LUCELEC Energy Storage System
Request for Proposals

LUCELEC
St. Lucia

Change History of Report

Date	New Revision	Author	Summary of Change
April 20, 2022	0	LUCELEC Team & Hatch Team	Original

1 Contents

2 Introduction

The following document outlines the Instruction to Proponents (Tenderers) who intend to respond to St. Lucia Electricity Services Limited. (LUCELEC) Request for Proposals (RFP) for the Engineering, Procurement and Construction of a 7.5 MW/3.75 MWh Energy Storage System (ESS) to connect to the Vieux Fort Substation (VFSS).

Note: Tender and Proposal are used interchangeably in this document. Proponent and Tenderer are used interchangeably in this document.

2.1 About St. Lucia Electricity Services Ltd. (LUCELEC)

LUCELEC is a vertically integrated public utility with the sole responsibility for the generation, transmission, distribution and sale of electricity in Saint Lucia. The company was established under the commercial code in 1964 and granted an exclusive license by Ordinance No. 27 of 1964 (now the Electricity Supply Act No. 10 of 1994).

2.2 Project Funding

The ESS project is being funded via LUCELEC's central funds. As such, the commercial offerings will be assessed against the corresponding increase in technical system performance.

2.3 Project Scope

In order to support grid stability, reliability and reduce fossil fuel consumption, LUCELEC is planning to integrate an Energy Storage System (ESS) to connect to the Vieux Fort Substation (VFSS).

The ESS will be composed of a containerized lithium-ion battery energy storage system (BESS), a containerized Power Conversion System (PCS), and step-up transformers for connection to AC grid at 11 kV.

LUCELEC plans to use the battery to provide capacity to the grid and added reliability.

1. The primary use of the ESS will be to provide 7.5 MW of operating reserve to the grid, to allow for more efficient operation of the diesel engines. The ESS will need to provide 7.5 MW of power output for 30 min, in the event of an unplanned increase in load or loss of generation.
2. The secondary use case for the ESS will be to provide frequency and voltage support to the grid.
    - Provide occasional frequency response to discharge in an underfrequency event, prior to load shedding events or to charge in an over-frequency event if there is excess generation on the grid.
    - Provide voltage support to reduce voltage sag in Vieux Fort.
3. To initiate blackstart procedures on the grid

- ESS must be capable of self-energizing and energizing adjacent substation.

4. PCS should have full 4 quadrant capabilities, offering reactive power support to the grid as required.

    - ESS must be capable of providing up to 8.4 Mvar of instantaneous reactive power.

The Scope of Supply for this Request for Proposal is for the Engineering, Procurement, Construction and Commissioning of the Energy Storage System, Energy Management System and the Balance of Plant, including:

- Specification, Engineering, Supply, Installation, Pre-commissioning, and Commissioning of a 7.5 MW/3.75 MWh Energy Storage System, and all associated components, including (but not limited to) inverters, auxiliary components, battery management system, as outlined in Schedule A – Battery Energy Storage System Specification and Schedule B – Power Conversion System Specification.

    - LUCELEC requests details on the service and maintenance agreement offerings outlined in Section 5.10.1. Based on the offerings, LUCELEC may select to engage the Contractor for a service and maintenance agreement.

- Design, Engineering, Supply and Integration of the Energy Management System, outlined in Schedule D – Energy Management System Specification

- Design, Engineering, Procurement and Construction for the Balance of Plant including:

    - Electrical Balance of Plant, including (but not limited to) protection equipment, coordination of Contractor supplied equipment and with new distribution lines, disconnect switch, medium voltage circuit breaker, gantry structure, ground grid, integration with LUCELEC SCADA, installation of the ESS, installation of the Energy Management System. Details on the Electrical Balance of Plant are outlined in Schedule C – Power Transformer Specification, Schedule E – Electrical Balance of Plant Specification, and Schedule L – Contractor Datasheet.

    - Civil Balance of Plant, including site preparation, site grading, access road, foundations, transformer oil containment (if applicable), site security, cable routing. Details on the site preparation and civil works are outlined in Schedule F – Site Preparation and Civil Works Specification

An indicative single line drawing and layout, that can be used as inputs, are attached in Schedule J - Reference Reports and Drawings. The Tenderer shall propose its preferred solution based on the standard ESS design. The reference drawings are provided for information only.

Additional information regarding the project location and scope of work is provided in Section 7.3.

3 Instruction to Tenderers

3.1 Receipt and Return of Tender

Tenderers shall acknowledge receipt of the Enquiry Documents, and confirm whether or not they intend to submit a completed tender. Only those indicating an intention to submit a proposal shall receive further correspondence related to this RFP. All potential bidders should receive:

1) RFP Document:
    a. Instruction to Tenderers (Sections 1-7)
    b. General Conditions of Contract (Section 8)
    c. Form of Tender (Appendix 1) (to be submitted with proposal)
    d. Receipt Confirmation Form (Appendix 2)
    e. Price Schedules (Appendix 3)
    f. Schedule of Deviations (Appendix 4)
    g. Technical Schedules A-L (Appendix 5)
    h. Term Sheet (Appendix 6)

The receipt form for the tender documents is enclosed (Appendix 2) and is to be signed and returned by potential bidders on or before April 28, 2022.

3.2 Presentation of Tender

The Tenderer is fully responsible for the timely delivery of their tender. The completed tender shall be submitted by email at Secretarytec@lucelec.com, and shall be received not later than 4:00 pm local time on the closing date, June 17, 2022. It is the policy of LUCELEC to promptly open the tenders on the closing date.

Proposals shall be submitted in two files:

- Non-Price Components, including all technical and quality related information
    - A separate excel file completing the Contractor Datasheet in Schedule L
- Price Components, including Pricing Schedule and all other Pricing and Commercial information

The files will be clearly labelled on the outside as follows:

"**NON-PRICE TENDER DOCUMENTS** – **LUCELEC ESS Project** – **COMPANY NAME**"

"**PRICE TENDER DOCUMENTS** – **LUCELEC ESS Project** – **COMPANY NAME**"

Given that evaluation is based primarily on price and technical/quality considerations, tenderers shall submit the price proposal and technical/quality proposal(s) in separate files.

3.3 Date and Time

No tender will be accepted after the date and time specified in the letter of invitation, or such latter date as may be notified in writing. Any tender which is not on the official Form of Tender may be rejected.

3.4 Language

All correspondence in relation to the Tender and the Contract when placed shall be in English. Supporting documents and printed literature furnished by the tenderer may be written in another language provided they are accompanied by an English translation of pertinent passages. For the purpose of interpretation of the tender, the English translation shall prevail.

3.5 Cost of Preparation of Tender

LUCELEC is not responsible for any expenses or losses incurred by the Tenderer in the preparation of the tender, regardless of the conduct or outcome of the tendering process.

3.6 Publicity and Confidentiality

Tenderers are required to treat as confidential, the specification and all other information whether in written, visual or oral form supplied to them by, or on behalf LUCELEC, or acquired in the course of visits to LUCELEC's premises. Reproduction of any such information, whether in whole or in part, other than for the purpose of the tendering process, is strictly forbidden without the prior written permission of LUCELEC. Tenderers are responsible for ensuring compliance with these requirements by any third party involved with the tender.

After the official opening of tenders, information relating to the examination, clarification, evaluation and comparison of tenders and recommendations concerning the award of contract will not be disclosed to Tenderers or other persons not officially concerned with such process. Information deemed to be confidential by LUCELEC shall not be disclosed at any time.

3.7 Notice from LUCELEC

At any time prior to the latest date for receipt for tenders stated in this Request for Proposals, LUCELEC may issue a Notice by email to all Tenderers, deleting or varying or extending any item in these documents. Tenders shall immediately acknowledge the receipt of each such Notice by email to Secretarytec@lucelec.com.

Any such Notice shall then become one of the Tender documents and shall be treated as such by the Tenderer.

3.8 Communications

Queries regarding the Enquiry Documents should clearly identify the section of the documents to which they refer. Queries should be submitted by E-mail to "The Secretary, Tenders Evaluation Committee" no later than 21 calendar days before the official date of the receipt of tenders.

Questions submitted by methods other than that outlined above will not be acknowledged. Any contact or attempt to contact any other employees of LUCELEC for purposes of securing privileged information or advantages in the bid process will result in the immediate disqualification of the bidder.

The text of submitted queries and any responses provided will be written, and issued unattributed to all bidders via e-mail. It is the responsibility of Respondents to ensure the functionality of e-mail accounts. Where appropriate, all responses will be issued as an addendum to the pre-existing tender documents.

3.9 False Declarations

Where Tenderers are deemed to have provided deliberately false or misleading responses to the technical schedules (or any other section of these enquiry documents) they may be excluded from further consideration at the discretion of LUCELEC.

Where there is any doubt as to the meaning of items in the technical schedules (or any other section) Tenderers shall request clarification, be submitted by E-mail to "The Secretary, Tenders Evaluation Committee" Secretarytec@lucelec.com no later than 21 calendar days before the official date of the receipt of tenders.

3.10 Modification or Withdrawal of Tenders

A tenderer may modify or withdraw its tender after submission only if the modification or notice of withdrawal is received in writing by LUCELEC, prior to the Proposal Due Date.

A notice of withdrawal shall be sent by e-mail.

No tender may be modified or withdrawn in the interval between the proposal due date and the expiration of the period of tender validity (minimum of 120 days from the proposal due date).

3.11 Tender Programme

The following Table 1, shows the timeline and key dates associated with the bidding process.

Table 1: Timeline of Bidding Process

Milestone	Date
RFP issued to potential bidders	April 21, 2022
Return of receipt form	April 28, 2022
Deadline for questions	May 27, 2022
Answers and clarifications posted for all bidders	June 3, 2022
Proposals due date	June 17, 2022

LUCELEC is committed to adhering to this schedule but reserves the right to make modifications and to notify all tenderers accordingly.

4 Completion of Tender

To facilitate and expedite the evaluation of proposals, LUCELEC requests that all respondents adhere to the following proposal submission format.

Omission of any requested information not listed as optional, may constitute grounds for rejection of submissions. Emphasis should be given to accuracy, completeness and clarity of content.

4.1 Tender Form and Tender Schedules

Where provided, tenders must be submitted in accordance with the terms of the enclosed specification and conditions of contract. The Tender Form, all price, technical and commercial schedules must be completed or the tender may not be considered.

4.2 Alternatives and Deviations

Tenderers shall in so far as possible offer systems and equipment that fully comply with the Specification. Where a Tenderer considers that this is not to be possible for any reason, details of any non-compliance shall be provided in the list of Deviations and returned with the Tender. Failure to return the list of Deviations shall be deemed by LUCELEC to mean that the systems and equipment offered fully comply with the Specification.

The Tenderer may propose alternative systems, equipment or solutions that differ in whole or part with those specified but which offer additional economic, financial or technical advantages.

Where a Tenderer wishes to submit alternative proposals, this should be done by way of an alternative tender. The alternative tender should be accompanied by sufficient information to enable it to be evaluated in accordance with the criteria set down in this document. LUCELEC reserves the right to reject any alternative tender considered inappropriate and to insist on design criteria and requirements that suit their general requirements in terms of maintenance, equipment, materials, methods of construction etc. An alternative tender that fails to comply with these requirements may be summarily rejected by LUCELEC, whose decision in the matter will be final.

4.3 Modification of a Standard Design

Where it is necessary to modify a standard design to meet the requirements of the Specification, the Tenderer should highlight this to LUCELEC and clearly indicate the implications of the modification on price and delivery lead-time.

4.4 Price Basis

A fixed price contract is required.

The prices used in the compilation of the Tender and Schedule of Prices shall include all Customs Duties and Levies in operation at that date.

Each individual item of the Schedule of Prices shall have a Price entered against it, such Price shall properly cover the full inclusive value of the work covered by that item.

To facilitate the analysis of tenders, the Tenderer shall submit (if requested) to LUCELEC a breakdown of the Prices in the Schedule of Prices. Failure to give LUCELEC the requested information will result in the Tender being excluded from further consideration.

4.5 Currency

The lump sum prices and rates shall be quoted by the tenderer in the following currencies;

A. For those inputs to the works that the tenderer expects to supply from within St. Lucia (local currency component) in East Caribbean dollars.
B. For those inputs to the works that the tenderer expects to supply from outside St. Lucia (foreign currency component) in US dollars.

Payments shall be made in the above currencies.

4.6 Taxation

The prices quoted in the Schedule of Prices shall be inclusive of all local taxes.

4.7 Payment Terms

LUCELEC shall pay to the Contractor in the following manner the Contract Price adjusted to give effect to such additions thereto and such deductions therefrom as are provided in these Conditions:

Table 2: Proposed Payment Terms

Milestone	Percentage of Total CAPEX	Cumulative Payment
On Award/Contract Signing	5%	5%
Submission of 60% engineering package in full	10%	15%
Completion of Engineering	5%	20%
Issuance of PO for all major equipment (Batteries, Inverters, Transformers, Switchgear) - All POs to be provided to LUCELEC for validation	15%	35%
Mobilization of Contractor	10%	45%
Completion of Site Preparation	10%	55%
Delivery of Major Equipment	25%	80%

Substantial Completion	10%	90%
Holdback	10%	100%

If at any time at which the payment would fail to be made, that a defect in any portion of the Works in respect of which such payment is proposed, LUCELEC may retain the whole of payment.

LUCELEC shall retain a 10% holdback on all payments until final completion of the project.

4.8 Defects Liability Period

The Defects Liability Period on workmanship and the balance of plant components shall be 12 months after LUCELEC approval of the Taking Over Certificate.

4.9 Product Warranty

In addition to the defect liability period on the balance of plant, the Tenderer shall provide a 2-year warranty on battery capacity, and parts and workmanship for the major equipment in the entire system. The Tenderer shall provide their standard 2-year base warranty, and identify any monitoring, data-logging, and operations requirements that may impact the validity of the warranty. The Tenderer shall indicate the level of service agreement required to maintain the 2-year warranty.

If warranties differ between the manufacturer's (s') major components (inverter, batteries, transformer, etc.), please provide a breakdown of the warranty by each component.

4.9.1 Optional Extended Warranty

In addition to the base warranty, provide the option for extended warranty of 5 years, 10 years, 15 years and 20 years. Please describe the service agreement required, if any, that would accompany an extended warranty.

If warranties differ between the manufacturer's major components (inverter, batteries, transformer, etc.), please provide a breakdown of the warranty by each component.

Please describe the energy capacity retainment warranty (5 years, 10 years, 15 years and 20 years); provide the cost of each option. Please indicate if there is an associated service agreement required or any other operation/maintenance terms/conditions required to maintain the energy capacity retention warranty. Please identify any monitoring, data-logging & archiving, and operations requirements that may impact the validity of the warranty.

Please indicate who will be the provider of each warranty (if multiple).

Proposed warranty agreements shall be provided with the Proponent's bid.

4.10 Delivery Terms

Unless otherwise stated, prices shall be submitted for the ESS plant to be delivered Carriage Paid To (CPT) to St. Lucia Electricity Services Ltd. (LUCELEC).

4.11 Tender Validity Period

Tenders shall be valid for a minimum of 120 days from the closing date for receipt of tenders.

4.12 Country of Origin

Tenderers should indicate clearly the country of origin of all items being delivered.

4.13 Performance Bond

The Tender shall be accompanied by evidence in writing from a recognised insurance, bank or bonding company (not agents) such that if the Tender is successful a Performance Bond of ten percent (10%) of the Contract value will be made available within one month from the date on which the Tenderer is offered the Contract. Failure to submit evidence may cause the Tender to be rejected. The Insurance Company and/or Sureties referred to above will be required to enter into a bond jointly with the Tenderer to the sum provided in a form to be agreed with LUCELEC.
Personal sureties will not be acceptable.

4.14 Proposed Commercial Terms and Conditions

The Tenderer shall submit its standard Commercial Terms and Conditions for LUCELEC's review with its Proposal.

LUCELEC reserves the right to comment and negotiate these terms and conditions in order to develop a mutually agreed upon contract, with the selected Contractor.

5 Technical Tender Structure and Format

Tenderers should include a cover page and a signed letter of transmittal followed by a table of contents.

Proposals should be organized into the following major sections and provide sufficient detail for LUCELEC to make an informed decision and comparison of proposals. Emphasis should be given to accuracy, completeness, and clarity of content.

Additional information such as marketing brochures and promotional materials may be included as an appendix but will not form an integral part of LUCELEC's evaluation process.

Model names and version numbers of all relevant components of the proposed system should be included.

5.1 Transmittal letter / Summary

The transmittal letter should state the willingness and ability to provide the services outlined in this RFP. It should summarize the important information contained in submitted proposals and should not exceed three pages.

5.2 Tenderer's Business Information

Respondents should use this section to describe their business' background including products and services and company history.

5.3 Tenderer's Business Structure and Overview

This section should provide information on the Tenderer's company, such as business structure, the types of business typically conducted and any other pertinent information.

5.4 Tenderer's Capability to Undertake Project

This section should provide proof of Tenderer's capability, which includes previous relevant experience, facilities, resources and partnerships, among other things.

The Tenderer shall provide its company safety record for the past 5 years. The Tenderer shall identify if there are any material claims or lawsuits made against the Tenderer in the past 10 years, as well as provide details on such claims.

5.5 Subcontractors and Suppliers

Any subcontractors and suppliers the Tenderer proposes to use in the course of this project should be listed in this section. Information provided should include the subcontractor's/supplier's responsibilities, business information, qualifications and any experience relevant to their responsibilities on this project. The Tenderer shall indicate which suppliers and subcontractors are providing services exceeding 5% of the Contract Value (Major Subcontractors and Major Suppliers).

In the event that the Tenderer wishes to propose a change to one or more of its Major Subcontractors or Major Suppliers, the Tenderer shall provide written notice to LUCELEC. Additionally, the Tenderer shall provide documentation (including but not limited to experience sheets, capabilities, resumes of key personnel, past projects, etc.) to demonstrate the capabilities of the proposed Subcontractor or Supplier, for LUCELEC's review. LUCELEC shall have the right to request additional information if required to evaluate the proposed Subcontractor or Supplier. LUCELEC, at its sole discretion, shall have the right to approve or reject any changes to Major Subcontractors and Major Suppliers. LUCELEC shall provide its response in writing to the Tenderer.

It is a requirement that whenever commercially possible local suppliers or subcontractors shall be given the opportunity to provide materials or work which is within their competence to supply. The tenderer shall include in his tender (if applicable) a section detailing the nature and value of the work that is expected to be subcontracted locally.

5.6 Tenderer's Qualifications and Ability to Meet Standards

This section must outline the Tenderer's qualifications in light of those required. Any exceptions or inability to meet desired qualifications should be noted.

5.7 References

The Tenderer shall demonstrate its past experience with similar projects for Battery Energy Storage Systems > 1 MWh and in the Caribbean. The Tenderer shall provide reference project details to demonstrate its capability to support this project. Additionally, the Tenderer shall provide contact details and information for referees for a minimum of 3 reference projects, preferably from the last 3 contracts put into service. LUCELEC will contact these referees as part of the evaluation process. LUCELEC will give preference to projects installed in the Caribbean and using the same equipment proposed.

Respondents should provide names, addresses and contact information for references, including phone numbers and e-mail addresses.

5.8 Project Technical Information

Respondents should use this section to provide all necessary technical information outlining their methodology of meeting their obligations under this RFP.

5.8.1 Overview

A synopsis of the key information contained in this section of the proposal should be presented here.

5.8.2 Personnel

Key personnel to be involved in this project should be listed along with detailed information on their qualifications, relevant experience and anticipated roles in this project. A proposed organisational chart and CVs are required.

5.8.3 Detailed Design / Build Approach

Tenderers shall conceptually design and engineer a fully operational Energy Storage System (ESS), taking into consideration all specified requirements suitable for the LUCELEC system.

Conceptual design documents submitted shall, at minimum, provide the following information:

- Proposed methodology;
- Overall system description;
- Individual equipment description and necessary details;
- System architecture and equipment layout;
- Equipment selection;
- Interfacing with third party systems;
- Specifications for equipment procurement and installation;
- Expected and/or specified performance and lifespan of equipment;
- Construction plan overview;
- Testing, commissioning and acceptance procedures;
- Product support.

Tenderers should discuss technology/ platform strategy and future upgrade plans that will assist in the decision process.

Tenderers must advise of their relationship with any manufacturer or provider of the critical components of the solution, i.e., Authorised dealer, Agent, etc.

Further details on the scope of work are outlined in Section 7.3 and the attached Specifications in Schedule A through L.

5.8.4 Identification of Potential Problems

Potential problems in the performance of obligations as outlined in this RFP should be highlighted by the Tenderer.

5.9 Project Programme

Tenderers should provide a proposed timeline for implementation of the project. The project programme should illustrate various phases of the project as well as milestones. Equipment lead times should be clearly illustrated. Detail on the Tenderer's method of achieving milestones should be presented in the relevant sections of the proposal.

5.10 After Sales Service and Technical Assistance

Tenderers should provide details of the after sales support services available to LUCELEC noting the expected fault response times detailed in the specification.

5.10.1 Service Agreement & Maintenance

LUCELEC wishes to build competency within the company to operate and maintain BESS and PCS and EMS where appropriate and cost advantageous to do so.

5.10.1.1 Service Agreement

Please provide a description of the standard Service Agreement for preventative maintenance of the ESS. Please describe the remote monitoring and troubleshooting support included in this service agreement.

Please provide a description of the standard Service Agreement for preventative maintenance of the EMS. Please describe the remote monitoring and troubleshooting support included in this service agreement.

Please provide the annual cost of each agreement and outline the inclusions and exclusions. Please indicate if a (or what level of) service agreement is required to maintain the product warranty.

The Tenderer shall indicate the estimated level of effort to complete the annual preventative maintenance (number of hours and number of technicians) and provide an indication of the estimated cost of parts for preventative maintenance for the ESS and the EMS.

If there are multiple options for service agreements, please provide a breakdown of each option, the associated services provided, and the annual cost of the option.

Provide a 20-year estimate for the cost to maintain the Energy Storage System.

Provide an estimate of the replacement cost after year 10 to replenish the energy capacity of the energy storage system, if required.

5.10.1.2 Routine Maintenance

Provide a detailed description of the routine maintenance that is recommended and/or required as a condition of support/warranty. The Tenderer shall identify the frequency of these maintenance activities. The Tenderer shall indicate the expected level of effort for all maintenance tasks that may be performed by LUCELEC Staff, including the number of staff per task and the estimated hours per task, tools, skills/ competency/ training required.

The cost, duration, and location (onsite or at the Tenderer offices) of this training shall be specified.

Maintenance activities shall be broken down by equipment (BESS, PCS, EMS). Describe the tasks required by the LUCELEC site technician on a daily, weekly, monthly, etc., basis to maintain a proper operation of the energy storage system and its components.

A detailed isolation and lock out procedure shall be included for all equipment. The Tenderer shall also include documentation and a manual on routine maintenance procedures and corrective maintenance procedures.

The Tenderer shall provide training to LUCELEC Staff to complete the routine maintenance activities. The cost of this training shall be included in the Tenderer's proposal price.

The Tenderer shall provide a list of all additional available training courses for operation, routine maintenance, annual preventative maintenance, and corrective maintenance for the ESS and EMS. The courses shall indicate the skill sets acquired (competency level), frequency (how often is it offered), location, duration, and cost.

5.11 Technical Schedules

Tenderers should provide a proposed technical solution that meets the requirements as detailed in the technical schedules (A – L) included in Appendix 5.

5.12 Project Schedule

Tenderers shall provide a firm delivery schedule from purchase order to commercial operation.

The ESS shall be fully operational by October 31, 2023. However, LUCELEC would prefer earlier delivery timelines if achievable.

Tenderers shall indicate the following key milestones in their bid.

Energy Storage System

- Drawing Review Timeline
- FAT
- Arrival at Site
- Installation Timeline
- Commissioning Timeline
- Operational Date

Energy Management System

- Drawing/Design Review Timeline
- FAT
- Arrival at Site
- Installation/Integration Timeline
- Commissioning Timeline
- Operational Date

Balance of Plant

- Drawing Review Timeline

- Mobilization Timeline
- Construction Timeline
- Substation Completion Date
- Final Completion Date

The Contractor will be assessed on their ability to meet the preferred 2023 project execution date, based on logistics schedules. However, if this is not possible, the Contractor shall indicate the critical path items (e.g., battery cell supply, inverter supply, integration, etc.).

If there is an opportunity to offer a better price at the expense of not meeting this date by a few weeks or months, this should be stated as an option in the Tenderer's Proposal.

5.13 Delivery and Transportation Plan

The Tenderer is to provide a transportation plan along with details about loading and unloading all equipment in a safe manner and where necessary lifting, using forklift trucks or cranes with slings. Transportation plan is required so that LUCELEC can know if there are access issues that the Tenderer will encounter during delivery. LUCELEC's proposed access route for transportation of materials and personnel to the site is provided in Schedule J. Any permitting is the responsibility of the Tenderer, LUCELEC will assist as and when required but does not take any responsibility for this.

Packaging (for transportation of equipment to site and dangerous goods from site) must be in accordance with Packaging and Shipping Requirements attached in Schedule K– Packaging and Shipping Requirements.

5.14 List of Deviations

Tenderers should provide full and complete list of deviations.

5.15 Safety, Health, Environment and Quality

Tenderers should provide full details of their applicable safety, health, environment and quality procedures and recognised international accreditation certificates applicable to the proposed works.

Tenderers should reference Schedules H and I to review LUCELEC's Health, Safety, Environmental and Quality Plans.

The successful Contractor will be responsible for preparation of a Health, Safety and Environmental Management Plan and a Quality Management Plan for the project.

5.16 Sustainability & Ethical Supply Practices

The Contractor shall provide a summary of their corporate sustainability practices and policies and a summary of the ethical supply and corporate/resource sustainability practices and policies of the battery cell OEM.

6 Commercial Tender Structure

Tenderers should include a cover page and a signed letter of transmittal followed by a table of contents.

Proposals should be organized into the following major sections and provide sufficient detail for LUCELEC to make an informed decision and comparison of proposals. Emphasis should be given to accuracy, completeness, and clarity of content.

6.1 Tender Form

Tenderers must complete and include the Tender Form. (Appendix 1)

6.2 Price Schedule

Tenderers must complete the proposed price schedule in Appendix 3. Any essential components not listed on the price schedule must be included. All items provided free and items for which costs are incorporated elsewhere must be identified.

Tenderers are strongly encouraged to provide completed price schedules for the Secondary Optional items.

6.2.1 Pricing Submission Format

Tenderers will complete Appendix 3 (Schedule M –Lump Sum Price Submission) with their Proposal response.

The Tenderer's Financial Proposal shall be evaluated based on the 20-year lifetime cost of the asset, including CAPEX, OPEX, Maintenance, and Augmentation Costs. Augmentation costs are defined as any sustaining capital costs required to add additional energy storage capacity to the ESS to maintain the usable energy above 3.75 MWh for the entire 20 year project life.

Provide a firm price for the proposed Energy Storage System, Energy Management System and Balance of Plant including engineering, supply, transportation, insurance, spare parts, FAT, SAT and commissioning. The cost to perform these services shall be included in the Tenderer's lump sum price.

A minimum 2-year parts, workmanship and capacity warranty shall be included. Spare parts and extended warranty and maintenance plans shall be itemized separately.

Factory Integration Testing (FIT) shall be itemized separately and priced separately. Service and preventative maintenance agreements shall be priced separately.

Tenderers shall provide a pricing scheme for 20 years of operation, including any capacity augmentation costs.

Tenderers are requested to provide augmentation costs in 2022$ based on current battery pricing, assuming no decline in future costs. Tenderers shall indicate any additional costs that may be incurred due to upgrades of the EMS as a result of augmentation of the energy storage capacity.

Tenderers are requested to provide service agreement costs and extended warranty costs in 2022$ and indicate any mandatory pricing escalation over 20 years (i.e. if the service agreement contract states an increases by x% year over year).

The lump sum prices and rates shall be quoted by the tenderer in the following currencies;

A. For those inputs to the works that the tenderer expects to supply from within St. Lucia (local currency component) in East Caribbean dollars.

B. For those inputs to the works that the tenderer expects to supply from outside St. Lucia (foreign currency component) in US dollars.

Payments shall be made in the above currencies.

The total pricing will be taken as the sum of the lump sum prices in US Dollars and East Caribbean Dollars. For evaluation, East Caribbean Dollar priced components will be converted to US Dollars at an exchange rate of $2.7 XCD:$1 USD.

In addition to completing Appendix 3 (Schedule M –Lump Sum Price Submission), please provide the following price information:

- Hourly Service Rates for Technicians for Remote and On-Site Support.

If multiple or alternative service agreements are available, in addition to describing the inclusions/exclusions of each agreement, please provide annual pricing separately for each offering within the Financial Proposal.

6.3 Recommended Spare Parts List

Tenderers should include their recommended spare parts list and associated prices.

6.3.1 Tools and Installation and Commissioning Spares

Please provide a list of any special tools (and/or tool specifications) required for installation of the equipment (e.g., lifting of battery modules, lifting of transformer, etc.). The Contractor shall indicate if any of these tools are proprietary in their bid.

The cost for commissioning and 2 years of operating spares shall be included in the Tenderer's quotation.

Provide a recommended list of spare parts to be purchased prior to commissioning the entire system and the cost.

Please indicate the required storage conditions of these parts as well as their shelf life.

6.3.2 Operational Spares

Please provide the cost for the spare parts package required to complete the annual service agreement and the availability of a parts agreement.

Provide a list of recommended spare parts and the cost, including:

- Part number, supplier, lead time and location.

- Any spares that require configuration need to be identified and defined.
- Please indicate the mass (in kg) and dimensions of all large spare parts.
- Please indicate the required storage conditions of these parts as well as their shelf life.
- Installation and commissioning spares shall not be included in this list, as these parts should be included in the lump sum pricing.

Identify if the Contractor has any mechanisms in place for regional spare parts storage and delivery to LUCELEC and the delivery times associated with the spare parts.

Recommended Spare parts should consider the climate of St. Lucia and delivery times to St. Lucia.

Advise if there is any savings opportunities by purchasing both a service agreement and a parts agreement.

6.4 Comments of the Payment Schedule

Tenderers should note any comments of the proposed payment schedule.

6.5 Performance Bond

Tenderers are to provide details of their proposed performance bond.

6.6 Tenderer's Financial Information

Tenderers are required to provide the following financial information:

- Last two years annual audited accounts.
- Most recent tax clearance certificate.

6.7 Company Stamp

Tenderers are requested to stamp each page of the commercial section's "original" copy with the company stamp.

7 Evaluation of Tenders

7.1 Confidentiality of Evaluation

Information relating to the examination, clarification, evaluation and comparison of tenders and recommendations concerning the award of contract will not be disclosed to Tenderers or other persons not officially concerned with such process. Information deemed to be confidential by LUCELEC shall not be disclosed at any time.

7.2 Requirements for a Compliant Tender

In order for a Tender to be accepted for evaluation, it must comply with the following:

A. Contain a completed Tender Form
B. Contain fully completed Prices Schedules
C. Contain fully completed Technical Schedules
D. Contain a list of Deviations
E. Be compliant with the Tender Validity Period
F. Provide evidence that a performance bond will be issued
G. Tender in the listed currencies
H. Similar project reference lists
I. Contain a proposed project programme
J. Contain a key personnel organisational chart and CVs
K. Tax Clearance certification
L. Submitted in advance of the delivery deadline to the Secretarytec@lucelec.com email

LUCELEC may waive, at its sole discretion, any minor informality, nonconformity or irregularity that does not constitute a material deviation and which does not prejudice or affect the relative ranking of any Tenderer.

7.3 Evaluation Criteria

LUCELEC reserves the right to reject any tender. The lowest or any tender will not necessarily be accepted. LUCELEC retains the option of accepting initial bids or of going on to a further negotiated phase. LUCELEC will act to select the most advantageous tender submitted which meets all project specifications.

The evaluation process will first ensure that all proposals meet minimum qualifications, satisfy all requisite standards and contain all information required for a satisfactory comparison between bidders.

Proposals will be evaluated in a two-stage process, first evaluating the technical/quality submissions and then evaluating the commercial/pricing submissions. Tenderers shall submit their Proposals in two separate files, one containing all technical/quality information (the contractor datasheet shall be submitted in a separate excel file) and one containing all pricing/commercial information.

All proposals satisfying the above will then be evaluated on both commercial and technical merit quality using a commercial/technical ratio of 40 % Commercial and 60% Technical. The evaluation will be based upon the evaluation criteria and weights listed in Table 3 and

Table 4. An in-house multidisciplinary Tenders Evaluation Committee (TEC) will conduct the evaluation exercise.

Table 3: Technical Evaluation Criteria and weighting (%)

Technical Evaluation Criteria	**Weighting**
Corporate Experience • Project References • Personnel Experiences • Safety, Environment, Financial Track Record • Project Team and Partnerships • Warranty • Supplier Risk	15
Technical Suitability of the Solution • Suitability of the BESS, Inverter, and EMS • Lifespan of the BESS • Certifications • Construction Plan and QA/QC plan • Suitability for Local Climate • Long Term Support	30
Schedule • Delivery within preferred timeline • Suitability of Schedule	10
Environmental • Suitability of corporate sustainability policy • Environmental safeguards in design • EHS Plan	5
Technical Total	**60**

Table 4: Commercial Evaluation Criteria and weighting (%)

Commercial Evaluation Criteria	**Weighting**
20-year Lifecycle Cost (total cost of ownership) **Proponent with lowest total price receives full point's allocation and is the baseline for other Proponents scoring.** $\text{Proponent's Score} = \frac{\text{Lowest Bid}}{\text{Proponent's Bid}} \times 40$	40
Commercial Total	**40**

The acceptance of a proposal does not obligate LUCELEC to purchase a system from the submitting vendor. LUCELEC reserves the right to reject all proposals and not make a decision or award a contract. LUCELEC reserves the right to award a bid to the most qualified and responsible bidder using objective criteria based on a number of factors to be used in the evaluation process.

After receipt of a proposal and prior to signing any contract, LUCELEC reserves the right to negotiate an updated system design by adding or deleting specific equipment or optional features.

Any decision by LUCELEC will be considered final.

8 Scope of Work

8.1 Project Location

The project will be located in La Tourney, St. Lucia. The ESS will be installed next to the 7A and 7B La Tourney solar PV plant close to the Vieux Fort Substation (VFSS). An underground distribution line, at 11 kV, will be used to connect the battery directly to the substation.

The site location is at the following coordinates 13°44'16" N, and 60°57'41" W. An aerial view of the site is shown in Figure 1 below, and the location of the site relative to the Vieux Fort Substation is shown in Figure 2.

Figure 1: Location of the ESS Site and Incoming Feeders from the VFSS

Figure 2: ESS Site and LUCELEC Headquarters

8.1.1 Climatic Conditions

The historic average maximum and minimum temperature by month for St. Lucia is shown in Table 5 and the average rainfall by month is shown in Table 6. The climate in St. Lucia is considered a tropical climate. Climatic conditions for the design are provide in Table 7.

There are on average 30 thunderstorm days per year in St. Lucia.

Table 5: Historic Average Maximum and Minimum Temperatures (1977 - 1997) for St. Lucia

Temperature	Value (°C)
Absolute Max. Temp. (1 in 20 yrs)	32.2
Average Monthly Max. Temp.	31.0
Average Monthly Min. Temp.	22.5
Absolute Min. Temp. (1 in 20 yrs)	21.1

Table 6: Historic Monthly Rainfall Average (1977 – 1997) for St. Lucia

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (mm)	113	61	73	70	108	152	209	253	263	257	234	121

The Contractor shall provide a containerized ESS that is outdoor-rated for the local climate. In the table below are details for the region and the minimum design criteria.

Table 7: Climatic Conditions for Design Requirements 1

Seismic Data	
Sa (0,2)	1.227
Sa (1,0)	0.393
PGA	0.225
Wind Speed	
Annual Maximum Windspeed (1 in 50 year - non-hurricane)	17.9 m/s
Maximum Hurricane Windspeed	56 m/s
Design wind speed (1 in 50 year, 3 second gust)	56 m/s *assume class B ground roughness and 22 °C ambient temperature for design calculations
Temperature Design Criteria	
Operational Outdoor Maximum Daily	40 °C
Operational Outdoor Minimum Daily	21 °C
Indoor Minimum	15 °C
Indoor Maximum	30 °C

The Contractor shall provide a containerized system to meet local climate conditions.

The site altitude is approximately at sea level. The Contractor shall consider the proximity of the ocean, and appropriately design the system considering salt spray and the saline atmosphere.

1 Seismic data is expressed is units of g forces (m/s^2)

The containerized solution should be designed to ensure reliable and safe operation within the standard climate conditions. Proponents should also indicate survival temperatures of the equipment (where it is idling/off).

8.2 Existing Power System

LUCELEC is a vertically integrated, regulated utility that owns and operates all major generation and owns and operates the transmission and distribution grid.

LUCELEC currently operates a diesel power plant in Cul de Sac, which supplies the majority of the country's energy, and a solar PV installation in La Tourney (where the ESS will be installed).

The LUCELEC transmission grid is a 2-ring system at 66 kV. The system consists of a single diesel generation station at Cul de Sac, a solar PV installation at La Tourney, and 7 substations around the island. The 7 substations break into 33 distribution feeders at 11 kV.

The main generation centre is at the Cul de Sac Substation, which is the centre of both rings. The northern ring feeds the Castries, Union and Reduit substations. The Castries substation is the main load centre, and the majority of the electricity demand is on the northern ring. The southern ring feeds the Praslin, Vieux Fort and Soufriere substations. The 3 MW PV site at La Tourney connects to the Vieux Fort substation by the Vieux Fort and Pierrot feeders. There is an increasing demand by customers in the area supplied by the Vieux Fort substation; this substation supplies the critical loads of the hospital and the international airport.

At a high level, the LUCELEC transmission grid is shown in Figure 3.

The ESS will be installed in the La Tourney solar PV, and connect to the Vieux Fort and Pierrot substations via underground distribution at 11 kV.

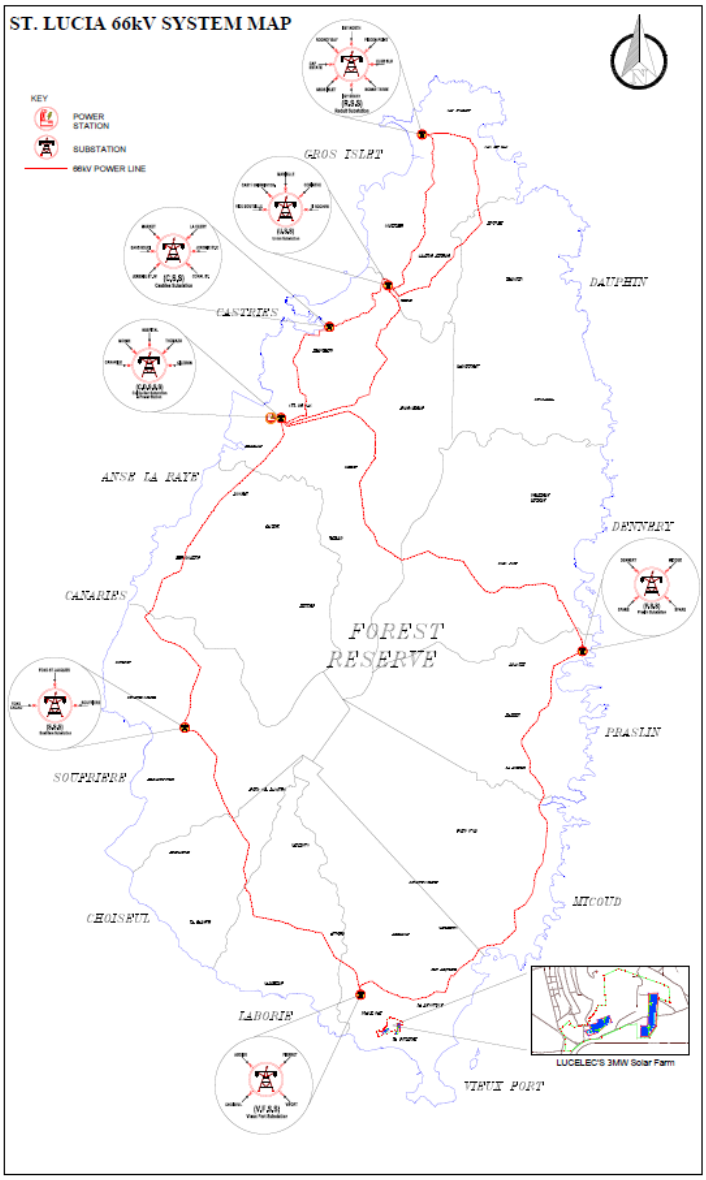

Figure 3: Schematic of LUCELEC Grid

8.3 Planned project

In this project LUCELEC is planning to install a 7.5 MW/3.75 MWh (usable power and energy) ESS split evenly in two parallel systems connected to the 11 kV network. The ESS shall be designed in parallel systems, which can operate simultaneously or independently. The parallel system sizing shall be selected such that the short circuit current on the low voltage side of the transformer is below 40 kA.

The ESS shall include the following equipment:

- A lithium-ion Battery Energy Storage System (BESS).
- A Power Conversion System (PCS) connected to a low voltage AC network.
- Step-up transformers from low voltage system to 11 kV.

- Protection relays and hardware necessary for the Vieux Fort switching station modification.
- And other ancillary equipment necessary for operation and safety of the ESS.

8.4 General Engineering Services

The Contractor shall supply as a minimum the following documents, as shown in Table 8:

Table 8: Documents and Drawings Required based on design packages

Deliverable	Proposal package	30%	60%	90%	IFC	As Built
General						
Drawing List		X	X	X	X	X
Project Schedule	X	X	X	X	X	
Health and Safety Plan	X			X		
Environmental Plan	X			X		
Quality Plan	X			X		
Operation and Maintenance Manual				X		X

8.4.1 Information to be supplied after Award

After the award the Contractor shall supply full documentation for the ESS project. Documentation shall be sufficient for the integration of the ESS system into LUCELEC's power system and the balance of plant.

The Contractor shall be supplied with all LUCELEC Standards necessary for the design.

The Contractor shall supply full documentation in a timely manner.

Three paper copies and one electronic copy of the following documentation shall be provided:

- FAT and FIT Reports;
- Installation and Commissioning Report;
- Detailed Lock-out Procedures; and
- Issue for Construction and As Built Drawing Package.

The Contractor shall be responsible for sealing all issue for construction or final drawings with an APESL (Association of Professional Engineers of Saint Lucia) seal.

The Contractor shall provide an editable version of the drawings in AutoCad 2010.

Paper copies of any Documentation shall be printed on, and/or electronic copies of any Documentation shall be formatted for, European standard sized paper, which is limited to the following dimensions:

- Letter: 8.5" x 11"; and
- Drawings: 11" x 17" or A1.

The Contractor shall indicate if the proposed submission and review schedule allows for delivery within the needed timeline.

The Contractor shall submit drawings for review by LUCELEC and their representative in a timely fashion. Submission dates of drawings and documents required for manufacturing shall be at least 4 working weeks before the start of manufacturing or ordering parts such that there are at least 2 weeks of review time for LUCELEC and their representative followed by 2 weeks for the Contractor to respond to changes if necessary.

Where electronic files are required, the Contractor shall submit the files in PDF format.

Drawings and documents submitted to LUCELEC and their representative will be stamped and returned to indicate review results. The stamp will be marked with one of the following results. The Contractor shall submit drawings marked “For Construction” after receipt of their drawings from LUCELEC or their representative noted "Code 1" or "Code 2".

- **Code 1** "Proceed, No Exception Taken" – This indicates that the Contractor may proceed.
- **Code 2** "Proceed, with Exceptions as Noted and Re-submit" – This indicates that the Contractor may proceed after actioning the exceptions. The Contractor may proceed before re-submitting.
- **Code 3** "Do not Proceed, Revise as Noted and Re-submit" – This indicates that significant changes are required as noted on the drawing or document, and the Contractor is to re-submit after changes or corrections are made. When drawings or documents are returned with Code 3, the Contractor shall make the necessary corrections required by or their representative, consistent with the Purchase Order and shall submit revised drawings or documents to LUCELEC and their representative for review.
- **Code 4** "Information Only" - This indicates that the submittal was for information not review, and no response is required from LUCELEC or their representative.

Drawings and documents shall be re-submitted for review if the Contractor revises them after they were sent for review by LUCELEC or their representative.

LUCELEC and their representative’s review of drawings will be for general design only and shall not relieve the Contractor from responsibility for deviations from drawings and specifications, unless the Contractor has in writing called LUCELEC’s and their representative’s attention to such deviations at the time of submission, and secured written approval of the deviation, nor shall it relieve the Contractor from responsibility for errors in shop drawings.

LUCELEC and their representative shall approve the Contractor’s drawings before start of manufacturing. Approval of the Contractor’s drawings, by LUCELEC or their representative, shall not relieve the Contractor of the responsibility for the correctness thereof, nor for the results arising from errors or omissions, nor any fault or defects, nor for the failure in the matter of guarantee which may become evident during erection or subsequent operation.

The Contractor shall submit all final design and record drawings in digital form.

For all Contractor equipment either type test or FAT certificates shall be presented per applicable standard.

All documents shall be in English.

8.4.2 As Built Drawings

The Contractor shall update working drawings throughout construction and commissioning. Ensure local station staff know where the drawings are kept in case troubleshooting is required.

Upon completion of construction and/or commissioning the Contractor shall transfer all field redlines to two (2) or more sets of drawings to ensure there are three (3) complete sets of redlines for the project. If the Contractor demobilizes from site for an extended period of time (due to a delay in the project), LUCELEC may request redlined as-builts before the Contractor leaves the site. The As Built Drawings shall be located in the following locations:

- Set 1 to remain on site and filed correctly in the Control Building drawers by the commissioning Contractor.
- Set 2 for LUCELEC's Operations & Maintenance Staff. The Contractor will turn this set over to the Construction Inspector (with a signed transmittal) and the Construction Inspector will be responsible for getting this set of drawings to System Test.
- Set 3 for LUCELEC's Drafting department. The Contractor will turn this set over to the Construction Inspector (with a signed transmittal) and the Construction Inspector will be responsible for getting this set of drawings to the Contract Administrator or designate.

Each drawing in the as-built packages shall contain a stamp that provides the following information:

- Company name;
- Redline date;
- Changes made? Yes or No check boxes; and
- Initials of Contractor.

This as-built stamp will only apply to the portions of the Drawing that relate to the Work performed by the Contractor.

The Contractor shall be responsible for sealing all final drawings with an APESL (Association of Professional Engineers of Saint Lucia) seal. Two (2) sets of drawings shall be provided as follows:

- Set 1 to remain on site and filed correctly in the Control Building drawers by the Contractor.
- Set 2 for LUCELEC's Drafting department. The Contractor will turn this set over to the Construction Inspector (with a signed transmittal) and the Construction Inspector will be responsible for getting this set of drawings to the Contract Administrator or designate.

8.5 Energy Storage System

The major components of the Scope of Supply are a Battery Energy Storage System (BESS), a Power Conversion System (PCS), and any auxiliary equipment needed for the safe and effective operation of the ESS. The BESS stores energy and is capable of delivering or absorbing energy at its DC Bus. The PCS converts DC power to AC power and vice versa and is the power interface to the AC electrical grid.

The Detailed Technical requirements for the BESS and PCS including the step-up transformer requirements are provided in Technical Specifications documents in Schedule A – Battery Energy Storage System Specification, Schedule B – Power Conversion System Specification, and Schedule C - Power Transformer Specification and in the datasheet in Schedule L – Contractor Datasheet – Transformer Tab.

The Energy Storage System shall be designed to meet the following main characteristics.

- The power output of 7.5 MW of discharge and charge power capacity at the 11 kV terminals of the transformer (accounting for losses in the transformer, PCS, BESS, and auxiliaries).
    - The ESS shall be designed with two or more parallel systems, for a total system capacity of 7.5 MW. Each of the subsystems shall be capable of operating independently.
    - The parallel system sizing shall be such that the short circuit current at the low voltage of the transformer is less than 40 kA.
    - Proponents should provide the maximum charge power as well as the recommended charge power to optimize the BESS lifespan.
    - Proponents shall indicate any derating in charge/discharge power based on the State of Charge (i.e. at low State of Charge, is the discharge power below 7.5 MW?).
- The ESS shall have 30 minutes of usable energy storage capacity (3.75 MWh) when discharged at the rated power of 7.5 MW at its End of Life (EOL), defined as 20 years of operation at the rated duty cycle.
    - Proponents may propose an augmentation strategy if required to achieve a 20 year lifespan. Proponents shall include in their proposals details on the augmentation strategy (if proposed) including timing, energy augmentation, strategy (e.g. new containers, adding additional modules to existing containers, etc.) and estimated cost.
- The ESS will be designed for a duty cycle of approximately 680-1,370 MWh discharge power per calendar year (180 - 365 cycles per year).
    - The planned resting State of Charge is between 80-85% of the 3.75 MWh of usable energy.
    - LUCELEC shall have the capability to adjust the resting State of Charge as desired based on system operation, through the system SCADA or HMI.
    - Proponents should provide details on both the cycle/throughput capacity fade and calendar aging for the BESS.

- The ESS shall have a fully integrated Battery Management System (BMS) systems including communication interface to the battery PCS and LUCELEC's SCADA system. All relevant parameters of battery cells must be available for accurate monitoring in real-time. The BMS must protect the battery from operating outside of its safe operating area.
- The BMS shall complete fully automated cell balancing system (no labour intervention)
- The PCS units shall be composed of IGBT-based AC/DC bi-directional Converter line-ups with full 4-quadrant functionality, preferably made from modular inverter units, complete with AC line filters and required surge protection. The PCS total capacity should be at minimum 8.4 MVA.
    - The design shall be comprised of parallel PCS systems, totalling a system capacity of 8.4 MVA.
    - The ESS is expected to operate at a power factor of 0.9.
    - Parallel system sizing shall be such that the short circuit current at the low voltage of the transformer is less than 40 kA.
- The PCS should be capable of providing 8.4 Mvar if there is 0 MW of load.
- The ESS shall have an AC Round Trip Efficiency of >85%, measured at the AC terminals of the inverter when discharged and charged at its rated power (7.5 MW). The DC Round Trip Efficiency shall be >90% when discharged and charged at its rated power (7.5 MW). Any changes to the Round Trip Efficiency as a result of battery aging or degradation shall identified in the Tenderer's Proposal.
- All low voltage bus work, cables and all connections.
- DC protection system (breakers or fuses) to connect the battery to the PCS.
- AC Breakers to connect the PCS to the step-up transformer(s). Switchgear should be rated for outdoor installation in the local climate.
- The packaging for BESS and PCS shall be in an outdoor-rated self-supporting enclosure meeting all climatic requirements of St. Lucia and Building Specifications in Schedule G – Containerized Building Requirements. Each container should have at least 1 access point with a hinged lock-able door; however, 2 man doors are preferred.
- The ESS shall include the necessary fire detection, fire protection and fire suppression systems for safe operation of a lithium-ion battery system. Proponents shall provide technical details on the types of fire detection, protection and suppression systems included in its offering.
- The ESS shall include a flammable gas and hydrogen detection system, and the necessary flammable gas management systems and explosion prevention systems to prevent an explosion in the event of a thermal runaway and cell gassing event.
- A demonstrated fire safety, flammable gas (gases which may evolve during a thermal runaway event, including hydrogen) management, and explosion prevention plan is required.

- In the event of a fire or flammable gas detection, the ESS shall audibly alarm to notify any LUCELEC staff or technicians working on site.
- Proponents should provide a recommended emergency response and firefighting protocol for local emergency responders.
- The ESS shall include a fully integrated thermal management system, as required based on climate conditions stated in Section 8.1.1 and battery operating conditions. This will include insulation in the walls, roof, and floor of the containers, as well as an automatically controlled HVAC system for all containers. Temperature, humidity and other atmospheric characteristics are to be controlled within the safe operating range of the BESS and PCS, and within the range where the battery life is maximized. Preference will be provided to HVAC systems with a lower amount of power consumption.
- The Proponent's Bid shall include all costs associated with installation of the batteries at the site, including offloading the containers, securing the containers, installing any components shipped loose, and connecting all cabling between the containers, the inverters, and the transformer.
- The Contractor's product shall obtain its auxiliary power for lighting, services, etc. behind the point of connection. For clarity, a separate auxiliary supply will not be available, and the ESS and all of the auxiliary loads must be served from a single connection point to the grid. The ESS shall deliver the rated power and energy at the point of connection after serving its auxiliaries.
- The Contractor shall design and supply all protection equipment and coordinate all protective devices for the ESS up to the primary of the 11 kV, including specification of the protections and supply of the relays, PTs and CTs. The Contractor is responsible for the protection coordination of all electrical elements within its scope of supply. This will be coordinated with the external LUCELEC protection systems.
- The Contractor shall perform the necessary arc flash analysis for all equipment within its scope of supply. All relevant electrical equipment shall have the appropriate arc flash labels following LUCELEC requirements (Arc Flash Requirements will be provided to the Contractor). The Contractor are to notify LUCELEC of the arc flash standards used, and any modifications, for incident energy calculations.
- The Contractor shall supply the necessary metering and indication equipment including fault recording device.
- The Contractor shall supply an Uninterruptible Power Supply (minimum duration of 4 hours) to serve ESS critical loads during a temporary outage of auxiliary power.
- The Contractor shall provide a list of all auxiliary equipment and the consumption. The Contractor shall estimate the auxiliary load/station services during charging, during discharging, and during idling.
- The Contractor shall provide a description of the ground fault detection method for each subsystem.
- If applicable, the Contractor should provide a high resistance ground system for protection.

- The ESS shall include a local monitoring panel and remote supervision equipment.
- The ESS shall include an E-stop button and panel front-door mounted indicating lights on all containers.
- The Contractor is responsible for all system studies and design engineering for the system, up to the fence line (Connection to the 11 kV switching station).
- The Contractor is responsible for completion of Factory Acceptance Testing of all Contractor supplied equipment.
- The Contractor shall indicate any components not explicitly referenced within this Specification, but necessary for the safe and automated operation of the equipment.
- The Contractor shall indicate the useful life, in years, of the BESS (End of Life defined as when system discharge capacity drops to less than 30 minutes at rated power of 7.5 MW). If this is less than the 20 years project life at the specified duty cycle, the Contractor shall include proposals indicating the cost structure and strategy to update/replace the BESS capacity.
- If an augmentation strategy is proposed the Contractor shall indicate if the control system (BMS, PCS controls, EMS, and any other system controls) is forward compatible with any augmentation plan.
- The Contractor shall indicate any foreseen concerns with this future compatibility if a battery augmentation plan is proposed or any additional upgrades that may be required.
- The Contractor shall identify any software required for operation of the ESS should be software for which the Contractor has a license. If there is software must be purchased by LUCELEC or requires ongoing licensing fees, the Contractor should outline the fees. Details on the software fees should include the software name, type of license (single payment, monthly, yearly, every 5 year, etc.) and cost of license (single payment, monthly, yearly, etc.).
- The Contractor shall assist LUCELEC with asset criticality ranking for Asset Management Planning.
- The Contractor shall provide any requested information to be entered into LUCELEC's requested format for its Asset Management System (LUCELEC to provide format after contract award).
- The Contractor shall provide a compiled list of all maintenance tasks and activities, and their frequency for the entire system to LUCELEC.

The power ratings of the major component are shown in Table 9 below. Nominal system rating of 8.4 MVA is defined at the battery limit, which is the contractual metering point, after serving its own auxiliary loads.

Table 9: Major System Component Power Ratings[2]

Location	Discharging	Charging	Losses
Battery Limit			
Transformer	↑ 7.5 MW/8.4 MVA	↓ 7.5 MW/8.4 MVA	A
Auxiliary Loads	↑ 7.5 MW/8.4 MVA + A	↓ 7.5 MW/8.4 MVA - A	B
Low voltage system			
Inverters	↑ 7.5 MW/8.4 MVA + A + B	↓ 7.5 MW/8.4 MVA – A – B	C
DC system			
Batteries	↑ 7.5 MW/8.4 MVA + A + B + C	↓ 7.5 MW/8.4 MVA – A – B – C	D

The Contractor shall provide a training program, including training booklets, presentation and recorded video for LUCELEC's use throughout the asset life. Training shall cover following areas: application, engineering/design, maintenance, operations, performance/asset management, safety and Fire/Explosion prevention/response.

The Contractor shall provide first response training to the local fire department.

8.5.1 Energy Storage System Duty Cycle

The BESS shall perform the following Duty Cycle:

- The BESS will support LUCELEC to manage grid stability, allow integration of new renewable generation and support optimized operation of the diesel generation fleet.
- The Primary Use Case ESS will used to provide backup power/supplementary operating reserve during sudden downturns of thermal generation or load increases. This will allow LUCELEC to operate its engines at higher loading and carry operating Reserve on the BESS. This use case is to be used for bridging during the time it takes to start a diesel genset, which is typically approximately 10 min. For reliable operation, the BESS should retain 30 min of operating reserve.
- The BESS will also be requested to respond to low or high frequency (up to 1.5 Hz deviation) to reduce grid instability. In low frequency events, the BESS would be used

[2] Reactive power ratings not shown. Full 4-quadrant inverter functionality dictates bi-directional Q capability in all charging and discharging scenarios.

to reduce the need (or prevent load shedding). In high frequency events, the BESS would charge to act as a load if a major load/transmission line was lost, to absorb excess generation until it can be ramped down safely. LUCELEC shall be capable of setting and adjusting the dead band on the frequency response.

- Additionally, the BESS will be used to provide voltage support and reactive power support occasionally, if required.
- The BESS should be capable of self-energizing and leading the blackstart of the grid after an outage or for load restoration.
- The estimated usage of the BESS is 680 - 1,370 MWh per year depending on the number of events (outages, operating reserve events, outage events, and grid stability, etc.) The cumulative cycling will be between 180-356 cumulative cycles per year (0.5 – 1 cycle per day). In reality the operation will consist of many shallow charge/discharge cycles where the BESS is only discharged/charged for short periods or is discharged/charged below its rated power for extended periods.
    - For the Proposal, sizing should be done assuming 1,370 MWh per year (1 cycle per day) of discharged energy.
- The planned resting State of Charge is between 80-85% of the 3.75 MWh of usable energy.

A calculated time-series data of the example discharge and charge power values for the BESS is available and can be provided to the Proponents upon request.

The Contractor shall model the anticipated degradation for the BESS based on the duty cycle for each year over a 20 year period.

Augmentation is acceptable and should be included in the degradation curve if the Contractor elects to perform augmentation over the 20 year period.

8.5.2 ESS Testing Plan

The Proponent's Bid should include a summary description of the Factory Acceptance Test (FAT). The quotation should be inclusive of all the cost to perform these activities.

The testing plan should include testing of all equipment, including any protections and control equipment supplied by the Contractor. The protection and control equipment shall be connected and tested as a subsystem in the factor using conditions identical to those expected on site.

The Contractor shall record the version of control software and firmware installed on the control and protection equipment throughout the time of the FAT. If the Contractor deems it necessary to install newer control software during or after the completion and acceptance of the FAT, the Contractor shall submit a software and software variance report to LUCELEC containing the following:

- Reason for change
- Details of change

- Potential impacts to other elements of the control and protection Equipment which were not changed
- Details of how the change was validated and tested
- Results of the validation and testing

Note LUCELEC or one of its Representatives shall witness all test, unless written authority to proceed with the tests in their absence has been received.

The Contractor shall prepare a FAT testing plan for review and approval by LUCELEC and its Representative. It is expected at minimum IEC testing protocol will be included, as well as industry standard testing for batteries, inverters, controls, and P&C.

The Contractor shall advise LUCELEC immediately should any failures take place during the FAT, commissioning or SAT tests and take remedial action. The Contractor shall repeat any tests which LUCELEC deems may have been impacted by the failure or the fix for the failure.

LUCELEC requests Factory Integration Testing (FIT) as an optional service, FIT testing should be priced out separately for LUCELEC review. FIT would be used to de-risk the integration of the EMS, PCS and BESS. Given the size of the installation, it is acceptable that a single line up (EMS + 1 PCS + 1 BESS container/string) would be used for FIT to complete the integration prior to shipping to St. Lucia. The FIT testing should include a testing plan for review and approval by LUCELEC and its Representative. It is expected at minimum IEC testing protocol will be included, as well as industry standard testing for batteries, inverters, controls, and P&C.

The Contractor is to advise if there are any training requirements or safety certifications for LUCELEC personnel prior to the FAT or FIT testing.

8.6 Energy Management System

The Contractor shall the supply and integrate an ESS Energy Management System (EMS) which involves a software and hardware solution to meet the operational objectives of the ESS.

The detailed technical requirements for the EMS are provided in Technical Specifications documents in Schedule D – Energy Management System Specification.

The EMS must include software necessary to control the ESS to provide the following functions/modes:

- Active Power Dispatch commanded by LUCELEC’s SCADA system;
- Primary frequency response, droop based;
- Voltage control;
- State of charge management;
- Black Start Capabilities;
- Manual Operation; and

- Any other Proponent-dictated functions required to support the operation of the ESS.

These operating modes are directly related to the ESS use cases described in Section 2.3. Specific details for their implementation are described in the Appendices. It shall be noted that these functions may require custom programming that is tailored to LUCELEC's systems. The primary operation mode will be to operate the ESS in a power setpoint response that will receive an active power setpoint from the LUCELEC SCADA system. The derivation of this setpoint will be determined either manually or automatically from the LUCELEC System Control Center (SCC). It is expected that the voltage control modes, State of Charge management and PFR will be active in parallel with the primary operation modes.

It is expected that LUCELEC will have access to as much of the EMS source code as possible. Proponents are to describe the level of access and modification to the EMS code that will be made available to LUCELEC. Solutions that give maximum access to LUCELEC will be evaluated favourably.

The Contractor is responsible for procuring, programming and commissioning the EMS with the functions described in the Specifications documents. This EMS will be the main point of interface to the LUCELEC SCADA network.

The Contractor shall supply a Schneider Electric SAGE 2400 RTU to interface between the LUCELEC SCADA Network and the EMS. The Contractor is responsible for integration of the RTU with the LUCELEC SCADA Network.

The Contractor shall supply a GE Multilin G500 Advanced Substation Gateway to interface between the LUCELEC SCADA Network. The Contractor shall be responsible for integrating the Gateway with the LUCELEC SCADA Network.

The Contractor shall account for the I/Os from the relays and/or a LUCELEC controller for distribution line protection.

The EMS functions/modes will be programmed on a utility-proven platform. A specific control architecture is not defined in this package due to the many configurations that could be implemented. Proponents are to provide the following preliminary information within their Proposal package:

- Software functional description describing how the functions/modes will be implemented in the EMS and how they align with the specifications.
- EMS distribution architecture showing locations of direct PT/CT monitoring and locations where networked power system measurements are obtained from distributed devices.
- Network communications drawings showing the EMS monitoring points and its interaction with distributed networked devices within the ESS.
- Internal communication interfaces/tag lists showing the communication between the EMS and internal ESS components such as distributed battery management controller, PCS controllers, relays and breakers.
- External communication interfaces/tag lists for communication between the EMS and the LUCELEC system.

- The type of EMS hardware proposed.
- Number of distributed EMS controllers or monitoring points both within the ESS installation.
- Proponents are to describe how redundancy is achieved for both the EMS hardware and software.
- Proponents are to describe the failure mode of the control system and the action on recovery.

The Contractor shall assist LUCELEC with asset criticality ranking for Asset Management Planning. The Contractor shall provide any requested information to be entered into LUCELEC's Enterprise Asset Management System (completion of LUCELEC data sheets). The Contractor shall provide a compiled list of all maintenance tasks and activities, and their frequency for the entire system to LUCELEC.

8.7 Electrical Engineering Services

The Contractor shall supply all the electrical engineering required for the design and construction of the ESS.

Further details on the Electrical Engineering Services and Requirements are outlined in Schedule E – Electrical Balance of Plant Specification.An indicative singe line drawing, that can be used as inputs for the electrical balance of plant design, is attached in Schedule J - Reference Reports and Drawings. The reference drawings are provided for information only.

8.7.1 Studies

The Contractor shall supply the following studies at the indicated review and submittal schedule, as shown in Table 10:

Table 10: Deliverable Submissions for Studies at Design Gates

Deliverable	Proposal package	30%	60%	90%	IFC	As Built
Short-Circuit Study		X	X	X		X
Protection Philosophy		X	X	X		X
Protection Coordination			X	X		X
Protection Relay Setting Sheet				X	X	X
Arc Flash Study			X	X		X
Harmonics and Perturbation Study			X	X		X
Lightning and insulation coordination Study		X	X	X		X
Grounding Study			X	X		X
Impact Study			X	X		X

8.7.1.1 Short-Circuit Study

The Short-Circuit Study shall include as a minimum the following aspects:

- Maximum available short-circuit for equipment design;
- Minimum available short-circuit for protection and arc flash study; and
- Minimum and maximum Short-circuit contribution from each source for protection coordination study.

8.7.1.2 Protection Philosophy

The protection philosophy shall cover as a minimum the following aspects:

- Protection strategy for discriminating each fault location;
- Protection strategy to reduce at the lowest possible arc flash exposition; and
- Protection strategy to mitigate impact of the ESS on St-Lucia electrical grid.

8.7.1.3 Protection Coordination Study

The protection coordination study shall cover as a minimum the following aspects:

- Calculation and explanation of each protection choice and setting;
- Typical protection coordination curve for each different type of connection; and
- Voltage and frequency protection range and setting.

8.7.1.4 Protection Relays Setting Sheet

Protection setting sheet shall be produced for each protection relays to be programmed into the relays at commissioning.

8.7.1.5 Arc Flash Study

An arc flash study shall be provided. The study shall present the arc flash level of each operable equipment at above 150 V Phase-To-Ground AC and DC. Arc flash and electric shock label shall be put on every equipment part of the study.

8.7.1.6 Harmonics and Perturbation Study

An harmonics and perturbation study shall be performed for the scope of supply of the present contract in accordance with the requirement of IEC 61000.3.6. The study shall cover as a minimum the following aspects:

- Harmonics emission level up to the 50^{th} harmonics;
- Current unbalance;
- Total current distortion;
- Voltage Unbalance;
- Voltage variation; and
- Flickers.

8.7.1.7 Lightning and insulation coordination Study

The lightning and insulation coordination study shall cover as a minimum the following aspects:

- Establish the voltage operating range of the system. The system shall at least operate continuously for +/-10% of the nominal voltage;
- Establish the voltage continuous limit;
- Confirm insulation level of equipment is adequate for transient overvoltage; and
- Confirm sizing of arresters.

8.7.1.8 Grounding study

The grounding study shall cover as a minimum the following aspects:

- Step and touch potential; and
- Equipment grounding is sufficient for the short-circuit level.

8.7.1.9 Impact Study

The Impact study shall cover the following aspects:

- Impact on the Voltage of a disconnection from the rest of the grid; and
- Impact on the voltage on the inrush of the transformers.

8.7.2 Protection and Control

The Contractor shall supply as a minimum the following documents:

Table 11:Deliverable Submissions for Engineering Design at Design Gates

Deliverable	Proposal package	30%	60%	90%	IFC	As Built
Single Line Diagram						
Main SLD	X	X	X	X	X	X
Auxiliaries SLD			X	X	X	X
DC SLD			X	X	X	X
Network Communication		X	X	X	X	X
Fire Alarm Riser			X	X	X	X
CCTV			X	X	X	X
Access Control			X	X	X	X
Schematics						
Circuit breaker control			X	X	X	X
Protection relay			X	X	X	X
Three Line Diagram			X	X	X	X
PCS			X	X	X	X
Others			X	X	X	X
Logic Diagram						
Protection relay			X	X	X	X
Inverter			X	X	X	X
Wiring Diagram						
Switchgear				X	X	X
PCS				X	X	X
Interconnection				X	X	X
Cable list				X	X	X
Others				X	X	X
Programming						
Protection relays setting file					X	X

Every system that requires control or protection shall be represented in a drawing submitted by the Contractor.

8.7.3 Electrical Layouts

The Contractor shall supply as a minimum the following documents:

Table 12: Deliverable Submissions for Electrical Layouts at Design Gates

Deliverable	Proposal package	30%	60%	90%	IFC	As Built
Layout						
General Site	X	X	X	X	X	X
Electrical Room		X	X	X	X	X
ESS Yard	X	X	X	X	X	X
Cable routing			X	X	X	X
Grounding			X	X	X	X
Lighting and services			X	X	X	X
Elevations and details			X	X	X	X

8.7.4 Electrical Balance of Plant

8.7.4.1 Control Building

The Contractor shall design, supply, install and commission a complete control building that will house the main switchgear, the EMS and auxiliary power distribution.

The control building shall be as described in the technical specification part of this RFP.

8.7.4.2 Electrical power distribution

The Contractor shall design, supply, install and commission a complete electrical power distribution system that will connect the ESS to the LUCELEC Grid.

The electrical power distribution system shall consist of the following equipment:

- Main switchgear as describe on the proposed single line diagram and the technical datasheet in Schedule L– Contractor Datasheet – Switchgear Tab, part of this RFP.
- ESS transformer shall be sized by the Contractor to ensure the short-circuit level at the secondary is not higher then 40 kA for safety purpose.

The connection between the main switchgear and the transformers shall be by underground cables sized accordingly by the Contractor. The size indicated on the single line diagram is for information only.

The connection between the ESS transformers and the ESS containers shall be by a cable bus system. The Contractor can propose another alternative subject to the LUCELEC's Approval.

8.7.4.3 Auxiliary power

The Contractor shall design, supply, install and commission a complete auxiliary power system that will power the control building along with the ESS containers.

The auxiliary power system shall consist of two (2) auxiliary transformers connected to the main switchgear in a redundant configuration. One (1) on each side of the main switchgear TIE breaker. The entire system shall be fully functional while one of them is off-line.

Contractor shall use circuit breaker in panel board and distribution panel for its distribution. Fuses shall be used only on LUCELEC's approval.

8.7.4.4 Grounding

The Contractor shall design a complete grounding system for the ESS plant. The Contractor can connect to the nearby Solar Farm grounding grid.

8.7.4.5 Protection and Control

The Contractor shall design, supply, install and commission a complete protection and control system for the entire ESS.

The protection and control system shall be powered by a redundant uninterruptible source.

8.7.4.6 Data Communication

The Contractor shall design, supply, install and commission a complete data communication system for the entire ESS.

8.7.4.7 Lighting

The Contractor shall design, supply, install and commission a complete lighting system for the entire ESS.

The exterior lighting system shall be design to facilitate the site circulation without contributing to the ambient light pollution of the neighbourhood.

8.7.4.8 Access Control

The Contractor shall design, supply, install and commission a complete access control system for the entire ESS.

The access to the control building and each container shall be control by card reader. Access to the site through fence shall be by key.

8.7.4.9 CCTV

The Contractor shall design, supply, install and commission a complete CCTV system for the entire ESS.

The site access, control building and container entrance shall be monitored by camera connected to the LUCELEC remote system.

8.8 Civil and Structural Engineering

The Contractor shall supply all the civil and structural engineering required for the design and construction of the ESS.

8.8.1 Studies and Survey

The Contractor shall supply as a minimum the following documents, as shown in Table 13:

Table 13: Documents and Drawings Required based on Design Package

Deliverable	Proposal package	30%	60%	90%	IFC	As Built
Survey						
Topographical Site Survey	X	X	X	X	X	X
Soil Survey	X	X	X	X	X	X

8.8.1.1 Topographical Site Survey

The Topographical site survey shall cover the following aspects:

- 10 meter beyond property line of the project;

8.8.1.2 Soil Survey

The soil survey shall cover the following aspects:

- Soil Resistivity test as per Wenner method.

8.8.2 Layouts

The Contractor shall supply as a minimum the following documents as shown in Table 14:

Table 14: Documents and Drawings Required based on Design Package

Deliverable	Proposal package	30%	60%	90%	IFC	As Built
Layout						
General Site	X	X	X	X	X	X
Electrical Room			X	X	X	X
ESS Yard	X	X	X	X	X	X
Access Road		X	X	X	X	X
Drainage			X	X	X	X
Elevations and details			X	X	X	X

Further details on the Electrical Engineering Services and Requirements are outlined in Schedule F – Site Preparation and Civil Works Specification.

Reference reports (geotechnical, topographical, and hydrological information) and an indicative layout drawing, that can be used as inputs for the civil and structural design, are attached in Schedule J - Reference Reports and Drawings. The reference drawings are provided for information only.

8.8.3 Civil Work

Construction of civil works required for the installation of the proposed equipment as per drawings and specifications, including:

- Site Preparation;
- Site Excavation and Backfill;
- Grading;
- Drainage;

- Surface drainage;
- Fencing and site security; and
- Trenching.

8.8.4 Structural Work

Construction of structural works required for the design and installation of the necessary foundations and structures, including:

- BESS Container Foundations;
- PCS Foundations;
- Transformer Foundations and Vault;
- Control Building Foundations;
- Foundations for any other major equipment; and
- Cable Trays, if required.

8.9 Procurement

The Contractor is responsible for the procurement of the equipment part of its scope of supply.

8.10 Construction Management

The Contractor is responsible for the construction management of the project.

8.10.1 Planning

The Contractor is responsible for the planning of the construction and survey works.

The Contractor shall provide an updated schedule and a progress report at least once every two week throughout the construction period.

8.10.2 Health and Safety

The Contractor is responsible for the health and safety during the construction and survey works.

The Contractor shall provide a complete Health and Safety Plan including risk analysis and mitigation measures. A basic plan shall be supplied along with the proposal.

8.10.3 Environment

The Contractor is responsible for the environmental respect during the construction and survey works.

The Contractor shall provide a complete environmental plan including risk analysis and mitigation measures.

8.10.4 Quality

The Contractor is responsible for the quality during the construction and survey works.

The Contractor shall provide a complete quality and inspection plan including risk analysis and mitigation measures.

8.11 Commissioning

The Contractor is responsible for the commissioning of the entire ESS system and its interconnection with the LUCELEC Grid.

The Contractor shall provide a complete commissioning plan test sheet for all equipment and cable of the project.

8.11.1 ESS and EMS Testing Plan and Commissioning

The Proponent's Bid should include a summary description of the Site Work including Installation, Commissioning, Site Acceptance Test (SAT), and Site Commissioning Personnel Plan. The quotation should be inclusive of all the cost to perform these activities.

The testing plan should include testing of all equipment, including any protections and control equipment supplied by the Contractor. The protection and control equipment shall be connected and tested as a subsystem in the factor using conditions identical to those expected on site.

The acceptance testing plan shall demonstrate at minimum the following:

- Safe and reliable operation of the system under normal operation and anticipated contingency/fault scenarios.
- Rated power throughput test (MW and Mvar) and performance fine tune.
- Energy cycling performance tests (including efficiency).
- Performance of the ESS to meet the production guarantees (7.5 MW at 0.9 PF (8.4 MVA) discharge for 30 min at the point of connection).
- Special control function tests.
- Protection schemes tests.
- ESS can perform all use cases outlined in the RFP:
    - Respond to PQ setpoints from LUCELEC System Operations
    - Respond to a frequency deviation on the grid based on its configured deadband and droop curve
    - Respond to a voltage sag/deviation on the grid based on its configured deadband and droop curve
    - Provide reactive power to the grid based on PQ setpoint from LUCELEC Operations
    - Initiated blackstart of the grid, including self-energizations, energization of the switching station, and energization of the underground distribution connection to Vieux Fort Substation.
- Demonstrate the Energy Management System functionality including:

- Individual control function tests.
- Combined control function tests.
- Settings modifications tests.
- Protection scheme tests.
- Remote access tests.

The Contractor shall prepare a Commissioning and SAT testing plan for review and approval by LUCELEC and its Representative. It is expected at minimum IEC testing protocol will be included, as well as industry standard testing for batteries, inverters, controls, and P&C.

Additionally, the Contractor should prepare an Inspection and Test Plan (ITP) for installation and commissioning. The ITP will be reviewed and approved by LUCELEC and its Representative.

The Contractor shall advise LUCELEC immediately should any failures take place during the FAT, commissioning or SAT tests and take remedial action. The Contractor shall repeat any tests which LUCELEC deems may have been impacted by the failure or the fix for the failure.

8.12 Work at Vieux Fort Substation

The Contractor shall perform the following work at the Vieux Fort Substation (VFSS):

- The Contractor shall first disconnect the Vieux Fort and Pierrot Feeders cables from the 11 kV switchgear at Vieux Fort substation.
- The underground cable and fibre optic from the ESS site up to the Vieux Fort substation is already installed by LUCELEC.
- The Contractor shall bring the cables (2 x 3c-240mm^2) looped on the ground at the Vieux Fort Substation inside the existing switchgear section (Vieux Fort and Pierrot Feeders) and connect them. Cable termination shall be supplied, installed and tested by the Contractor. Any cable support or tray is the responsibility of the Contractor.
- The Contractor shall design, install and connect a new protection relays panel including the new current differential protection relays (GE P543) for each feeder. The existing protection relays (GE P141) on the switchgear shall be used as back-up protection in the protection scheme. The differential protection scheme will use an existing fibre optic cable, that is installed between VFSS and the ESS site, as the communication medium. The same protection scheme shall be implemented at the ESS site for the same feeders.
- The Contractor shall include in its protection coordination and Arc Flash study this new protections relay and switchgear section.
- The Contractor shall produce all the protection relay setting file and perform the complete commissioning.
- The Contractor shall terminate the new fibre optic link in a patch panel at the Vieux Fort substation. Dedicated fibre optic shall be used with the protection relay to achieve the feeder current differential protection.

- The Contractor is responsible to confirm if the existing 300:1A Current Transformer inside the switchgear is acceptable for the new system. If its not then the Contractor shall supply and install new current transformer accordingly.

8.13 Battery Limits (Boundary of Scope of Supply)

8.13.1 Vieux Fort Substation

At Vieux Fort Substation the battery limits/scope boundaries are:

- Existing switchgear section and circuit breaker;
- Installation of new relays and possibly a new relay panel at the substation. Work will also involve commissioning a fibre optic link for differential protection.
- Feeder cable to the ESS connection only.

8.13.2 ESS Site

At the ESS site the battery limits/scope boundaries are:

- Cables for all feeders are by others except the cable for the ESS themselves.
- Connection of Vieux Fort Feeder and Pierrot Feeder by Contractor.
- Connection of two cables from the Vieux Fort Substation
- Installation of all Equipment Supplied by the Contractor.
- Site Acceptance Testing.
- Spare Parts supply for all Contractor Supplied Equipment.
- Documentation and Manuals for Supplied Equipment:
    - Equipment Drawings
    - AC & DC Schematic Drawings
    - Commissioning Manual
    - Decommissioning/Reclamation Manual
    - Emergency Response Plan
    - Maintenance Manual
    - Safety/Lock-out/Tag-out Procedures/Requirements
    - De-Energization Manual
    - Personal Protective Equipment and Safety Manual
    - Signage, Tagging, Labelling and Nomenclature of Contractor supplied equipment
    - Software Manuals
    - Start-up manual

  - Transportation Manual
- Any components or equipment not explicitly referenced but necessary for the safe and automated operation of the equipment.

8.14 Out-of-scope

The following items are considered outside of the scope of work:

- Installation, pre-commissioning, and commissioning of all LUCELEC supplied apparatus.

8.15 Progress Reporting

8.15.1 Weekly Updates

During the performance of the Work, weekly meetings or conference calls will be held for reviewing the progress of the Work, the latest progress reports and the Critical Path Schedule.

8.15.2 Monthly Progress Reporting

The Contractor shall prepare and submit to LUCELEC monthly written progress reports on the progress and status of the Work compared to the Critical Path Schedule, the status of Equipment and other scheduled deliveries, the Subcontractors' activities and engineering, permitting, procurement and construction progress (the "**Monthly Progress Report**"). Each Monthly Progress Report will provide cost information regarding back charges and a summary of any changes executed by the Parties.
The Contractor shall promptly provide LUCELEC with written notice of a delay at any time that the Contractor becomes aware of a material delay or expected delay in any aspect of the Critical Path Schedule.

8.16 Working Schedule & Mandatory Training

8.16.1 Working Schedule

The Contractor shall define its own work schedule. Please provide details for the planned work schedule in the bid documentation. Proponents work schedule should ensure that the project can be completed in the proposed timeline.

8.16.2 Mandatory Contractor Training

8.16.2.1 LUCELEC Orientation

The Contractor's team will need to complete a Job Analysis Form and submit it to LUCELEC prior to starting any work.

Additionally, the Contractor's team will need to complete the LUCELEC Safety Orientation prior to starting work at the site. This should be coordinated with LUCELEC in order to appropriately schedule the training. The training will be one day in length.

8.16.3 Site Working Requirements

The Contractor shall ensure all duties and activities performed on site are in compliance with applicable acts, codes, permits, and regulations including but not limited to the following:

- LUCELEC Safety Rules;
- Workmen's Compensation Ordinance Act; and
- Saint Lucia Employees Occupational Health and Safety.

LUCELEC's Health and Safety Requirements are included with this procurement package in Schedule H – LUCELEC Design Criteria and Standards: Health and Safety Requirements.

8.16.4 COVID-19 Protocol

Given the continually changing landscape of the COVID-19 Pandemic, the Contractor's staff will be expected to follow LUCELEC's COVID-19 protocols during all site work.

LUCELEC will provide the most up to date COVID-19 protocols to the Contractor before the site visit.

The Contractor will also be expected to follow any entry requirements for St. Lucia due to COVID-19 restrictions. Current entry requirements for visitors to St. Lucia can be found at COVID-19 | Saint Lucia Tourism Authority (stlucia.org). The Contractor shall review the requirements prior to mobilization of its team and ensure that all entry requirements are followed.

8.17 Deliverables

8.17.1 Bid Information

The Proponent's Proposal shall contain the following information. Any Proponent's exceptions to technical specifications shall be made in writing, attached to its Proposal and make reference to points in the specifications attached herein. Proposals with incomplete or missing information will not be considered. All documents submitted as part of the bid must be appended to the Proposal. Materials attached with links to other locations (websites, online file repositories, etc.) may not be reviewed.

The Proponent's Proposal will be evaluated based on technical compliance, ability to meet the schedule and lifetime cost of their proposed solutions including CAPEX, OPEX and Battery Augmentation Costs.

- Energy System Overview:
    - Major Equipment List/Bill of Materials, including identification of the manufacturer, model, type, ratings and number of all major components.
    - Applicable datasheets, technical specifications and manuals.
    - Technical information on the battery cells proposed for the installation – from the manufacturer.
    - Overall System Architecture.

- System Management and Control Description:
  - Measurement functions.
  - Monitoring functions.
  - Controlling functions.
  - Communication for integration with other systems.
  - System protections.
  - User Interface.
  - Data logging & tag list.
- Data System Architecture.
- Battery Management System Controller Description:
  - Alarms.
  - Failures modes.
  - Fire/gas Detection and Suppression System Descriptions and Type.
  - HVAC.
- Product roadmaps.
- Safety and Quality Plans and Policies.
- Duty Cycle Performance and Availability.
- Round trip efficiency.
- Aging and life time characteristic of the battery as a function of cycles (small charge and discharge and deep discharge).
- Rate of energy losses over time.
- System Track Record and References.
- Detailed cost breakdown.
- Delivery schedule.
- Yearly maintenance requirements and typical maintenance contract.
- Level of effort for all maintenance tasks, including number of technicians and number of hours per task.
- Estimated cost of parts for annual preventative maintenance.
- Hourly rate for service call.
- Warranty and terms of payment.
- Description of decommissioning and reclamation requirements.

- Energy Management System Overview and all information requested in this package:

- Major Equipment List/Bill of Materials, including identification of the manufacturer, model, type, ratings and number of all major components. Specifically:
  - Hardware model of the main EMS PLC or industrial computer.
  - Software development environment of EMS.
  - Hardware model of any HMI server equipment.
- Applicable datasheets, technical specifications and manuals.
- Description of Event Recorder functionality.
- EMS Network System Architecture.
- Control System Description, including specific descriptions of how the system programming will meet the control functions defined in the Energy Management System specification. Other functions that shall be described are:
  - Measurement functions describing if direct (CT/PT) connections are used or networked measurements for specific ESS nodes.
  - Communication for integration with other systems.
  - Response time of EMS.
  - System protections.
  - User Interface.
  - Data logging & tag list.
- Data System Architecture.
- How redundancy is achieved in both software and hardware.
- Level of software code access to be provided to LUCELEC.
- HMI description including screenshots.
- Product roadmaps describing:
  - Previous versions of the software.
  - Previous bug fixes and impacts.
  - How software updates are completed by Contractor and how LUCELEC will be notified.
  - How Contractor will maintain compliance with NERC CIP requirements.
- Safety and Quality Plans and Policies.
- System Track Record and References.
- Detailed cost breakdown.
- Delivery schedule.
- Yearly maintenance requirements and typical maintenance contract.

    - Level of effort for all maintenance tasks, including number of technicians and number of hours per task.
    - Estimated cost of parts for annual preventative maintenance.
    - Hourly rate for service call.
    - Warranty and terms of payment.
- Balance of Plant:
    - Preliminary Design.
    - List of Exclusions.
    - Installation Plan.
    - Quality Control/Quality Assurance Plan Template.
    - Test Plan Template.
    - Health, Safety and Environmental Plan Template.
- Local Content.
- Sustainability Practices.
- Contractor Experience.
- Safety Track Record.
- Availability of Contractor Staff.
- Other Ongoing Projects.
- Pricing for Each Package.
- Proposed Commercial Terms and Conditions.

8.17.2 Contractor Datasheet Document

The Proponent is asked to fill in their responses in the Contractor Datasheet documents and submit with their bid included in Schedule L – Contractor Datasheet. Responses must be completed in the Datasheet. Datasheets with excessive use of "Refer to Section XX of Proposal" or links to other sites may be considered incomplete.

Appendix 1 – Form of Tender

FORM OF TENDER

To : **ST LUCIA ELECTRICITY SERVICES LIMITED** **SAN SOUCI** **CASTRIES** **ST LUCIA**	Name(s) of Tenderer: Address :

1 We, _____ (Name(s) in block letters) hereby offer and undertake on the acceptance of this tender to supply services as specified in the LUCELEC 'LUCELEC ESS Project' Request for Proposal.

2 Our Tender is fully consistent with and does not contradict or derogate from your Invitation to Tender or downgrade anything in your Requirement Specifications. You are entitled to reject our tender if it is inconsistent with or contradicts or derogates from the LUCELEC 'LUCELEC ESS Project' Request for Proposal invitation.

3 We undertake that we shall as and when required by you execute with you a formal agreement in the appropriate form incorporating the Conditions of Contract set out in this Invitation to Tender together with such further terms and conditions, if any, agreed upon between LUCELEC and us.

4 OUR OFFER IS VALID FOR 120 CALENDAR DAYS FROM THE CLOSING DATE OF THIS TENDER.

5 We agree that as and when requested by the ST LUCIA ELECTRICITY SERVICES LTD we shall extend the validity of this offer for one or more periods not exceeding in total _____ calendar months.

6 Our price (herein referred to as "the Contract Price") for the services to be supplied by us is _____.

7 A breakdown of the Contract Price for the goods and services is given in the cost proposal attached hereto.

8 We are registered/not registered* with _____ (Name of Government Registration Authority) under the following supply category/head(s) as specified in the Invitation to Tender:

Supply Category/Head	Financial Category	Expiry

9 We further undertake to give you any further information which you may require.

10 We warrant, represent and declare that we are duly authorized to submit, sign this tender, receive instruction, give any information, accept any contract and act for and on behalf of _____ (Insert name of company).

Dated this _____ day of _____, 20_____

Tenderer's (as *Principal/Agent) Company or Business Registration No:	Tenderer's official Stamp:

Authorized Signature

Name :

Designation :

(*Delete whichever is not applicable)

NOTICE: This Form duly completed MUST accompany every Tender Proposal. Any change to its wordings may render the Tender liable to DISQUALIFICATION.

Appendix 2 – RFP Receipt Confirmation Form

SCADA System Replacement

RFP Receipt Confirmation Form

Please return this form by e-mail to:

The Secretary
Tenders Evaluation Committee
St. Lucia Electricity Services Limited (LUCELEC)
Cul De Sac
Saint Lucia
E-mail: secretarytec@lucelec.com

We hereby acknowledge receipt of the RFP. We have read the document and advise that:

❑ we intend to submit a proposal on or before Friday 17th of June 2022 before 4:00PM

❑ we do not intend to submit a proposal.

Company: _____

Contact Person: _____

Title: _____

Street Address: _____

City: _____ **Country:** _____

Mailing Address, if different: _____

Phone Number: (___) _____ **Fax Number:** ___(___)___

E-mail Address(es): _____

Signature: _____ **Date:** _____

Appendix 3 – Price Schedules

Notes on Completion of Price Schedules

The price schedules are divided into separate Schedules related to each distinct area of work. The Schedules do not generally give a full description of the work to be performed under each item and Tenderers shall be deemed to have read the Technical Schedules and other Tender Documents and Drawings and otherwise to have satisfied themselves as to the complete scope of work to be included in each item prior to filling in the rates and prices. The entered rates and prices shall be deemed to include for the full scope as aforesaid, including overheads and profit.

If Tenderers are unclear or uncertain as to the scope of any items, they shall seek clarification from LUCELEC prior to submitting their bid.

Pricing

Prices shall be filled in the space adjacent to each line item giving the Price Breakdown as indicated in the Schedules. Any alterations necessary due to errors, etc. shall be initialled by the Tenderer.

Where there are errors between the total amounts given under the column for the Price Breakdown and the amount given under the Total Price, the former shall prevail and the alter will be corrected accordingly. Where there are discrepancies between the amounts stated in the figures and the amounts stated in words, the amounts stated in words shall prevail.

Items left blank will be deemed to have been included in other items. The TOTAL for each Schedule and the Total of the Grand Summary shall be deemed to be the total price for executing the Facilities and sections thereof in complete accordance with the Contract, whether or not each individual items has been priced. Where a ‘lump sum’ price is called for, the price quoted shall be inclusive of all materials, services, installation and commissioning price components.

Tender Pricing and Price Schedules

Tenderers shall offer a fixed price to carry out the complete works described in this specification. The contract price may however be adjusted in 2 specific cases, all referenced in the Scope of Work and in the Price Schedules.

- Unit Prices
- Optional Items

Unit Prices

For some items of equipment, the final quantity of items required will not be known until after the Award of Contract. For these items, where specified in the Scope of Work, Tenderers

shall provide a unit price per item, and the final contract price shall be adjusted in line with the quantity of the items LUCELEC decides are required.

The unit prices shall include all costs for the provision of the items including supervision, overheads and profit, site establishment, insurance, labour, plant, temporary works, etc.

Optional Items

Optional items are items which are preferred by the Purchaser, but may not be included in the contract if the cost of the items is excessive or if the functionality requested cannot be provided. Tenderers shall provide a price for the provision of all of these optional items.

Appendix 4 – Schedule of Deviations

Schedule of Deviations and Exclusions from the Specification

The Tenderer shall list hereunder any system or items of offered equipment that are not fully compliant with the Specifications or any requirements it has excluded. This schedule shall be completed and returned with the Tender for all material deviations and/or exclusions from the Specifications.

Specification Number	Reference Number	Description of Deviation	Explanation for Deviation

The Tenderer [……..] confirms that all offered systems and equipment are fully compliant with the specifications with the exception of the items listed in the above Schedule.

Name: _____

Company: _____

Position in Company: _____

Date: _____

Appendix 5 – Technical Schedules

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Appendix 6 – Term Sheet

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