	0.1 MΩ to 10 GΩ
Test Voltage	250V, 500V, 1000V, 5000V
Test Voltage accuracy	+20% on positive side only no negative variation is allowed
Insulation Test Current	1 mA nominal
Auto Discharge	Discharge time< 0.5 Second for C = 1
Open Circuit test Voltage	>4 V, <8 V

Accessories
Heavy duty Test Lead Set – 4 Nos.
Carry Case with sufficient space for accommodating accessories.

1.2 Digital Multimeter

Parameter	**Specification**
Display	Backlit LCD or LED display; Minimum resolution: 5 ¾ places for DC, 4 ¾ places for AC
Measuring Category	1000V CAT III as per IEC Standard 61010-1; wave shape independent RMS measurement (True RMS) suitable for operation in the site conditions.
Additional Functions	Resistance (Ω), Temperature (^{O}C), Continuity, Diode, Capacitance, Frequency, Duty cycle measurement
Accessories	
Temperature Probe	
Silicon Test Lead	
Alligator Clip	
Carry Case with sufficient space for accommodating accessories.	

1.3 Clamp meter

Parameter	**Specification**
Display	Backlit LCD or LED display
Measuring Category	1000V CAT III as per IEC Standard 61010-1; wave shape independent RMS measurement (True RMS) suitable for operation in the site conditions.
Current Range	AC&DC Current up to 1000A/400 A
Voltage range	AC&DC Voltage up to 1000V
Additional Functions	Resistance, continuity, diode and non- contact voltage detection, Active, Reactive and Apparent Power, THD, PF
Accessories	
Test leads	
Electrical test leads	

Probe light & extend
Carry Case with sufficient space for accommodating accessories.

All testing equipment shall possess valid calibration certificate issued from approved. Testing Laboratories as per ISO/IEC. Instruments of superior rating is allowed after seeking consent of the EFL.

1.4 Cables

1.4.1 All cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses develop under steady state and transient operating conditions.

1.4.2 All cables shall be Cross Link Polyethylene (XLPE) insulated

1.4.3 Only terminal cable joints shall be accepted. No cable joint to join two cable ends shall be accepted. However, cable joints may be allowed if the route length is more than maximum available drum length subject to EFL's approval.

1.4.4 In addition to manufacturer's identification on cables as per relevant standard, following marking shall also be provided over outer sheath.

(i) Cable size and voltage grade

(ii) Word 'FRLS' at every meter

(iii) Sequential marking of length of the cable in meters at every meter

1.4.5 Cables shall be sized based on the following considerations:

(i) Rated current the equipment

(ii) Maximum voltage drop in LV cable (from inverter-to-inverter transformer) shall be limited to 0.5% of the rated voltage. For HV cables (from inverter transformer to interconnection point), maximum voltage drop shall be limited to 0.5 % of the rated voltage. The Contactor shall provide voltage drop calculations in excel sheet.

(iii) Short circuit withstand capability as per design for 1s.

(iv) De-rating factors according to laying pattern.

Laying of cables shall be over cable trays with proper support and accessories. All cable trays shall be composed of anti-corrosion material.

2 Commissioning

2.1 Commissioning Testing

2.1.1 All necessary commissioning test including Charge / Discharge Test, Cell Balancing Test, BMS trip test, PCS trip test and communication test shall be carried out.

2.1.2 The commissioning test result shall be approved by the EFL and KOICA. The BESS system shall be handover to the EFL after the approval.

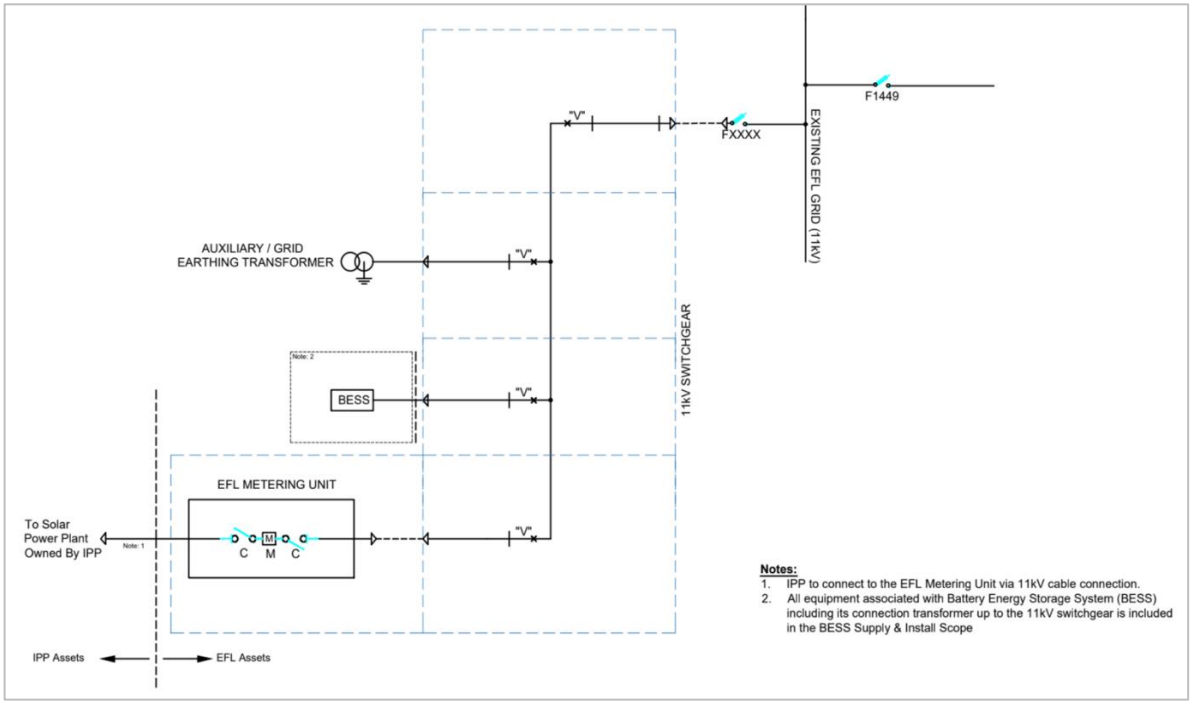
3 Battery End-of-Life (EOL)

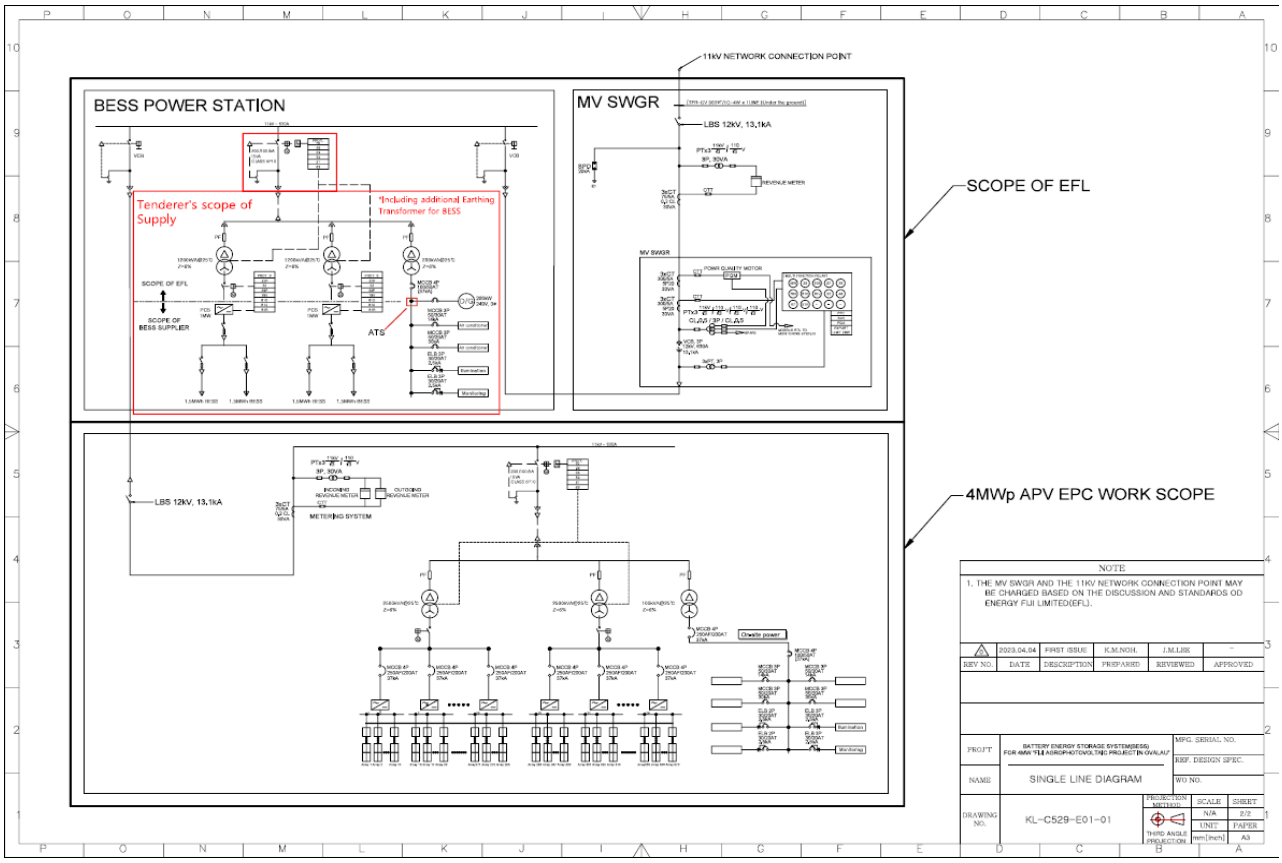
3.1.1 The EPC Contractor shall bear full responsibility, including all costs, for collecting, transporting, recycling and legally disposing of every battery cell and related component at end-of-life.

4 Supply Scope

4.1 <u>The contractor for the BESS EPC shall be responsible for the scope of the work shown in the picture below as the "Note 2"(including auxiliary / grid earthing transformer)</u>

4.1.1 All equipment associated with BESS including its connection transformer up to the 11kV switchgear is included in the BESS Supply & Install Scope.





5.12.15 Spare parts

The Contractor shall forward a list of manufacturer's mandatory operational spare parts (and expected replacements times) required for operation and maintenance of the Plant and Materials which is supplied and delivered under the Permanent Works over a period of 10 years, as a part of the Contract.

The Contractor shall provide mandatory commissioning spare part and operational spare parts needed in the first 3 years of operation after take-over, which is required operation and maintenance of the Plant and Materials which is supplied and delivered under the Permanent Works, as a part of the Contract.

Included in, or as the case maybe in addition to the above, the Contractor shall provide the following spare parts as a part of the Contract:

5.13 Mechanical and electrical systems for grid interoperability

The following are the requirements for the main components of the Communications Equipment for grid interoperability.

5.13.1.1 Communications Equipment for grid interoperability

The Contractor shall be responsible for providing all communications equipment for the connection and operation of BESS for grid interoperability.

5.14 Civil Works Requirements

The civil works for the Containerized Battery Energy Storage System (BESS) located at the Bureta solar power station plot are not an all-inclusive list but provide the general requirements for the permanent and temporary works necessary for a fully operational system.

The Contractor shall ensure the delivery of a fully operational BESS, which includes, but is not limited to, the main civil components specified herein, plus any additional peripherals and components required (but not listed) to ensure a fully operational system under the Works. This encompasses all site preparation, foundations, structures, and ancillary civil infrastructure.

The Contractor shall prepare and obtain all required regulatory documentation to allow for the start and completion of civil works, including but not limited to environmental and building approvals, permissions, and plans, in accordance with Fijian law.

The design of foundations for a containerized Battery Energy Storage System (BESS) must be holistic, integrating structural, geotechnical, and material requirements. The following standards provide the necessary framework.

1. Overarching Structural Design Actions (The "Loading Code")

This is the primary standard for determining all forces acting on the structure.

- **AS/NZS 1170.0:2002 - Structural design actions - General principles**
  - This part provides the general principles and procedures for establishing combinations of loads (dead, live, wind, seismic, etc.) for structural design.

2. Wind Load Design

- **AS/NZS 1170.2:2021 - Structural design actions - Wind actions**
  - This is the critical standard for calculating wind loads on the BESS containers and their foundations.
  - **Key Considerations for your Design:**
    - **Region:** The tender specifies **Region D**, which is the most severe wind classification for cyclonic regions.
    - **Importance Level:** The tender specifies **Importance Level 4**. This is for structures that pose a very high consequence to human life and the environment in the event of failure (e.g., critical infrastructure like a power station). This results in higher design wind speeds and factors.
    - **Shielding & Topography:** The design must account for the site's proximity to the coast (increased wind speeds) and any local topographic effects.
    - **Overturning Moments:** The wind pressure on the large surface area of the BESS containers will create significant overturning moments that the foundation must resist to prevent sliding and uplift.

3. Seismic/Earthquake Load Design

- **AS/NZS 1170.5:2004 - Structural design actions - Earthquake actions - New Zealand**
  - While this standard is New Zealand-specific, it is a comprehensive seismic design standard often referenced in the Pacific region. The design must meet or exceed the seismic level specified in the tender (7 on the open-ended Richter scale). The foundation and anchorage must be designed for the associated ground accelerations and inertial forces.

4. Geotechnical Investigation & Foundation Design

These standards guide the interpretation of site conditions and the design of foundations based on those conditions.

- **AS 1726-2017 - Geotechnical site investigations**

- This standard outline the requirements for conducting a proper geotechnical site investigation, including drilling, sampling, and in-situ testing to determine soil parameters (e.g., bearing capacity, shear strength, settlement properties).

- **AS 2159-2009 - Piling - Design and installation**
  - If the geotechnical report recommends deep foundations (piles) due to poor soil conditions, this standard governs their design and installation.
- **AS 2870-2011 - Residential slabs and footings**
  - While for residential structures, the principles for classifying sites (e.g., Class A: stable, to Class P: problem) and designing for soil movement (especially in reactive clays) are relevant. A more general concrete standard would be used for the specific design, but the soil-structure interaction principles are key.

5. Concrete Design and Construction

These standards govern the material properties, design, and construction of the reinforced concrete foundations.

- **AS 3600:2018 - Concrete Structures**
  - This is the primary standard for the design of concrete buildings and structures in Australia. It covers everything from material properties and durability to the detailed design of footings, slabs, and reinforced concrete elements for strength and serviceability.
- **AS 1379-2007 - Specification and supply of concrete**
  - Specifies the requirements for the manufacture and supply of concrete, including mix designs suited for the aggressive saline environment (e.g., using sulphate-resisting cement, appropriate water-cement ratios).
- **NZS 3101:2006 - Concrete structures standard**
  - The New Zealand counterpart to AS 3600. Given the project's location and the requirement for AS/NZS standards, designs should comply with both or the more stringent requirement. NZS 3101 is particularly robust for seismic design.

6. Earthworks and Construction Practice

- **AS 3798-2007 - Guidelines on earthworks for commercial and residential developments**
  - Provides guidelines for earthworks, including cut and fill, compaction, and preparation of the subgrade for foundations. This is crucial for ensuring a stable platform for the BESS foundations.

5.14.1 Design Considerations

5.14.1.1 Design Principles

All structures and their components, including the containerized BESS foundations, support plinths, and any ancillary buildings, shall be capable of withstanding the worst practicable combinations of loads and effects. This includes dead, imposed, wind, seismic, soil, water, ground water, vibration, erection, impact, and maintenance loads, as well as temperature, creep, and shrinkage effects, without exceeding acceptable deflection and stress limits.

The design methodology for all structures shall be consistent with AS/NZS 1170 – Structural Design Actions. All structures shall be designed to facilitate erection according to the Contractor's proposed sequence and must remain stable at all stages during construction.

The dimensions of all structures shall provide adequate space for the safe installation, proper operation, and maintenance of all plant and equipment, including safe access and egress, and required clearances for electrical safety.

The design shall include provision for impacts from climate change, including potential sea level rise and increased intensity of tropical cyclones, over the minimum design life of the asset (25 years from taking over).

5.14.1.2 Design Actions

Design Actions will be derived in accordance with the **AS/NZS 1170 series**. The following parameters will be used as minimum requirements:

- **Wind Loading: 85m/s,** Region D, as per AS/NZS 1170.2.
- **Importance Level:** Level 4 for seismic and wind actions, considering the critical nature of the energy infrastructure.
- **Seismic Loads:** In accordance with AS/NZS 1170.4, considering the seismic level specified in the Employer's Requirements.
- **Environmental Conditions:** All designs must account for the high salinity, humidity, and tropical rainfall conditions of the coastal site. Materials and protective systems (e.g., concrete mix design, steel coatings) shall be selected to ensure durability and prevent corrosion over the design life.

5.14.1.3 Geotechnical Information

The Contractor shall allow for and undertake any further geotechnical investigations and testing it deems necessary to confirm the design parameters for the foundation system. A geotechnical interpretive report, prepared by a qualified geotechnical engineer, shall be submitted to the Employer's Representative for review prior to the finalization of the design.

The foundation design for the containerized BESS units and other structures must be based on the confirmed site-specific geotechnical data to ensure stability, bearing capacity, and settlement control.

Containerized BESS Specific Design Considerations

- **Foundations:** Foundations for the BESS containers shall be robust reinforced concrete plinths or pads, designed to distribute the concentrated loads of the containers and their internal equipment. The design must account for dynamic loads during operation and transportation.
- **Drainage:** Permanent open drains of at least 1% grade shall be prepared around the perimeter of the BESS containers and other structures to manage stormwater runoff effectively, leading to the existing roadside drain.
- **Access and Maintenance:** The layout and civil design must provide clear, level access for the delivery, placement, and potential future replacement of BESS containers using heavy haulage and crane equipment. Adequate working space around the containers for operational and maintenance activities must be incorporated.
- **Fire Safety Integration:** The civil design must integrate with the specified fire fighting system, including provisions for containment and drainage of firewater in compliance with relevant standards and environmental protection requirements.

5.14.2 Main components for the BESS System

The following are the requirements for the main civil components of the 5MWh BESS located on the Bureta solar power station plot. The Contractor shall prepare all required regulatory documentation to allow for the start and completion of civil works, to include but not be limited to environmental and building approvals, permissions, and plans.

5.14.2.1 Clearing

All vegetation and other impediments to the Permanent Works shall be removed from the allocated plot area for the BESS and other EFL assets, but only the area consisting of no less than 30m distance from any Permanent Works structures & equipment, excluding fencing, drainage, and road which should be cleared no less than 10m distance away. All clearing should prevent the trimming or felling of trees in places where they can be left standing.

5.14.2.2 Grading and leveling

Grading and leveling will be required at the BESS and other EFL assets allocated area. This should be done for areas of no less than 10m distance away from any Temporary or Permanent Works, excluding the new entrance and new onsite assess road which may have a shorter safe distance. However building codes and site conditions may require greater distance. Noting that all structures shall be placed above the 20m mean sea level mark.

Grading and leveling for foundations for fixed structures will ensure grades of no more than 2%, and appropriate compaction, to ensure flat foundations for structures.

All earth works should include protection for runoff during construction and work to prevent an increase of particles and sedimentation in drainage and waterways.

Permanent open drains of at least 1% grade will be prepared around the perimeter of the built structures (e.g. building & foundations) and leading to the existing roadside drain. A 600 Ø RCRRJ culvert is needed under the new onsite assess road.

5.14.2.3 Onsite Access roads

An onsite access road is required on the plot, which must allow for traffic of heavy trucks with 40' containers. The road is expected to consist of 250mm thick compacted high density gravel and be of 4m width. In additional a short entrance from the existing coastal main road will be needed.

IMPORTANT: The construction of the onsite access road outside the BESS designated area is the responsibility of others (independent power producer), and not the Contractor. However, the Contractor shall coordinate with the independent power producer during the design and construction of the Temporary and Permanent Works, as not to cause impediments or delays to the Works and its completion, and for suitable interfacing.

5.14.2.4 Fencing & Gates

Metal fencing (as per requirements of Australian Standard AS 2067) shall be placed all around the perimeter of the area holding the BESS and EFL assets, grid connection system, control building, and laydown yard. The fencing should be at least 20m from any Permanent Works, consist of chain-linked metal and metal posts and have a height of at least 200 cm, with at least two access points with 4m wide metal gates. All metal materials shall be able to withstand the local environment, and prevent human and animal entrance into the Site.

5.14.2.5 Security

Security shall consist of the fencing and gates indicated above, and a CCTV security system with at least cameras placed at strategic points including the site entrance, office building, and control building. The number of cameras to be installed at the plant should be suggested by the bidder at the bidding stage. The CCTV shall be LAN / hard-wire or wireless connected and allow for storage of video footage with at least 4 TB storage capacity. Any cameras shall have a minimum protection class of IP67 and have night vision (illumination), with preference of in camera SD memory of at least 64 GB.

All building and structures shall meet fires codes in Fiji and have installed fire system (including alarms).

5.14.2.6 Foundations for Equipment and Structures & Buildings

All foundations for equipment and buildings, shall meet the AS 1170 series of standards for structural loads, and consist of reinforced concrete. Specific care should be placed on the wind loads AS 1170.2-2011 Wind Region D, and salinity conditions as the site is close to the sea. It is noted that if concrete is used, aggregate for concrete must be delivered to Ovalau if not available in sufficient quantities. Such material sourcing is the responsibility of the Contractor.

5.14.2.7 Structures & Buildings

Structures should include a switch gear building of at least a minimum 4m x 4m, and 6m x 4m reinforced masonry block office building with a washroom (including waster/sewage and electricity). Both structures include common electrical installations for 240v power supply and lighting & ventilation. All buildings and structures shall meet Fiji building codes, and include at least fire alarms and portable fire extinguishing equipment. Any structures shall have Cyclone Engineers Certificates.

5.15 Summary of Performance Requirements

The Plant and Materials as a part of the Permanent Works shall perform in accordance with the Purpose for the Works. This includes but it not limited to the following:

a. The BESS shall have a beginning of life power output (in kW) and energy storage (in kWh) of at least the required capacity. Under normal conditions meeting (i) two-hour discharge of 210 kW and 420 kWh on a single unit, or 105 kW and 210 kWh on two single units; and (ii) one hour discharge of 290 kW and 290 kWh on a single unit at 85% system efficiency, or 145 kW and 145 kWh on two single units at 82% system efficiency. Power output shall be within the range as stated in these Employer's Requirements.

b. The solar PV power station management and communications system shall be fully functional, responsive to circuit breaks or faults within the boundary of the solar PV power station and on-site BESS. It shall also record plant data as an hourly basis on-site and off-site (cloud data storage).

c. The power communications system shall be fully functional and responsive to circuit breaks or faults both within the 11 kV grid for Ovalau, and react to any circuit break or fault within the boundary of the solar PV power station.

d. Concrete for concrete foundations shall meet the design strength in the Design.

e. Structures shall be fully functional, this includes any mechanical, electrical, plumbing, and utility needs as per Design and Employer's Requirements.

5.16 Plant and Materials Testing

The Plant and Materials as a part of the Permanent Works shall perform in accordance with the Purpose for the Works, and the following test are required of the Contractor and the Contractors expense:

a. The manufacturers stated performance of installed equipment for the Plant and Materials as stated in these Employer's Requirements, as evidenced by the manufacture's equipment data sheets and standards-certifications, and any related factory type-test certificates.

b. The pre-commissioning test and commissioning tests shall be carried out by the Contractor on the Plant and Materials, witnessed by the Employer's Representative, or as the case maybe the Employer's Personnel. Results of the pre-commissioning tests shall be forwarded to the Employer for approval prior to commissioning of the Works. All costs of carrying out the pre-commissioning and commissioning tests shall be borne by the Contractor.

c. After commissioning the Contractor shall perform performance testing for the Permanent Works to ensure that all parts of the Permanent Works meet the performance requirements and purpose of the for the Works. The supplier may recommend the standards, methods, and procedures to be used for the performance test to the Employer. If the Employer does not approved of the recommended the standards, methods, and procedures, in part or in whole, then a reputable and certified third party shall be commissioned to perform the performance testing. The performance testing shall be witnessed by the Employer's Representative, or as the case maybe the Employer's Personnel. All costs of carrying out the performance tests shall be borne by the Contractor.

d. The Contractor shall provide strength test results of concrete placed in-situ or pre-cast for concrete foundations, which shall meet the design strength in the Design.

6. Section 6: Technical Information and Data

6.1 Existing power system on Ovalau

Levuka, on the island of Ovalau, holds historical significance as Fiji's first capital and the site of its earliest power supply, established in 1927. Today, Ovalau's electricity is generated by five 500 kW diesel generators at the Levuka Power Station, supporting a peak load of approximately 1.8MW to 2.05 MW. The largest consumer on the grid is the PAFCO factory. The network comprises three primary 11 kV feeders: Nasova, PAFCO, and Cawaci. The upcoming solar farm at Bureta represents a major step toward reducing Ovalau's reliance on fossil fuels, significantly cutting carbon emissions and advancing the island's transition to clean, sustainable energy.

6.2 Summary of the results of the Geotechnical Study and Land Survey

Insert geotechnical survey reference and land survey reference.

7. Section 8: Required forms of Agreement, Securities, and Guarantees

7.1 CONTRACT AGREEMENT

This Agreement made the _____ day of_____ _____

Between _____ of _____ (hereinafter called "the Employer") of the one part,

and _____ of _____ (hereinafter called "the Contractor") of the other part

Whereas the Employer desires that the Works known as Supply, Installation and Commissioning of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau (no. MR307/2025) should be executed by the Contractor, and has accepted a Tender by the Contractor for the execution and completion of these Works and the remedying of any defects therein, for the lump sum Contract Price of:

_____

[currency and amounts in figures]

_____

[currency and amounts in words]

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement:

(a) The memoranda annexed hereto (which includes a breakdown of the Contract Price)

(b) The Conditions of Contract

(c) The Employer's Requirements

(d) The completed Schedules

(e) The Tender and

(f) The JV Undertaking. *

* [if the Contractor constitutes an unincorporated JV, otherwise delete]

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to design, execute and complete the Works and remedy any defects therein, in conformity with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor, in consideration of the design, execution and completion of the Works and the remedying of defects therein, the final Contract Price at the times and in the manner prescribed by the Contract.

[5. The Contract shall come into full force and effect on the date when the following conditions are satisfied:

[List of pre-conditions]

The Employer shall promptly confirm to the Contractor the date on which alt these conditions have been satisfied. If any of these conditions has not been satisfied within days of the above-mentioned date on which this Agreement is made, this Agreement shall be void and ineffective and any securities issued in relation to the above Works shall be returned. _ _____ optional]

[5. The Commencement Date shalt be _____ optional]

In Witness whereof the parties hereto have caused this Agreement to be executed the day and year first before written in accordance with their respective laws.

SIGNED by: _____ Witness: _____

for and on behalf of the Employer in the presence of Name: _____

Address: _____

Date: _____

SIGNED by: _____ Witness: _____

for and on behalf of the Contractor in the presence of Name: _____

Address: _____

Date: _____

7.2 EXAMPLE FORM OF PARENT COMPANY GUARANTEE

Name of Contract/Contract No.: Supply, Installation and Commissioning of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau (no. MR307/2025)

Name and address of Employer: Energy Fiji Limited, 2 Marlow Street, Suva, FIJI (together with successors and assigns).

We have been informed that _____ (hereinafter called the "Contractor") is submitting an offer for such Contract in response to your invitation, and that the conditions of your invitation require his/her offer to be supported by a parent company guarantee.

In consideration of you, the Employer, awarding the Contract to the Contractor, we (name of is parent company) irrevocably and unconditionally guarantee to you, as a primary obligation, the due performance of all the Contractor's obligations and liabilities under the Contract, including the Contractor's compliance with all its terms and conditions according to their true intent and meaning.

If the Contractor fails to so perform his/her obligations and liabilities and comply with the Contract, we will indemnify the Employer against and from all damages, losses and expenses (including legal fees and expenses) which arise from any such failure for which the Contractor is liable to the Employer under the Contract.

This guarantee shall come into full force and effect when the Contract comes into full force and effect. If the Contract does not come into full force and effect within a year of the date of this guarantee, or if you demonstrate that you do not intend to enter into the Contract with the Contractor, this guarantee shall be void and ineffective. This guarantee shall continue in full force and effect until all the Contractor's obligations and liabilities under the Contract have been discharged, when this guarantee shall expire and shall be returned to us, and our liability hereunder shall be discharged absolutely.

This guarantee shall apply and be supplemental to the Contract as amended or varied by the Employer and the Contractor from time to time. We hereby authorise them to agree any such amendment or variation, the due performance of which and compliance with which by the Contractor are likewise guaranteed hereunder. Our obligations and liabilities under this guarantee shall not be discharged by any allowance of time or other indulgence whatsoever by the Employer to the Contractor, or by any variation or suspension of the works to be executed under the Contract, or by any amendments to the Contract or to the constitution of the Contractor or the Employer, or by any other matters, whether with or without our knowledge or consent.

This guarantee shall be governed by the law of the same country (or other jurisdiction) as that which governs the Contract and any dispute under this guarantee shall be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one or more arbitrators appointed in accordance with such Rules. We confirm that the benefit of this guarantee may be assigned subject only to the provisions for assignment of the Contract.

Signed by	_____	Signed by	_____
Name	_____	Name	_____
Date	_____	Date	_____

7.3 EXAMPLE FORM OF TENDER SECURITY

Guarantee No.: _____

The Guarantor: _____

[insert name and address of place of issue, unless indicated in the letter head]

Name of Contract/Contract No.: Supply, Installation and Commissioning of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau (no. MR307/2025)

The Beneficiary (the "Employer"): Energy Fiji Limited, 2 Marlow Street, Suva, FIJI.

We have been informed that _____[name and address of the Tenderer]_____ (hereinafter called the "Applicant") is submitting an offer for such Contract in response to your invitation, and that the conditions of your invitation (the "Conditions of Invitation", which are set out in a document entitled Instructions to Tenderers) require his/her offer to be supported by a tender security.

At the request of the Applicant, we _____[insert name of Guarantor]_____ hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ US$ 1000 *one thousand US dollars* _____upon receipt by us of your demand in writing and your written statement (in the demand) that:

(a) the Applicant has, without your agreement, withdrawn his/her offer after the latest time specified for its submission and before the expiry of its period of validity, or

(b) the Applicant has refused to accept the correction of errors in his/her offer in accordance with such Conditions of Invitation, or

(c) you entered into the Contract with the Applicant and he/she has failed to deliver a performance security complying with Sub-Clause 4.2.1 of the Conditions of Contract.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at the following office ___[insert address of office]____ on or before _ [insert the date 35 days after the expiry of the validity of the Letter of Tender]____, when this guarantee shall expire.

The party liable for the payment of any charges: __ Contractor Name ___[insert the name of the party].

This guarantee shall be governed by the laws of _____[insert the law governing the guarantee]____, and shall be subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

Signed by	_____	Signed by	_____
Name	_____	Name	_____
Date	_____	Date	_____

7.4 EXAMPLE FORM OF PERFORMANCE SECURITY – DEMAND GUARANTEE

Guarantee No.: _____

The Guarantor: _____

[insert name and address of place of issue, unless indicated in the letter head]

Name of Contract/Contract No.: Supply, Installation and Commissioning of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau (no. MR307/2025)

The Beneficiary (the "Employer"): Energy Fiji Limited, 2 Marlow Street, Suva, FIJI.

We have been informed that_____ [insert name and address of the Contractor] (hereinafter called the "Applicant") is your Contractor under such Contract, which requires him/her to obtain a Performance Security.

At the request of the Applicant, we _____ [insert name of Guarantor] hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ [insert in figures and words the maximum amount payable and the currency in which it is payable]_____ (the "Guaranteed Amount") upon receipt by us of your demand in writing and your written statement indicating in what respect the Applicant is in breach of its obligations under the Contract.

[Following receipt by us of an authenticated copy of the Taking-Over Certificate for the whole of the Works under Clause 10 of the Conditions of Contract, the Guaranteed Amount shall be reduced by _____% and we shall promptly notify you that we have received such certificate and have reduced the Guaranteed Amount accordingly.]

Following receipt by us of an authenticated copy of a statement issued by you that, pursuant to Sub-Clause 4.2.1 of the Conditions of Contract, variations or adjustments under Clause 13 of the Conditions of Contract have resulted in an accumulative increase or decrease of the Contract Price by more than twenty percent (20%) of the Contract Price stated in the Contract Agreement, and that therefore the Guaranteed Amount should be adjusted by the percentage specified in the statement equal to the accumulative increase or decrease, respectively, we shall promptly inform you that we have received such statement and have adjusted the Guaranteed Amount accordingly. In the case of a request for a decrease of the amount of the Performance Security, the above statement shall be accompanied by your written consent to such decrease.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at the following office _____[insert address of office] _____on or before _____ [insert the date 70 days after the expected expiry of the Defects Notification Period for the Works) (the "Expiry Date"), when this guarantee shall expire.

The party liable for the payment of any charges: __ Contractor Name _____[insert the name of the party]. This guarantee shall be governed by the laws of _____ [insert the law governing the guarantee], and shall be subject to the Uniform Rules for Demand Guarantees, (URDG) 2010 Revision, ICC Publication No. 758.

Signed by	_____	Signed by	_____
Name	_____	Name	_____
Date	_____	Date	_____

7.5 EXAMPLE FORM OF PERFORMANCE SECURITY – SURETY BOND

Guarantee No.: _____

The Guarantor: _____

[insert name and address of place of issue, unless indicated in the letter head]

Name of Contract/Contract No.: Supply, Installation and Commissioning of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau (no. MR307/2025)

The Beneficiary (the "Employer"): Energy Fiji Limited, 2 Marlow Street, Suva, FIJI.

We have been informed that_____ [insert name of the Contractor] (hereinafter called the "Principal") is your contractor under such Contract, which requires him/her to obtain a Performance Security.

By this Bond, _____[insert name and address of contractor]_____(who is your Contractor under such Contract) as Principal and:_____[insert name and address of Guarantor] as Guarantor are irrevocably held and firmly bound to the Beneficiary in the total amount of _____[insert in figures and words the maximum amount payable and the currency in which it is payable]_____ (the "Bond Amount") for the due performance of all such Principal's obligations and liabilities under the above named Contract.

[Such Bond Amount shall be reduced by _____% upon the issue of the Taking-Over Certificate for the whole of the Works under Clause 10 of the Conditions of Contract.] (1)

This Bond shall become effective on the Commencement Date defined in the Contract.

Upon Default by the Principal to perform any contractual obligation, or upon the occurrence of any of the events and circumstances listed in Sub-Clause 15.2.1 of the Conditions of Contract, the Guarantor shall satisfy and discharge the damages sustained by the Beneficiary due to such Default, event or circumstances. (2) However, the total liability of the Guarantor shall not exceed the Bond Amount.

The obligations and liabilities of the Guarantor shall not be discharged by any allowance of time or other indulgence whatsoever by the Beneficiary to the Principal, or by any variation or suspension of the Works to be executed under the Contract, or by any amendments to the Contract or to the constitution of the Principal or the Beneficiary, or by any other matters, whether with or without the knowledge or consent of the Guarantor.

Any claim under this Bond must be received by the Guarantor on or before _____ [insert the date six months fatter the expected expiry of the Defects Notification Period for the Works] ____ (the "Expiry Date"), when this Bond shall expire and shall be returned to the Guarantor.

The benefit of this Band may be assigned subject to the provisions for assignment of the Contract, and subject to the receipt by the Guarantor of evidence of full compliance with such provisions.

This Band shall be governed by the law of _____ [insert the law governing] ____being the same country (or other jurisdiction) as that which governs the Contract. This Bond incorporates and shall be subject to the Uniform Rules for Contract Bonds, published as number 524 by the International Chamber of Commerce, and words used in this Bond shall bear the meanings set out in such Rules.

Whereas this Band has been issued by the Principal and the Guarantor on ____[date]___.

Signed by	_____	Signed by	_____
Name	_____	Name	_____
Date	_____	Date	_____

7.6 EXAMPLE FORM OF ADVANCED PAYMENT GUARENTEE

Guarantee No.: _____

The Guarantor: _____

[insert name and address of place of issue, unless indicated in the letter head]

Name of Contract/Contract No Supply, Installation and Commissioning of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau (no. MR307/2025)

The Beneficiary (the "Employer"): Energy Fiji Limited, 2 Marlow Street, Suva, FIJI.

We have been informed that _____[insert name and address of the Contractor]_____ (hereinafter called the "Applicant") is your Contractor under such Contract and wishes to receive an advance payment, for which the Contract requires him/her to obtain a guarantee.

At the request of the Applicant, we _____ [insert name of Guarantor] hereby irrevocably undertake to pay you, the Beneficiary/Employer, any sum or sums not exceeding in total the amount of _____ [insert in figures and words the maximum amount payable and the currency in which it is payable] (the "Guaranteed Amount") upon receipt by us of your demand in writing and your written statement that:

(a) the Applicant has failed to repay the advance payment in accordance with the Conditions of Contract, and

(b) the amount of the advance payment which the Applicant has failed to repay.

This guarantee shall become effective upon receipt [of the first instalment] of the advance payment by the Applicant. The Guaranteed Amount shall be reduced by the amounts of the advance payment repaid to you, as evidenced by your notices issued under Sub-Clause 14.6 of the Conditions of Contract. Following receipt of a copy of each purported notice, we shall promptly notify you of the revised Guaranteed Amount accordingly.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at the following office [insert address of office] on or before _____ [insert the date 70 days after the expected expiry of the Time for Completion] (the "Expiry Date"), when this guarantee shall expire.

The party liable for the payment of any charges: ____ Contractor Name _____[insert the name of the party].

This guarantee shall be governed by the laws of _____[insert the law governing the guarantee}, and shall be subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

Signed by	_____	Signed by	_____
Name	_____	Name	_____
Date	_____	Date	_____

7.7 EXAMPLE FORM OF PAYMENT GUARANTEE BY EMPLOYER

Guarantee No.: _____

The Guarantor: _____

[insert name and address of place of issue, unless indicated in the letter head]

Name of Contract/Contract No.: Supply, Installation and Commissioning of the Battery Energy Storage System (BESS) for 4MWp Agrophotovoltaic Project in Bureta, Ovalau (no. MR307/2025)

The Beneficiary (the "Contractor"): _____[insert name and address of the Beneficiary]

We have been informed that_____[Insert name and address of the Employer]__(hereinafter called the "Applicant") is required to obtain a bank guarantee.

At the request of the Applicant, we _____ [insert name of Guarantor] hereby irrevocably undertake to pay you, the Beneficiary/Contractor, any sum or sums not exceeding in total the amount of _____ [insert in figures and words the maximum amount payable and the currency in which it is payable] upon receipt by us of your demand in writing and your written statement that:

(a) in respect of a payment due under the Contract, the Applicant has failed to make payment in full by the date fourteen days after the expiry of the period specified in the Contract as that within which such payment should have been made, and

(b) the amount(s) which the Applicant has failed to pay.

Any demand for payment must be accompanied by a copy of _____ [insert list of documents evidencing entitlement to payment and the language in which these documents are to be submitted], in respect of which the Applicant has failed to make payment in full.

Any demand for payment must contain your signature(s) which must be authenticated by your bankers or by a notary public. The authenticated demand and statement must be received by us at the following office [address of office] on or before _ _____[insert the date six months after the expected expiry of the Defects Notification Period for the Works] when this guarantee shall expire.

The party liable for the payment of any charges: __Contractor Name_____[insert the name of the party}.

This guarantee shall be governed by the taws of _____ [insert the law governing

the guarantee] and shall be subject to the Uniform Rutes for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

Signed by	_____	Signed by	_____
Name	_____	Name	_____
Date	_____	Date	_____

8. Section 9: Schedules Required from Tenderers

8.1 Schedule A: Qualifications of the Tenderer

A	Item & Requirement	Proposed in Tender	Deviations from Employer's Requirements
1	Provide a minimum of (x3) three references for the supply (including engineering, installation, and commissioning) of grid connected solar PV BESS of at least capacities of as outlined in qualification criteria.	*Items Provide (attach to schedule)*	
2	Provide a minimum of (x2) two references for the supply (including engineering, installation, and commissioning) of battery energy storage systems (BESS) connected to solar PV power stations and/or grid of capacities as per qualification criteria.	*Items Provide (attach to schedule)*	
3	Provide a minimum of (x3) three letters of reference (email acceptable, with contact details) for the Employer / Client of similar projects indicating the Tenderer has performed the project's works to their satisfaction.	*Items Provide (attach to schedule)*	
4	Provide the (a) business license / registration certificate in country of incorporation, (b) proof of taxes paid in the last financial year, (c) financial statements for the past two years (with revenues exceeding US$ 3,000,000 in each year), (d) statement that the Tenderer is not on the World Bank Listing of Ineligible Firms & Individuals or under current litigation, if so indicate what litigation. In the case of a consortium or Joint Venture provide (a), (b), and (d) of each party.	*Items Provide (attach to schedule)*	
5	Provide a description of how the Tenderer plans to finance its performance under the Contract, to include identifying any equity contribution of the		

	company in %, expected loans to be taken out from reputable banks and/or other investment institutions in %. The description shall not state the lump sum price, or currently amounts and only refer to the Letter of Tender.		
6	If loans are to be taken out then a statement from at least one reputable bank and/or other investment institutions should be provided indicating that the company is in good financial standing and is at least credit worthy up to the lump sum price stated in the Letter of Tender, BUT the letter shall not state the lump sum price and only refer to the Letter of Tender (taking into account the payment schedule under the Contract).	*Items Provide (attach to schedule)*	
7	In the case of a consortium or Joint Venture provide a description of the roles of each party.		
8	In the case of sub-contracting provide a description of the roles of each party.		

8.2 Schedule B: Key Contractors Personnel

B	Item & Requirement	Proposed in Tender	Deviations from Employer's Requirements
1	Qualifications of the assigned ***Project Manager*** shall include at least holding a bachelor's degree in mechanical, electrical, energy or civil engineering, and have at least 7-yrs of experience with solar PV BESS system and other renewable energy projects. Please also indicate any charters, registrations, and/or certificates held. Shall be fluent in English (spoken and written).	*Summary of Eligibility (attach 2 page CV)*	
2	Qualifications of the assigned ***Senior Electrical Engineer / Power Systems Engineer*** shall include at least holding a bachelor's degree in mechanical, electrical, energy engineering, and have at least 5-yrs of experience with solar PV BESS System and other renewable energy projects. Please also indicate any charters, registrations, and/or certificates held. Shall be fluent in English (spoken and written).	*Summary of Eligibility (attach 2 page CV)*	
3	Qualifications of the assigned ***Senior Civil Engineer*** shall include at least holding a bachelor's degree in civil engineering, and have at least 5-yrs of experience with civil works in small island developing countries, with preference to the Pacific region. Please also indicate any charters, registrations, and/or certificates held. Shall be fluent in English (spoken and written).	*Summary of Eligibility (attach 2 page CV)*	
4	Qualifications of the assigned ***Superintendent*** shall include at least holding a bachelor's degree in engineering or secondary-education certificate in electrical or power systems, and have at least 5-yrs of experience with electrical or power system projects in small island developing countries, with preference to the Pacific region. Please also indicate any charters, registrations, and/or certificates held. Shall be fluent in English (spoken and written).	*Summary of Eligibility (attach 2 page CV)*	

8.3 Schedule C: Description of Proposed Works (and any preliminary drawings)

C	Item & Requirement	Proposed in Tender	Deviations from Employer's Requirements
1	Provide a description of the guaranteed performance of the Works proposed by the Tenderer, and how the Tenderer proposed to test the Works for said performance.	*Max. 300 words description*	
2	Provide a description of the proposed civil works as a part of the Works proposed by the Tenderer	*Max. 900 words description (plus at least 1x drawing of site layout and 1x drawing of proposed structures)*	
3	Provide a description of the proposed mechanical works as a part of the Works proposed by the Tenderer	*Max. 900 words description (plus at least 1x sing line diagram of the power system, 1x drawing of solar array configuration)*	

8.4 Schedule D: Proposed Major Items

D.1 Civil Works

D.1	Main Components	Proposed in Tender	Deviations from Employer's Requirements
1	Clearing, Grading and Levelling	*Quantities, methods applied, expected grades, running off protection and draining (under Temporary and Permanent Works)*	
2	Access Road	*Quantities, methods applied, expected grades, load characteristics, running off protection and drainage (under Temporary and Permanent Works)*	
3	Fencing	*Quantity, type, manufacture, origin, model, and specifications meeting or exceeding the Employer's Requirements (attach product data sheet and web-link)*	
4	Security	*Quantity, type, manufacture, origin, model, and specifications meeting or exceeding the Employer's Requirements (attach product data sheet and web-link)*	
5	Foundations for BESS System	*Quantity, type, manufacture, origin, model, and specifications meeting or exceeding the Employer's Requirements (attach product data sheet and web-link)*	
6	Foundations for Equipment and Structures & Buildings	*Size / Quantities, type / materials, load characteristics*	
7	Structures & Buildings	*Size / Quantities, type / materials, methods manufacture, origin, model, and specifications*	

D.2 Mechanical Works

D.2	Main Components	Proposed in Tender	Deviations from Employer's Requirements
16	Battery Energy Storage System (BESS)	*Quantity, Manufacture, origin, model, and specifications meeting or exceeding the Employer's Requirements (attach product data sheet and web-link)*	

17	Communications equipment for grid interoperability	*Quantity, Manufacture, origin, model, and specifications meeting or exceeding the Employer's Requirements (attach product data sheet and web-link)*	

8.5 Schedule E: Tenderers Proposed Management and Timelines

E	Item & Requirement	Proposed in Tender	Deviations from Employer's Requirements
1	Provide a description of the proposed project management plan for completing the Works, including the roles of Key Contractors Personnel, and continual reporting to the Employer.	*Max. 600 words description (attached 1x diagram of management process, and any project management methods / standards used…etc.)*	
2	Provide a description of the proposed quality management plan for ensuring quality of the Works, including the roles of Key Contractors Personnel, and continual reporting to the Employer.	*Max. 600 words description (attached 1x diagram of quality management process, attach any ISO 9001 or equal certificate)*	
3	Provide a timeline for the execution of the Works from Contract Signing to The Return of the Performance Security	*Max. 300 words description (plus an attached GHANT chart), milestone should at a minimum include: Singing of Contract, Deliver of Performance Security, Commencement Date, Start of Civil Works, Start of Mechanical Works, Employer/Contractor on-going Meetings, Community Consultations, End of Civil Works, End of Mechanical of Civil Works, Commissioning, Training, Testing on Completion, Date of Completion, Remedying Defects, Issuance of Performance Certificate, Return of the Performance Security*	
4	Provide a description of the proposed Health & Safety Plan (H&SP).	*Max. 900 words description (including responsible persons, scope of the H&SP, safe work procedures, personal protective equipment, site access, site security and barriers, warnings, storage & disposal, emergency procedures, training, monitoring & incident reporting, attach any ISO 45001 or equal certificate)*	
5	Provide a description of the proposed Construction Environmental	*Max. 600 words description*	

	Management Plan (CEMP)		
6	Provide a description of the community / social engagement plan as a part of the Works proposed by the Tenderer	*Max. 300 words description*	

8.6 Schedule F: Schedule for Prices

The following Schedule for Prices is not all-inclusive but intended to provide general guidance for Tenderers to show their itemised costs for the purpose of evaluation of the Lump Sum offer under the Tender. The information provided in this Schedule for Prices shall not be considered the final list of materials and service costs or used for the procurement of the renewable energy system or for detailed final design. The equipment selection and procurement shall be provided by the Tenderer under the Contract. The Tenderer is advised to perform its own due diligence for their proposed design, final list of materials and service costs, and to exercise own professional judgment on materials and service costs, and to consult with suppliers for materials and service costs supplied under the Contract.

IMPORTANT: the itemised costs below shall that incurred by the Employer within the Lump Sum price of the Contract, and this include any and all materials and service costs, contingencies, Contractor overhead, off-shore taxes, fees and duties, and shipping costs & insurances to the site…etc.

Lump Sum for Required Capacities	Unit	Unit Cost	Qty.	Total Price	Source / Comments
(A) Regulatory Costs					
A.1: Land Regulations (Processing & Application Fees)				**Input Sub-Total**	
Environmental Impact Assessment					
Planning and Construction Permissions					
Building and Environmental Management Permits					
Insert additional items here					
A.2: Electricity Regulations (Processing & Application Fees)				**Input Sub-Total**	
Licenses for electrical contractor					
Insert additional items here					
Regulatory Costs - Total (A):				**Input Sub-Total**	

Lump Sum for Required Capacities	Unit	Unit Cost	Qty.	Total Price	Source / Comments
(B) Engineering Costs					

B.2: EPC Design Engineering				**Input Sub-Total**	
Additional Site Survey and layout					
Detailed Civil Works Design					
Detailed Mechanical Works Design					
Structural engineering verification visits					
Test drilling and piling					
Other engineering and testing					
Insert additional items here					
Engineering Costs - Total (B):				**Input Sub-Total**	

Lump Sum for Required Capacities	Unit	Unit Cost	Qty.	Total Price	Source / Comments
(C) Mechanical Costs					
C.1: Control Building / BESS / Sync Communications / Security				**Input Sub-Total**	
BESS (batteries / inverters / power controls)					
Single Mode Fiber					
Network switches with SFP slots (native fiber connections)					
Security CCTV and lighting etc.					
Required additional peripherals					
Insert additional items here					
Mechanical Costs - Total (C):				**Input Sub-Total**	

Lump Sum for Required Capacities	Unit	Unit Cost	Qty.	Total Price	Source / Comments
(D) Mechanical Installation Costs					
D.1: Power Transmission Side				**Input Sub-Total**	
Transformer / Switchgear / Cabling					
Required additional peripherals					
Insert additional items here					
D.2: Inverter DC and AC Side of Equipment:				**Input Sub-Total**	
Inverters / cabling / controls					
Required additional peripherals					
Insert additional items here					
D.3: Panels / Frames and DC Side of Equipment				**Input Sub-Total**	
Panels / Frames / Security					
Required additional peripherals					
Insert additional items here					
D.4: Control Building / BESS / Sync Communications / Security				**Input Sub-Total**	
Control Room BESS					
Required additional peripherals					
Insert additional items here					

Mechanical Installation Costs - Total (D):				**Input Sub-Total**	

Lump Sum for Required Capacities	Unit	Unit Cost	Qty.	Total Price	Source / Comments
(E) Civil Works Costs					
E.1: Power Transmission Side				**Input Sub-Total**	
Transformer / RMU / Switchgear foundations					
Required additional peripherals					
Insert additional items here					
E.2: On-Site Civil Works plus Installation				**Input Sub-Total**	
Stormwater Culverts & wingwalls (internal road)					
Stormwater open earth drains (>1% slope, width & depth varies)					
BESS foundations					
Levelling and compaction and fill of land on-site					
Clearing of land					
Seeding (grass) of land					
Required additional peripherals					
Insert additional items here					

Civil Works Costs - Total (E):				**Input Sub-Total**	

Lump Sum for Required Capacities	Unit	Unit Cost	Qty.	Total Price	Source / Comments
(F) Miscellaneous Costs					
F.1: Miscellaneous				**Input Sub-Total**	
Insurance During Construction					
EPC Gap Financing					
Spare parts					
Additional peripherals					
Insert additional items here					

Miscellaneous Costs - Total (F):	**Input Sub-Total**	

Lump Sum for Required Capacities		Total Cost	Applicable VAT
Total Lump Sum (Tender Price)		**Total Lump Sum**	**Total VAT Sum**
Regulatory Costs - Total (A):		**Input Sub-Total**	**Input Sub-Total**
Engineering Costs - Total (B):		**Input Sub-Total**	**Input Sub-Total**
Mechanical Costs - Total (C):		**Input Sub-Total**	**Input Sub-Total**
Mechanical Installation Costs - Total (D):		**Input Sub-Total**	**Input Sub-Total**
Civil Works Costs - Total (E):		**Input Sub-Total**	**Input Sub-Total**
Miscellaneous Costs - Total (F):		**Input Sub-Total**	**Input Sub-Total**

Lump Sum for Additional Capacities		Total Cost	Applicable VAT
All inclusive cost for each additional 50 kWp capacity of the solar PV power station, exceeding the Required Capacities		**Input Sub-Total**	**Input Sub-Total**
All inclusive cost for each additional 100 kWh capacity of the BESS, exceeding the Required Capacities		**Input Sub-Total**	**Input Sub-Total**
Insert additional items here		**Input Sub-Total**	**Input Sub-Total**

The Contract Price shall include all taxes, duties, and other changes imposed outside the Employer's country on the production, manufacture, sale and transport of the Contractor's equipment, Plant, materials and supplies to be used on or furnished under the Contract, and on the services performance under the Contract. The prices bid by the Contractor shall include all customs duties, import duties, with Holding Tax, business taxes, income and other taxes that may be levied in accordance to the laws and regulations in being as of the date 28 days prior to the closing date for submission of bids in the Employer's country on the Contractor's Equipment, Plant, materials and supplies (permanent, temporary and consumable) acquired for the purpose of the Contract and on the services performed under the Contract.

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

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 Wednesday 21st January, 2026.

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

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

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

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

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

Tender Submission via email or fax will not be accepted.