



Request for Proposals (RFP) to Implement Solar Photovoltaic (PV) Systems with Battery Storage and Lighting Retrofit in Two (2) Public Schools in Lebanon

Energy Smart Mediterranean Schools Networks Project

ESMES (A_B.4.3-0123)

Financed in the framework of the ENI CBC Mediterranean Sea Basin Programme 2014-2020

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Prepared by the Lebanese Center for Energy Conservation (LCEC)
Beirut, Lebanon



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Table 1 RFP Overview

<p>Context of the RFP</p>	<ul style="list-style-type: none"> ▪ The implementation of grid-interactive solar photovoltaic (PV) systems with lithium battery storage and LED lighting retrofit for two (2) Public Schools in Lebanon (herein called the systems), under the Energy Smart Mediterranean Schools Network project (ESMES). ▪ ESMES is an EU funded project under ENI CBC Med Programme, that focuses on the optimization of energy consumption in public schools through innovative, monitoring-based renewable energy and energy efficiency (REEE) pilot actions. ▪ The budget of this activity is € 60,000 euros.
<p>ESMES Project Partner</p>	<p>The Lebanese Center for Energy Conservation (LCEC)</p>
<p>Required Service</p>	<ul style="list-style-type: none"> ▪ Under the supervision of LCEC, the contractor shall survey, design, supply, build, test, and commission the PV systems with battery storage, and in general be responsible for all aspects related to the good operation of the systems. ▪ The contractor shall also conduct a training of operators in each school after the commissioning of the systems. ▪ The contractor shall be responsible of the Operation and Maintenance (O&M) of systems for a period of one (1) year, following the issuing of the provisional acceptance certificate by LCEC. ▪ The contractor shall replace all existing non-LED with LED lights.
<p>Location of the Facilities</p>	<ul style="list-style-type: none"> ▪ George Sarraf Public School, Tripoli, North Lebanon ▪ Abi Samraa AlOula for Girls School, Tripoli, North Lebanon
<p>Eligibility Criteria for Participation in this Bid</p>	<ul style="list-style-type: none"> ▪ The bidder shall have at least three (3) years of experience in the design, supply, and installation of solar PV systems. ▪ The bidder shall have installed in Lebanon a minimum total solar PV capacity of 200 kWp. ▪ The bidder shall have at least designed, installed, and commissioned in Lebanon 20 solar PV with lithium battery storage systems.



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Expected Duration of Work	Two (2) months starting from the date of contract signature
Deliverables	Please check Section 5: Required Deliverables
Client and Supervisor of the Work	LCEC
Validity Period of Proposals	120 days
Currency	Euro (€)
Payment Terms	Please check Section 3: Contract Terms and Payments
Criteria for Contract Award	<ul style="list-style-type: none"> ▪ Completeness of the proposal; ▪ Administrative and technical responsiveness and full compliance of the proposal with the minimum specifications and requirements described in this RFP, annexes and addendums; and ▪ Best price.
Closing Date for Receipt of Bid Proposals	28 February 2023 at 2:00 PM
Submission Details	<p>One signed hard copy and one soft copy must be submitted in a sealed envelope included the technical and financial proposals both as well in sealed envelopes to the following address:</p> <p>The Lebanese Center for Energy Conservation (LCEC), Ministry of Energy and Water (MEW), Corniche du Fleuve, 1st Floor, Room 303, Phone: 00961 1 569101.</p>
Contact Details for Inquiries	<p>Emails to esmes.bids@lcec.org.lb</p> <p>Subject of the email: "ESMES PV Bid"</p>
Annex to this RFP	Forms



Section 1: Introduction

A. Bid Overview

1. The objective of this Request for Proposals (RFP) is for the Lebanese Center for Energy Conservation (LCEC) to procure roof-mounted grid-interactive solar PV systems with lithium battery storage and lighting retrofit in two (2) Public Schools in Lebanon: George Sarraf and Abi Samraa AlOula for Girls Pubic Schools.
2. The intent is to award the contract to one (1) qualified bidder.
3. The contractor shall retrofit all existing non-LED fixtures with LED light.
4. The contractor shall survey, design, supply, build, test, and commission the PV systems, and in general be responsible for all aspects related to the good operation of the systems.
5. The contractor shall also conduct a training of operators in each school after the commissioning of the systems.
6. The contractor shall be responsible of the O&M of systems for a period of one (1) year, following the issuing of the provisional acceptance certificate by LCEC.
7. The solar system shall be connected to the internal grid of each school at one (1) single connection point.
8. The excess of electricity produced shall be delivered to the national grid through net-metering mechanism.
9. The contractor shall provide all necessary documents for the net-metering applications and shall assist, to the extent reasonably possible, in the application procedure.
10. This proposed initiative shall eventually contribute in responding to the current power sector challenges specifically in public schools, through the adoption of clean and renewable energy.
11. This project is implemented under the Energy Smart Mediterranean Schools Network project (ESMES).
12. The funding of the two (2) solar PV systems with lithium battery storage is available for up to 90% of the project cost through ESMES project.
13. The remaining 10% share of project cost is available as co-financing through LCEC internal budget.



B. Background Information

About ENI CBC Med Programme

14. ENI CBC Med is the largest Cross-Border Cooperation (CBC) initiative implemented by the European Union (EU) under the European Neighborhood Instrument (ENI). Through calls for proposals, ENI CBC Med finances cooperation projects for a more competitive, innovative, inclusive and sustainable Mediterranean area.
15. Some of the main challenges addressed by projects selected for funding in the framework of the programme are the creation of innovative start-ups, the development of Mediterranean-wide economic value chains, the diversification of tourism, technological transfer, the inclusion of women in the labor market, better management of waste, water and coastal areas, and the improvement of energy efficiency in public buildings.
16. For more information, please refer to the following website:
<http://www.enicbmed.eu/about-us/the-programme-at-a-glance>

About ESMES

17. The Energy Smart Mediterranean Schools Network project (ESMES), is part of the ENI CBC Med Programme and focuses on the optimization of energy consumption in public schools through innovative, monitoring-based renewable energy and energy efficiency (REEE) pilot actions.
18. ESMES is being implemented in five (5) Mediterranean countries and it involves six (6) organizations: the Institute for University Cooperation (ICU) being the Lead Beneficiary, the Lebanese Center for Energy Conservation (LCEC) being the Project Partner in Lebanon, the German Jordanian University in Jordan, the National Agency for Energy Management of Tunisia, the Ribera Consortium of Valencia in Spain, and the Alcamo Municipality in Italy.
19. ESMES is expected to contribute to environmental protection, climate change adaptation and mitigation, by adopting the below specific objectives:
 - a. Increase civil society awareness and improve energy habits through the cross-border engagement of students in a sustainable use of energy resources in Jordan, Tunisia, Lebanon, Italy and Spain.
 - b. Reduce the energy consumption in public school buildings in the five (5) mentioned countries, through the introduction of cost-effective REEE solutions tailored to buildings energy loads, type and use, and climatic zone.



- c. Enhance capacities of national, regional and local institutions to plan and realize improved energy rehabilitations for higher energy sustainability of public buildings through cross-border cooperation.
20. ESMES will be implemented over a duration of four years starting September 2019.
21. For more information about the project, please visit the following website:
<https://lcec.org.lb/our-work/partners/ESMES>

Section 2: Administrative Information

A. Schools Details

Table 2 Location of Schools and Contact Details

School Name	District – Governorate	Site Coordinates	Contact Person
George Sarraf Public School	Tripoli – North Lebanon	34.41616756 35.8392465	Mr. Ahmad Harrouk Tel: 26-430500
Abi Samraa AlOula for Girls Public School	Tripoli – North Lebanon	34.41616756 35.8392465	Ms. Asmaa Darwish Tel: 26-440928
LCEC shall be informed of all the communications with schools at any time after contract signature.			

B. Site Visits

22. Interested bidders are invited to join LCEC in the technical site visits to the mentioned site.
23. The bidders are responsible for all site measurements and quantities that are necessary to design and quote the project.
24. The site visits schedule is provided below.
25. In case of any changes in the dates, LCEC will inform the bidders by email.

Table 3 Site Visits Schedule

School Name	Scheduled Visit
George Sarraf Public School	10 February 2023
Abi Samraa AlOula for Girls Public School	10 February 2023



C. Procurement Timetable

26. The following dates are set forth for informational and planning purposes; however, LCEC reserves the right to change the dates.

Table 4 Procurement Timetable

Issue Date of the RFP	6 February 2023
Questions Due Date	17 February 2023
Response Date to Questions	22 February 2023
Closing Date for Receipt of Bid Proposals	28 February 2023
Announcement Date of Winning Bidder	Within 15 working days of the closing date for receipt of bid proposals
Contract Signature Date	Within 10 working days of the announcement of winning bidder

D. Clarification Process

27. From the issue date of this RFP until the announcement of the winning bidder, bidders may contact LCEC **ONLY** by email to esmes.bids@lcec.org.lb in case of questions, comments, or suggestions, including the following in the email subject “ESMES PV Bid”.
28. LCEC assumes no responsibility for not answering questions comments, or suggestions whereby the bidder failed to include “ESMES PV Bid” in the email subject.
29. Oral questions will not be permitted.
30. LCEC assumes no responsibility for verbal representations made by its employees unless such representations are confirmed in writing and incorporated into the RFP.
31. Written responses to questions, requests for clarifications, or suggestions will be sent to all bidders on or before the date listed in the Procurement Timetable.
32. LCEC will share a list of questions and answers with all bidders.
33. If the questions, requests for clarifications, or suggestions pertain to a specific section of the RFP, the page and section number(s) must be referenced.



E. Amendment of the RFP and Withdrawal of Bid Proposal

34. LCEC may, at its discretion, ask any bidder for a clarification of its proposal which shall be submitted within a stated period. Any request for clarification and all clarifications shall be in writing.
35. If a bidder does not provide clarifications of the information requested by the date and time set in the request for clarification, its proposal may be rejected.
36. Should any company interested in submitting a proposal fail to provide its contact details to LCEC, LCEC shall not be responsible if such company fails to receive any updates to this document or clarifications relating thereto.
37. The bidder may withdraw its bid proposal prior to the closing date for receipt of bid proposals, by submitting a written request to withdraw to LCEC.
38. Electronic mail and faxed requests to withdraw will not be accepted. The bidder's withdrawal notice shall be prepared, sealed, marked, and sent by hand and followed by a signed confirmation from LCEC.

F. Submission of Bid Proposals and Validity Period

39. The bidder shall only submit one bid.
40. The deadline for the submission of proposals is as mentioned in the [Procurement Timetable](#).
41. All proposals received after the mentioned date and time will be rejected and will be returned unopened to the bidder.
42. LCEC may at its discretion, extend the deadline for the submission of proposals, in which case all rights and obligations of LCEC and the applicants subject to the previous deadline shall thereafter be subject to the deadline as extended.
43. Proposals must be delivered to the LCEC offices, no later than 2:00 PM, at the following address: Ministry of Energy and Water (MEW), Corniche du Fleuve, first Floor, Room 303.
44. The period of validity of proposal is 120 days and it starts on the closing date for receipt of bid proposals.
45. The period of validity of quotation is 120 days and it starts on the closing date for receipt of bid proposals.
46. In exceptional circumstances, LCEC may request the bidders to extend the validity of the proposal and quotation beyond what has been initially indicated in this RFP.



G. Bid Proposal Opening

47. LCEC will open bid proposals after the closing date for receipt of bid proposals as specified in this RFP.
48. The bid proposals will remain confidential until LCEC reviews all of the bid proposals submitted in response to this RFP and the LCEC announces a notice of intent to award a contract.
49. The financial offers will be kept sealed and will be opened in the presence of the qualified bidders, prior to announcing the winning bidder.
50. The date and time of the opening of financial offers will be communicated with qualified bidders by email.

H. Cost of Preparing the Bid Proposal

51. The costs of preparation and delivery of the bid proposal are solely the responsibility of the bidder.

I. Power of Attorney

52. The bid proposal shall be signed by the bidder or a person duly authorized to bind the bidder to the contract.
53. The latter authorization shall be indicated by a written power-of-attorney accompanying the proposal.
54. The power of attorney should authorize the person signing the forms and bid proposal to act as a representative on behalf of the bidder.

J. Reservation of Rights

55. At any time prior to the deadline for submission of proposals, LCEC may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, to:
 - a. Modify or withdraw from the RFP, or modify the provisions contained in the RFP, for any reason;
 - b. Select zero, one, or multiple bid proposal(s) in response to this RFP in order to enter into negotiations or execute an agreement;
 - c. Award contract to a bidder based on some or all criteria in this RFP, or additional criteria not specified in this RFP, or post-bid negotiations;
 - d. Waive any material or immaterial non-conformity in any bid received;



- e. Reject parts of the bid or the entire bid for any reason;
- f. LCEC shall have no obligation to provide a reason for rejecting a bid;
- g. Issuance of this RFP in no way constitutes a commitment by LCEC to award a contract.

K. Verification of Bid Proposal Contents and Reference Checks

- 56. The contents of a bid proposal submitted by a bidder is subject to verification.
- 57. Misleading or inaccurate responses shall result in disqualification.
- 58. LCEC reserves the right to contact any reference to assist in the evaluation of the bid proposal, to verify information contained in the bid proposal, and to discuss the bidder's qualifications and the qualifications of any party identified in the bid proposal.
- 59. LCEC reserves the right to obtain and consider information from other sources concerning a bidder, such as the bidder's capability and performance under other contracts.

L. Disposition of Bid Proposals

- 60. All bid proposals become the property of LCEC and shall not be returned to the bidder.
- 61. All information submitted by a bidder may be treated as public information by LCEC, following the conclusion of the selection process. However, commercially sensitive information may be made anonymous only if the bidder explicitly identifies it as commercially sensitive and detrimental to the bidder's financial or commercial position.

M. Joint Ventures, Consortiums, and Associations

- 62. Given the scale of implementation, bids submitted by a joint venture, consortium or association of two or more firms as partners will not be accepted.

N. Sub-contracting

- 63. The winning bidder shall not subcontract any portion of the works on the two (2) sites.



Section 3: Contract Terms and Payments

A. Method of Payment

64. All payments under the contract shall be made in fresh Euro (€).
65. The terms of payment shall be within thirty (30) days, after receipt and acceptance of invoice by LCEC.
66. The contract amount shall be disbursed upon achievement and approval of the corresponding milestones, in accordance with the below table.

Table 5 Payments

Milestone	Payment Percentage
Contract Signature and work order issued	40%
Completion and acceptance of civil, electrical, and mechanical works in the two (2) sites including Solar PV systems and lighting retrofit	30%
Commissioning and acceptance of all the works in the two (2) schools, after submitting the as-built documentation, O&M manuals, warranties, and conducting the training of operators	30%

B. Contract Period and Penalties

67. The contactor shall complete all the works including successfully commissioning the system, submitting the as-built documentation, and conducting the training of operators within two (2) months from the date of contract signature.
68. Subject to the contract, liquidated damages equal to one three-hundredths (1/300) of the contract value in €/day will apply to every working day of delay.
69. The bidder shall be forfeited the performance bond for non-compliance or inability to successfully complete the project in the proposed timeframe.
70. LCEC shall have the right to deduct from the performance bond the sums, expenses, liquidated damages, or compensation caused by the contractor.
71. The maximum period of delay for this contract shall not be more than one (1) month, after that, LCEC has the right to terminate the contract or take any other action it deems necessary to complete the works.



Section 4: Format and Content of Bid Proposals

A. Introduction

72. These instructions prescribe the format and content of the bid proposal and are designed to facilitate the submission and evaluation.
73. The bidder shall only propose one (1) specific design per site with well-defined components and configurations.
74. The submission of more than one (1) option for the design, components, brands, and/or configurations, will result in the disqualification of the bid.
75. Proposals shall be concise and only necessary documentation need to be submitted otherwise, this would negatively affect the evaluation.
76. Failure to adhere to the required format will result in the disqualification of the bid proposal.

B. General Instructions

77. The bidder shall prepare one (1) hard copy of the bid proposal.
78. The bid proposal shall be divided into two parts: (1) the Technical Proposal and (2) the Financial Proposal.
79. The Technical Proposal and the Financial Proposal shall be placed in separate envelopes.
80. Each of the two (2) envelopes must be sealed.
81. If any of the envelopes is not sealed and marked as required, LCEC will assume no responsibility for the misplacement of the proposal or its premature opening.
82. The bidder shall submit a CD containing a digital copy of the entire proposal (except the financial offer) as one searchable document in PDF format. The CD must be clearly marked to indicate the name of the bidder and the title of this RFP.
83. The entire bid proposal including the two (2) envelopes and the CD shall be sealed in another envelope (or a box if necessary to accommodate the size of the bid proposal).
84. If the Technical Proposal is in multiple volumes, the volumes shall be numbered in the following fashion: 1 of 4, 2 of 4, etc.
85. The envelopes shall be labeled with the following information:
 - a. RFP Title
 - b. Bidder's Name, Address, email, and Telephone Number
 - c. The Lebanese Center for Energy Conservation (LCEC), Ministry of Energy and Water (MEW), Corniche du Fleuve, 1st Floor, Room 303, Phone: 00961 1 569101.



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86. The bid proposal shall be typed or written in indelible ink and shall be signed by the bidder or a person duly authorized to bind the bidder to the contract.
87. The latter authorization shall be indicated by written power-of-attorney accompanying the proposal.
88. The bid proposal, as well as all correspondence and documents relating to the RFP shall be written in English language.
89. Supporting documents related to the power of attorney, the company incorporation, and the company financial situation and performance could be in Arabic.
90. Other supporting documents and printed literature that are part of the application may be in another languages, provided they are accompanied by an accurate official translation of the relevant passages into the English language, in which case, for purposes of interpretation of the application, the translation shall govern.
91. A proposal shall contain no interlineations, erasures, or overwriting except, as necessary to correct errors made by the bidder, in which case such corrections shall be initiated by the person or persons signing the proposal.
92. Evaluators will read the printed copy of the proposal. All evaluators may not have access to the internet; therefore, it is recommended not to include URLs, hyperlinks or other forms of internet-based content in the proposal.
93. Only necessary documents must be provided. Irrelevant datasheets, products certificates and other documents will negatively affect the evaluation of the proposals.

C. Technical Proposal

94. The technical proposal must be prepared and organized in three (3) parts.
95. All of the three (3) parts must be referred to by an indexed file separator.
96. Each of the three (3) parts should include the required information as per the details and order of documents provided below.

Table 6 Technical Proposal Format and Content

<p>Part 1</p>	<p>Forms – completed, signed, stamped and submitted with all supporting documents. Any alternate text in any of the forms, shall result in the disqualification of the bid proposal.</p>	<ul style="list-style-type: none"> - Power of attorney, if applicable - Form 1: Letter of Application - Form 2: Applicant Information Form – copies of articles of incorporation or equivalent, and/or documents of registration of the legal entity to be attached. - Form 3: Bid Bond – to be made payable in cash to the LCEC to the amount of 4,000 USD. - Form 4: Relevant Experience - Form 5: Financial Situation and Performance for the years 2020, 2021 and 2022 with supporting documents. - Form 6: Team Composition and Tasks Assignment – CV of each team member to be attached. - Form 7: Performance Bond – Cash Retention – the bid bond shall be returned after signing the contract with the winning bidder and a performance bond will be entered, equivalent to 10% of the contract amount in Euro (€). - The bidder shall be forfeited the performance bond for non-compliance or inability to successfully complete the project in the proposed timeframe. - At this stage, the bidder shall provide a copy of the template Performance Bond, signed and stamped, thus confirming a commitment to execute a performance bond, as per the template, before signing the contract. - Form 8: Performance Guarantee Letter - Form 9: Warranty Form
<p>Part 2</p>	<p>Full design and specifications with</p>	<ul style="list-style-type: none"> - Project Timeline.



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	<p>datasheets, drawings, and certificates</p> <p>The bidder shall only propose one specific design per site, with well-defined components and configuration</p>	<ul style="list-style-type: none"> - System description and components selection per site. - Software simulation report showing the sizing, shadowing scenes, energy and data analysis of the solar PV system with battery storage per site. - A layout plan indicating the structure of modules, number of modules, dimensions of arrays, tilt and orientation, distances between rows, passages, and clearance from parapets per site. - Single Line Diagram (SLD) including panels, inverters, protection devices, and earthing per site. - Lightning protection layout per site. - Stringing summary and layout per site. - Civil design notes based on wind loads as per Lebanese Standard NL 137:2020 for each facility, signed by a civil engineer member of the Order of Engineers and Architects of Beirut or Tripoli. - Declaration of the civil engineer that the solar system does not affect the structural safety of the building. - A copy of the membership card of the civil engineer in the Order of Engineers and Architects of Beirut or Tripoli. - Datasheets of mounting structures, panels, inverters, batteries, DC/AC cables, DC/AC protection devices, sensors and monitoring equipment, etc. - Certificates for standards compliance.
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<p>Part 3</p>	<p>Two (2) Unpriced Bill of Quantities (BoQ), one for each site</p>	<ul style="list-style-type: none"> - Detailed BoQ per site, showing a clear list of components with description, quantities, specifications, country of origin, manufacturer of equipment, references of products, materials, tools, operation, training, and maintenance, etc. - The submission of more than one (1) option for a specific component will result in the disqualification of the bid. - If the bidder decides to mention instead of the specific products references the terms “similar”, “equivalent”, or “superior function” for the design, products, performance, and/or configurations, the proposal will be rejected. - The list of proposed components shall be included without any pricing.
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D. Financial Proposal

97. The financial offer should be submitted in a separate sealed envelope.
98. The financial offer should be divided into two (2) sites.
99. The financial offer should indicate the quoted items per each site.
100. The bidders must quote the prices for all the components referred to in their submitted solution and BoQs.
101. The financial offer must be submitted in Euro (€) and exclusive of VAT.
102. If any item is needed during installation, commissioning, or operation and was not stated in the offer, then it is the bidder's responsibility to provide at no additional cost.
103. For each system, the price of the contract is a lump sum. The bidder's total remuneration shall be a fixed lump-sum including all staff costs, subcontractor's (if any) costs, printing, communications, travel, accommodation, and the like, and all other costs incurred by the bidder in carrying out the services.
104. At any time during the validity of the financial offer, no price variation due to escalation, inflation, fluctuation in exchange rates, or any other market factors shall be accepted by LCEC after it has received the financial offer.

Section 5: Required Deliverables

105. The professional assignment shall include the tasks mentioned in the following points.
106. LCEC shall always be informed about any activity initiation or progress on site by email.
107. The contractor's site supervisor shall always be present on site during the implementation of activities.
108. LCEC may ask for progress reports to be submitted throughout the period of the contract, identifying potential risks, signaling any delays in deliverables, and providing updates on relevant components and activities.
109. The reports should be comprehensive and written in proper prose. The language should be clear, concise and understandable.
110. The performance measurements shall be accompanied with quantitative and qualitative indicators.
111. International System of Units (SI) must be used in all parts of the reports.
112. All calculations in the submitted reports should be checked for mathematical accuracy.
113. The expected deliverables are provided in the table below.

Table 7 List of Deliverables

Deliverable 1	Report of project working plan with time schedule and Gantt chart for the execution of the works and submission of detailed systems design, drawings, datasheets, and BoQs per site	Within one (1) week of contract signature
Deliverable 2	On-site supply and delivery of components	Within two (2) weeks of contract signature
Deliverable 3	Civil and concrete works on site completed	Within three (3) weeks of contract signature
Deliverable 4	PV mounting completed	Within four (4) weeks of contract signature
Deliverable 5	Electrical and communication works completed	Within four (4) weeks of contract signature
Deliverable 6	All components installation finalized	Within five (5) weeks of contract signature
Deliverable 7	Acceptance tests performed and punch list submitted	Within seven (7) weeks of contract signature
Deliverable 8	Punch list completed, commissioning and performance tests conducted	Within eight (8) weeks of contract signature
Deliverable 9	As-built documentation submitted, warranties, O&M manual and training of operators conducted	Within eight (8) weeks of contract signature
Deliverable 10	Lien waiver submitted by contractor and provisional acceptance certificate issued by LCEC	Within eight (8) weeks of contract signature
Deliverable 11	One (1) year O&M for the two (2) systems, followed by a final acceptance certificate issued by LCEC and performance bond returned	Within eight (8) weeks of contract signature



Section 6: Evaluation of Bid Proposals

A. Introduction

114. This section describes the evaluation process which will be used to determine the winning bidder.
115. The proposals shall be reviewed based on the following:
- Completeness of the proposal;
 - Administrative and technical responsiveness and full compliance of the proposal with the minimum specifications and requirements described in this RFP and addendums; and
 - Best price.
116. The proposal will undergo a three-stage evaluation, with the evaluation of the technical proposal being completed prior to any price proposal opening.
- Stage 1: Administrative and Technical Qualification;
 - Stage 2: Financial Offers Comparison;
 - Stage 3: Negotiation and Contract Signature.
117. Stage 1 evaluation will be based on the compliance with all terms of this RFP and Annexes.
118. The evaluation committee will reject proposals that do not meet all the qualification criteria.
119. Bidders who pass the Stage 1 evaluation will proceed to Stage 2 Financial Offer Comparison.
120. The bidder who passes Stage 2 will proceed to Stage 3 Negotiation and Contract Signature.

B. Stage 1: Administrative and Technical Qualification

121. LCEC shall disqualify proposals for any of the below reasons.
122. The bidder profile does not meet all the minimum qualification criteria.
123. The bidder does not meet the minimum technical specifications.
124. The bidder does not meet the administrative requirements.
125. The bidder submits incomplete forms.
126. The bidder fails to deliver the bid proposal by the due date and time.
127. The bidder fails to deliver the financial proposal in a separate sealed envelope.



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128. The bidder fails to include information necessary to substantiate that it will be able to meet the project requirements. A response of "will comply" or merely repeating the requirement is not sufficient.
129. If the bidder decides to mention instead of the specific products references the terms "similar", "equivalent", or "superior function" for the design, products, performance, and/or configurations.
130. The bidder fails to respond to the LCEC request for information, documents, or references.
131. The bidder fails to include any form, signature, certification, authorization, stipulation, disclosure or guarantee requested in the sections of this RFP or Annexes.
132. The bidder presents the information requested by this RFP in a format inconsistent with the instructions of the RFP.
133. The bidder fails to submit an offer based on full design, installation, commissioning, operation, training and maintenance of the two (2) sites.
134. The bidder provides misleading or inaccurate responses.
135. The bidder provides conflicting, contradictory, implausible (administrative and technical data or calculation) or in any other way misleading information.
136. The bidder fails to abide by any of the requirements stated in the RFP sections:

Table 8 Minimum Qualification Criteria

Qualification Criteria	Minimum Eligibility
Required System Size	At least 12 kWp solar PV array with 30 kWh Lithium battery storage at George Sarraf (Site 1) At least 12 kWp solar PV array with 20 kWh Lithium battery storage at Abi Samraa Al Oula for Girls (Site 2)
Minimum Guaranteed Performance Ratio per Site (to be detailed in Form 8)	83%
Company's Year of Incorporation	The commercial registration of the company shall not be later than January 2017.
Financial Capability	The bidder shall have a total revenue (turnover) of at least 120,000,000 LBP in 2022.
Past Relevant Experience (to be justified in Form 4)	<ul style="list-style-type: none"> ▪ The bidder shall have at least three (3) years of experience in the design, supply, and installation of solar PV systems.



	<ul style="list-style-type: none"> ▪ The bidder shall have installed in Lebanon a minimum total solar PV capacity of 200 kWp. ▪ The bidder shall have at least designed, installed, and commissioned in Lebanon 20 solar PV with <u>lithium</u> battery storage systems.
Team Members (to be justified in Form 6)	<ul style="list-style-type: none"> ▪ The project team shall at least include one (1) project manager, one (1) electrical engineer, one (1) civil engineer, and (1) site supervisor. ▪ One of the team members must have at least three (3) years of experience in the design, supply, and installation of solar PV with storage systems with at least ten (10) projects that are operational.

C. Stage 2: Financial Offers Comparison

137. Bidders who pass the Stage 1 evaluation will proceed to Stage 2 Financial Offer Comparison.
138. The financial offers will be kept sealed and will be opened in the presence of the qualified bidders, prior to announcing the winning bidder.
139. The bidder with the lowest price will proceed to Stage 3 Negotiation and Contract Signature.

D. Stage 3: Negotiation and Contract Signature

140. LCEC reserves the right to negotiate the proposed financial offer with the winning bidder before signing the contract.
141. In case the winning bidder does not sign the contract within thirty (30) days of the announcement of the award, then the LCEC reserves the right to disqualify the winning bidder and choose the next bidder, in such case the winning bidder will forfeit the bid bond.





Section 7: Technical Specifications


A. Important Notes

142. The sections below provide an overview on the facility and the minimum design specifications.
143. It is the bidders' responsibility to double check all the sites information and measurements, before submitting their proposals.
144. The minimum specifications of the solar PV systems with storage are mentioned in the table below.
145. Failing to comply with the minimum requirements will result in the rejection of the bid.
146. The contractor is responsible for providing the necessary studies and works to deliver the optimal design and construction of the two (2) solar PV systems with battery storage, including: sites preparation, study of the roof structures, design and study of support structures, study of the re-routing of electro-mechanical equipment, civil works, supply and installation of equipment, testing, commissioning, documentation, training, and one (1) year O&M.
147. The contractor shall use high quality, commercially viable solar PV panels, inverters, batteries, and related power equipment technologies that are certified as per international standards. In addition, the contractor shall use equipment that is widely deployed around the world in the solar industry and possesses a proven track record of reliability.
148. The solar PV systems should be able to run with EDL and diesel generator subscriptions, or private diesel generators, whichever sources are running in the facility.
149. The contractor shall comply with the most recent version of design and standards for all work, equipment and materials, including NL HD 60364-7-712:2017.
150. The contractor is responsible for all electrical works related to the lighting retrofit and motion sensor rewiring.
151. The contractor shall use high quality LED lights and motion detectors that comply with the specifications mentioned in the "LED Lighting Retrofit for the Two (2) sites" section below.
152. The contractor shall comply with all applicable Lebanese laws and regulations, and future amendments.

B. Sites Technical Information

Table 9 Sites Technical Information

Site 1	George Sarraf Public School
Google Maps Coordinates	34.41616756, 35.8392465
Climatic Zone	Coastal
Installation Location	Rooftop of the building
Google Maps Screenshot	
Site Photos	

Total Roof Area	Around 210 m ²
Building Height	20 m
Roof Parapet Height	1.1 m
EDL Subscription	3x40A
Generator Subscription	1x10A
ATS Availability	No
Earthing	Required
Lightning Protection	Required
Load Segregation	Not required
Site 2	Abi Samraa AlOula for Girls Public School
Google Maps Coordinates	34.41616756, 35.8392465
Climatic Zone	Coastal
Installation Location	Rooftop of the building
Google Maps Screenshot	
Site Photos	



Total Roof Area	Around 210 m ²
Building Height	20 m
Roof Parapet Height	1.1 m
EDL Subscription	3x40A
Generator Subscription	3x30A
ATS Availability	No
Earthing	Required
Lightning Protection	Required
Load Segregation	Not required

C. Minimum Technical Specifications

Table 10 Minimum Technical Specifications

General Requirements	
PV System Type	Grid-interactive PV system with lithium battery storage in the two (2) locations



Minimum Required System Size	<ul style="list-style-type: none"> ▪ George Sarraf Public School (Site 1) – 12 kWp solar PV array with 30 kWh Lithium battery storage ▪ Abi Samraa Al Oula for Girls (Site 2) – 12 kWp with 20 kWh Lithium battery storage
Net-metering	<p>Required as per EDL requirements for net-metering</p> <p>The contractor shall provide all necessary documents for the net-metering applications and shall assist, to the extent reasonably possible, in the application procedure.</p>
Control System	<p>Required to ensure the good and safe operation of the installed systems in the two (2) sites, including but not limited to power export limitation with generator’s subscription(s), diesel generators, or EDL.</p> <p>The control system shall also include at the inverter’s output, a physical disconnection devices in case of a malfunction or fault.</p>
Approval on Installation	<p>The contractor will be in charge of the preparation of the solar PV application to be submitted as per the Ministry of Energy and Water’s procedure for solar PV installations, and will be also responsible for the technical follow-up for approval</p>
Product Brands	<ul style="list-style-type: none"> ▪ Same brand and reference model for PV modules shall be selected for the two (2) sites. ▪ Same brand of inverters is recommended to be selected for the two (2) sites, unless the design and sizing require otherwise (justification is required in this case). ▪ Same brand of batteries shall be selected for the two (2) sites. ▪ All the other components shall be selected of the same brand (cables, protection devices, protection boxes, etc.).
Mounting Structure	
Type	Fixed-tilt type
Fixation	<ul style="list-style-type: none"> ▪ Either foundation-mount or ballasted-mount types (concrete density should be at least 250 kg/m³) ▪ Direct fixation into the roof is not allowed ▪ Any direct or indirect impact on the roof waterproofing, should be remediated
Material	<ul style="list-style-type: none"> ▪ Either hot-dip galvanized steel or aluminum ▪ The cutting edges and openings should be cold galvanized

<p>Design</p>	<ul style="list-style-type: none"> ▪ Nuts and bolts shall be stainless steel of grade SS 304 ▪ Mounting structure must be designed in a way to have the solar PV array oriented as much as possible towards the south and keeping enough passages for maintenance and cleaning (especially for the carport structure) ▪ East-west orientation of panels is not permitted ▪ The metallic structure must be installed while maintaining a buffer zone from the parapets of the roofs, for safer circulation and shading prevention ▪ In order to reduce the pressure on structure and foundation, clear spacing between two adjacent modules shall be sufficient to allow wind passage ▪ The structure shall be designed to allow replacement of any module ▪ The mounting structure shall be grounded properly
<p>Standards</p>	<ul style="list-style-type: none"> ▪ The mounting structure must comply with the decision number 32 of 2019 of the higher council for urban planning, which states that buildings lower than 15 m can install PV panels at a maximum elevation of 3 m, and buildings higher than 15 m can install PV panels at a maximum elevation of 4.5 m (with reference to the roof level, not the roof of the staircase or any room or element on the roof) ▪ The bidder shall provide civil design notes based on wind loads as per Lebanese Standard NL 137:2020, signed by a civil engineer member of the Order of Engineers and Architects of Beirut or Tripoli ▪ The bidder shall provide a declaration of the civil engineer that the solar system does not affect the structural safety of the building ▪ The bidder shall provide a copy of the membership card of the civil engineer in the Order of Engineers and Architects of Beirut or Tripoli
<p>Minimum Warranty</p>	<p>10 years</p>



Solar PV Modules	
Type	Monofacial, either monocrystalline or polycrystalline technology
Power Rating	At least 540 Wp per module
Power Tolerance	Positive
Efficiency	At least 20%
Orientation	South (as much as possible)
Inclination	Between 5° and 20°
Standards	Compliance with the following standards: <ul style="list-style-type: none"> ▪ NL EN 61730-1:2016 ▪ NL EN 61730-2:2016 ▪ NL EN 61215:2016
Minimum Warranty	The manufacturer should warrant the solar modules to be free from defects and/or failures due to manufacturing or quality of materials, for a period not less than 10 years from the date of sale to the customer
Spare Parts	10% of the total quantity of panels
DC Cables for PV Array	
General Specifications	<ul style="list-style-type: none"> ▪ Solar DC cables, copper conductor, halogen-free, double insulated, UV protected and fireproof, with IP67 MC4 connectors ▪ DC cables between the modules and the inverters section has to be sized to limit the total voltage drop in the DC circuit to a value less than 4% of its value at rated power
Routing	<ul style="list-style-type: none"> ▪ All DC wiring shall be installed so that it is mechanically and electrically sound and neat in appearance ▪ DC cables shall be routed from the PV array to the junction boxes, DC protection boxes, or inverters in covered UV resistant cable trays ▪ The cable trays shall be hot-dip galvanized and shall be equipped with all the needed brackets, clips, junctions, and accessories for installation and fixation ▪ Electric Metallic Tubing (EMT) conduits and cables glands shall also be used where advised by LCEC

- The outside corrosion protection of EMT conduits shall be zinc-based and the inside shall have an organic corrosion-resistant coating
- The cutting edges and openings of cable trays and cable conduits should be cold galvanized
- Induction loops must be avoided when cabling strings; it is highly recommended to use the skip-wiring method (also known as leap-frog) instead of the conventional daisy-chain method, as per the figure below (Source: UNDP DREG Best-Practices Guidelines and Lessons Learnt for On-grid and PV-diesel Hybrid Systems Guideline Report)

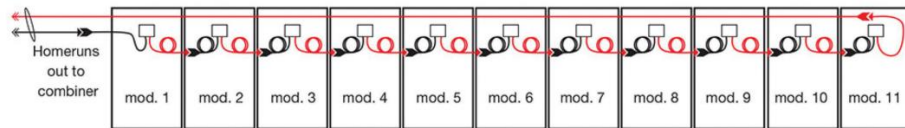


Figure 1a - Conventional daisy-chain wiring (Source: solarprofessional.com)

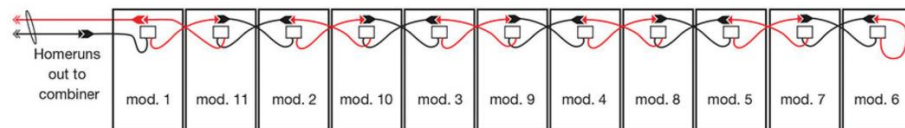


Figure 1b - Proposed skip-wiring method (Source: solarprofessional.com)

DC Protection Box

- The contractor is responsible for the supply and installation of a thermoplastic box for general DC load break of a PV array connected to a single inverter input, with the following requirements
 - Class II
 - IP54 for indoor use and IP65 for outdoor use
 - Includes general DC disconnect switch easily recognizable and readily accessible for disconnection
 - Includes suitable DC fuses on each (+) and (-) polarities of each string of panels
 - Includes easily accessible and adequately rated Type 2 SPD with fault signal and thermal disconnection at each DC input of the inverter

	<ul style="list-style-type: none"> ▪ Wiring inside the box shall be done with unipolar double insulated cables ▪ The DC protection box shall be equipped with appropriate safety, functionality, grounding and protection
Labeling	<ul style="list-style-type: none"> ▪ Each string of panels has to be properly labeled with the reference and corresponding polarity, every ten (10) meters and at the input and output of cables trays, junction boxes, DC protection boxes, protection devices, or inverters ▪ Each component installed within the DC protection box shall be labeled ▪ The DC protection box shall include the label “Warning: DC Energized Cables”
Standards	<p>Compliance with the following standards, or equivalent:</p> <ul style="list-style-type: none"> ▪ Compliance of DC cables with IEC 62930:2017 and EN 50618:2014 ▪ Compliance of MC4 connectors with IEC 61984:2008 and IEC 62852:2014 ▪ Compliance of DC protection box with IEC 60529 and IEC 62208 ▪ Compliance of circuit breakers with IEC 60947 (Part 1, 2, and 3) ▪ Compliance of SPD with with IEC 61643-11
Minimum Warranty	2 year-warranty on DC protection box and components
Inverter (s)	
Grid Type	<ul style="list-style-type: none"> ▪ George Sarraf (Site 1) – Three phase ▪ Abi Samraa Al Oula for Girls (Site 2) – Three phase
Topology	Transformerless
Coupling	Either AC or DC coupled, with the ability to inject the excess of energy into EDL grid
Inverter Loading Ratio (ILR)	Between 1 and 1.2
Nominal Output Frequency	<ul style="list-style-type: none"> ▪ 50 Hz +/-0.1% ▪ For on-grid operation, the frequency shall be adjusted to operate as per EDL grid requirements



Output Voltage	3L/N/PE, 220/380 Vac, 230/400 Vac
Power Factor	Adjustable from 0.8 leading to 0.8 lagging
Maximum Efficiency	At least 97%
Number of MPPT	At least 2
Maximum Total Harmonic Distortion	Less than 3%
Protection Required	<ul style="list-style-type: none"> ▪ The three-phase inverter should be able to realize 100% unbalanced phase-level output ▪ Anti-Islanding Protection (Integrated) ▪ DC Reverse Polarity Protection (Integrated)
Protection Degree	At least IP65 if placed outdoor At least IP 54 if placed indoor
Labeling	Each inverter shall be labeled with a sticker showing its reference number
Standards	Compliance with the following standards, or equivalent: <ul style="list-style-type: none"> ▪ NL EN 62116:2016 ▪ NL EN 61427-2:2017 ▪ NL EN 61427-1:2017 (if off-grid inverter) ▪ IEC 61000-3 or equivalent (parts 2,3,4,5,11 and/or 12 to be specified) ▪ IEC 62109-1 ▪ IEC 62109-2
Minimum Warranty	5 years
AC Cables	
General Specifications	<ul style="list-style-type: none"> ▪ Multipolar cables with double insulation (Class II) ▪ AC cables between the inverters and connection have to be sized to limit the total voltage drop in the AC circuit to a value less than 3% of its value at rated power
Routing	<ul style="list-style-type: none"> ▪ All AC wiring should be installed so that it is mechanically and electrically sound and neat in appearance

	<ul style="list-style-type: none"> ▪ AC cables shall be routed in covered UV resistant cable trays ▪ The cable trays shall be hot-dip galvanized and shall be equipped with all the needed brackets, clips, junctions, and accessories for installation and fixation ▪ EMT or PVC conduits and cables glands shall also be used where advised by the client ▪ The cutting edges and openings of cable trays and EMT cable conduits should be cold galvanized
<p>AC Protection Box</p>	<ul style="list-style-type: none"> ▪ The contractor is responsible for the supply and installation of a thermoplastic box for general AC protection box with the following requirements ▪ Class II ▪ IP54 for indoor use and IP65 for outdoor use ▪ Includes general AC disconnect switch easily recognizable and readily accessible for disconnection ▪ Includes adequately rated AC circuit breakers ▪ Includes adequately rated residual current devices ▪ Includes easily accessible and adequately rated Type 1 SPD with fault signal and thermal disconnection shall be installed at the grid connection point, if the distance between the inverter and connection point is less than 10m. ▪ If the distance between the inverter and connection point is more ten (10) meters, an additional Type 2 SPD with fault signal and thermal disconnection must be installed upstream the AC input of the inverter, as close as possible to the AC output of the inverter. ▪ The AC protection box shall be equipped with appropriate safety, functionality, grounding and protection
<p>Labeling</p>	<ul style="list-style-type: none"> ▪ AC cables shall be labeled with "AC solar power" cables every ten (10) meters and at the input and output of cables trays, junction boxes, AC protection boxes, protection devices, or inverters ▪ Each component installed within the AC protection box shall be labeled



	<ul style="list-style-type: none"> The AC protection box shall include the label “Main Switchboard”
Standards	<p>Compliance with the following standards, or equivalent:</p> <ul style="list-style-type: none"> Compliance of AC cables with IEC 60228, IEC 60332-1-2 and IEC 60502-1 Compliance of AC protection box with IEC 60529 and IEC 62208 Compliance of circuit breakers with IEC 60947 (Part 1, 2, and 3) Compliance of SPD with IEC 61643-11 Compliance of RCD with NL IEC 60364-4-41:2003
Minimum Warranty	2 year-warranty on AC protection box and components
Solar Charge Controller	
Type	MPPT
Output Voltage	48V
Charging Algorithm	3 stages
Protection Required	<p>Output short circuit</p> <p>Battery reverse polarity detection</p> <p>Over temperature</p>
Efficiency	At least 97%
Labeling	Each charge controller shall be labeled with a sticker showing its reference number
Standards	Compliant with NL EN 62509:2016, or equivalent
Minimum Warranty	5 years
Battery Bank	
Rated Voltage	48V
Battery Technology	<ul style="list-style-type: none"> Lithium The battery storage room should be well ventilated and might require the installation of an exhaust fan, as advised by LCEC
Nominal Battery Bank Energy (kWh)	<ul style="list-style-type: none"> At least 30 kWh Lithium battery storage at George Sarraf (Site 1) At least 30 kWh Lithium battery storage at Abi Samraa Al Oula for Girls (Site 2)



Roundtrip Efficiency	> 95%
Lifecycle (at 80% DoD, 25°C)	> 6,000 cycles
Operating Temperature	-20°C to 50°C
Status Indicators	ON/OFF LED – Run LED – Alarm LED – State of Charge LED
Standards	Compliance with the following standards, or equivalent: <ul style="list-style-type: none"> ▪ IEC 63056 ▪ IEC 62485-1:2015 ▪ IEC 60695-1-11:2014 ▪ IEC 61000-6-1 ▪ IEC 61000-6-2 ▪ IEC 62619
Protection Devices	Overcurrent and over temperature protection
Minimum Warranty	3 years
Weather Station	
Measurement Device	<ul style="list-style-type: none"> ▪ Supply and installation of one (1) calibrated pyranometer for global irradiation measurement. ▪ The pyranometer shall be installed with a tilt angle that is equivalent to that of the solar PV modules
General Specifications	<ul style="list-style-type: none"> ▪ Spectral range (wavelength): 285 to 3000 nm ▪ Maximum operational irradiance: 2000 W/m² ▪ Accuracy of bubble level: less than 0.2° ▪ Field of view: 180° ▪ Operating temperature range: from -40 °C to 80 °C ▪ IP67 ▪ Modbus communication
Routing of Communication Cables	<ul style="list-style-type: none"> ▪ The minimum separation between communication cables and power cables and routing, should be done as per the international best practices



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Standards	<ul style="list-style-type: none"> ▪ Compliant with IEC 61724-1:2017, or equivalent
Minimum Warranty	5 years
Remote Monitoring	
Data Readings	<ul style="list-style-type: none"> ▪ A data monitoring system shall be accessible locally and also remotely via the web ▪ The monitoring interface shall provide at least the following readings: <ul style="list-style-type: none"> - On site measured irradiation data - DC and AC power - DC and AC voltage - DC and AC current - Energy production (kWh) - Battery state of charge - Load flow to and from battery (charged or discharged) - Faults and alarms ▪ The contractor is responsible for the supply of all the needed components to connect the monitoring system to the internet available in the facility ▪ A data access for remote monitoring shall be provided to the owner ▪ At least 2 months of local logging and storage of historical data must be available at 10-minute intervals ▪ The operators shall have a free remote access to all the requested data, throughout the lifetime of the project (at least 20 years) ▪ No license purchase or renewal shall apply throughout the lifetime of the project (at least 20 years)
Communication	WIFI/LAN/RS485
Minimum Warranty	3 years on equipment, data acquisition softwares, and remote monitoring
Safety Signage	
<ul style="list-style-type: none"> ▪ Suitable signs to warn of electrical hazards associated with the presence of photovoltaic plants should be installed where necessary ▪ The material shall be anti-corrosive and durable 	



Labeling

Please check the labeling requirements in each section

Earthing

- The contractor is responsible for the installation of one (1) electrical earthing system for both sites, in the form of earthing rods, with a ground resistance value less than 5 ohms.
- The rods may be copper or copper-clad steel, one or two meters long.
- The distance between rods should be two or three times depth.
- The contractor is responsible for the interconnection of all the metallic parts of the plant, including but not limited to metallic structure, cable trays, panelboards, inverters, relevant protection devices, etc. on both DC and AC sides. The bonding connection must be connected to the main earthing terminal.
- The earthing and bonding cables have to be yellow-green colored.
- The earthing system shall be compliant with IEC 60364-7-712 - Low voltage electrical installations - Part 7-712: Requirements for special installations or location

Lightning

- The contractor is responsible for the supply and installation of one (1) complete external lightning protection system (LPS) for both sites.
- The contractor must keep a certain separation distance between the conductive parts of the solar PV system and the LPS, to prevent shadows, induced overvoltage, and arcing.
- If separation distance cannot be maintained, the metal components of the solar PV system must be connected to the LPS through a conductor with a cross-section of at least 16mm².
- The Lightning protection system should be implemented according to IEC 62305-3 and best practices for similar systems.
- The ground rods of the earthing system and lightning protection system should not be bonded.

Safety Requirements

- The solar PV systems with battery storage shall be designed considering the safety during the construction and operation especially:
 - Safety of workers
 - Safety of users
 - Safety for the equipment of the plant



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- Safety for existing infrastructures and systems
- Any intervention on the inverters must be possible in full electrical safety.
- The contractor is responsible for the supply, installation, and testing of the following components in the inverters/battery bank rooms:
 - Two (2) portable powder fire extinguisher (one (1) in each electrical room)
 - Two (2) standalone smoke detector with alarm (one (1) in each electrical room)
 - Two (2) standalone Hydrogen Fluoride sensor with alarm (one (1) in each electrical room)

Operation and Maintenance

- The contractor is responsible for the supply and installation of the following components:
 - One (1) weatherproof electrical socket for maintenance purpose
 - One (1) water access point next to the PV array, for cleaning activities
- The contractor shall be responsible of the O&M of systems for a period of one (1) year, following the issuing of the provisional acceptance certificate by LCEC and the successful commissioning of the systems.
- The contractor shall furnish all necessary staff, supplies, materials, and equipment needed for the O&M activities.
- The O&M activities will include:
 - Daily remote monitoring of systems performance, alarms and diagnostics
 - Preventive maintenance
 - Corrective maintenance to take the necessary remedial measures or exchange the failed components
 - Component replacement
 - Updates of documentation where applicable
 - Reporting to LCEC when requested
- The preventive maintenance shall be conducted twice per year with the presence of LCEC representatives, to inspect and maintain the PV array and mounting structures, the inverters/chargers, the batteries, the weather station, the remote monitoring, sensors, the wiring systems and enclosures, the connectors, the protection devices, the metallic parts, the earthing and lightning systems, in addition to the labels and signage.
 - During the preventive maintenance, the contractor shall check any visual defects, discolouration, corrosion, deterioration, or mechanical damage of the



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components and take the suitable remedial measures in coordination with LCEC.

- The contractor shall observe and ensure that the amount of power/energy being generated by the PV systems is typical of the conditions. The contractor shall compare current readings from the inverters with a diagnostic benchmark.
- The contractor shall make sure that there are no loose or missing panels clamps
- The contractor shall make sure that the enclosures show no signs of internal heating and that the fuses, holders and protection devices are still intact.
- The contractor shall verify the open circuit voltage and short circuit current to make sure that the system is still functioning correctly.
- The contractor shall make sure that the labels and signage are still visible, legible, and adequately labelled.
- Any proposed remedial solution has to be approved by LCEC, prior to taking any action on site.
- The contractor shall respond to field failures within 3 days from LCEC approval.

Testing and Commissioning

- The contractor is responsible for obtaining the necessary tools and conducting the testing and commissioning of the solar PV systems with battery storage in the two (2) sites, including but not limited to the below tests.
- If the results of the tests are not compliant with the requirements of the RFP, the contractor is responsible for taking the necessary remedial measures in coordination with LCEC.

Final Checkouts and Visual Inspection

- The site is clean and orderly
- The installation matches the design documentation
- The modules and cable routing is done properly
- The equipment is securely mounted
- Cut metallic edges and openings are cold galvanized
- The installations are matched to the manufacturer's specifications and recommendations
- Warning signs and labels are posted appropriately
- Safety equipment is installed properly
- The installations are compliant with standards and best practices



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<p>Mechanical Systems and Civil Works</p>	<ul style="list-style-type: none"> ▪ Concrete compression test: to be conducted and approved before the continuation of work ▪ Pull-out test for 5% of the fixations: to be performed using a motorized pull tester and will be given a pass criterion if the accepted values are 2 times the negative load. It is the contractor’s responsibility to assign the pull-out test to a specialized expert to carry out the test after the fixation of the mounting structure ▪ Make sure that there is no rust or cracks formed in the mounting structure or foundation ▪ Make sure that all clamps, nuts, and bolts are secured and tightened as per the manufacturer’s recommendations, using a torque meter ▪ Inclination test of panels using inclinometer, shall result in a consistent tilt angle of panels as per the approved design ▪ Orientation test of panels using compass, shall result in a consistent orientation angle of panels as per the approved design
<p>Electrical Systems</p>	<ul style="list-style-type: none"> ▪ DC voltage test and comparison with expected voltage ▪ Polarity test ▪ AC voltage test at inverter output and compare to inverter datasheet ▪ Open circuit test ▪ Short circuit test ▪ Insulation resistance test ▪ Ground resistance test (date to be specified by LCEC) ▪ Voltage drop tests ▪ Battery bank tests
<p>Functional Tests</p>	<ul style="list-style-type: none"> ▪ Start-up procedure ▪ Verify the proper operation of components’ connection and disconnection sequences ▪ Verify that the inverters and AC modules de-energize their output to utility grid upon loss of grid voltage ▪ Verify that inverters automatically reconnect to their output to the grid once the voltage has been restored

	<ul style="list-style-type: none"> ▪ Verify the proper grid voltage and frequency to operate inverters ▪ Verify that the data communication is working properly ▪ Conduct a communication equipment functional test ▪ Check validity of all data recording and readings including export, download and data transfer ▪ Parallel operation with existing power sources ▪ Battery bank tests
Performance Test	The performance ratio (PR) test method is explained in Form 8 – Performance Guarantee Letter .
Documentation and Training	
O&M Manual	<ul style="list-style-type: none"> ▪ Two (2) printed copies of the O&M manual shall be delivered to the client ▪ The O&M manual shall provide an overview of the project and shall include considerations for operation in the presence of faults including but not limited to: <ul style="list-style-type: none"> A. Contact Details of contractor and suppliers of main equipment B. Remote Monitoring System Usage and Control <ul style="list-style-type: none"> - Dashboard details and functionality - Alarms systems levels and categories - Generate reports and analyze the data received C. Monitoring Equipment Maintenance and Data Collection System <ul style="list-style-type: none"> - Define each sensor installed - Define parameters - tolerances and accuracy - Explain how each sensor is cleaned and maintained - Explain the dashboard and interface - How to read data - How to retrieve data - How to save as .csv file D. Panel Cleaning and Panel Replacement <ul style="list-style-type: none"> - Cleaning method and tools used - Importance of cleaning and soiling effect on the performance of the system



	<ul style="list-style-type: none"> - Handling method of the replacement <p>E. Inverter Functionality, Resets, and Interface</p> <ul style="list-style-type: none"> - Explain interface and advantages - Explain alarms and categories - Procedure for alarms categories - Explain the string monitoring system - Explain the security components and importance of each component <p>F. Layouts, Stringing Summary, Datasheets, SLDs, etc.</p>
<p>Training of Operators</p>	<p>A training of operators shall be conducted by the contractor at the end of the project, introducing the systems and explaining the different parts of the O&M manual in a power point presentation.</p>
<p>Technical Documentation to be Submitted by Bidders</p>	
<ul style="list-style-type: none"> ▪ Project Timeline ▪ System description and components selection ▪ Software simulation report showing the sizing, shadowing scenes, simulation and data analysis of the PV system ▪ A layout plan indicating the structure of modules, number of modules, dimensions of arrays, tilt and orientation, distances between rows, passages, and clearance from parapets ▪ Single Line Diagram (SLD) including panels, inverters, protection devices, and earthing ▪ Stringing summary and layout ▪ Civil design notes based on wind loads as per Lebanese Standard NL 137:2020, signed by a civil engineer member of the Order of Engineers and Architects of Beirut or Tripoli ▪ Declaration of the civil engineer that the solar system does not affect the structural safety of the building ▪ A copy of the membership card of the civil engineer in the Order of Engineers and Architects of Beirut or Tripoli ▪ Datasheets of mounting structure, panels, inverters, batteries, DC/AC cables, DC/AC protection devices, sensors and monitoring equipment, etc. ▪ Certificates for standards compliance 	



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- Detailed Bill of Quantity (BoQ) showing the brand names and references of products, quantities, and unit prices
- Guaranteed monthly performance ratio (PR) letter signed by the bidder

Irradiation Data

- All bidders are requested to use the following daily global horizontal irradiation data for solar PV software simulation.
- If different irradiation data is used, this would result in the rejection of the bid.

Month	Coastal – Tripoli (Wh/m ²)
January	2,387.6
February	3,195.8
March	4,898.1
April	6,012
May	6,837
June	7,192
July	7,010.4
August	6,343.7
September	5,374.6
October	3,873.5
November	2,757.2
December	2273.4
Average	4854.6

LED Lighting Retrofit for the Two (2) sites

- All existing CFL, incandescent and other non-LED type fixtures should be retrofitted with LED lighting, according to the BoQ below, with the minimum number of lighting fixtures needed for the two (2) sites:

Item	General Specifications	Quantity
1	LED T8 tube with starter, G13 double ended, 15W to 18W, equivalent to 32W T8 tubular fluorescent lamp 120cm - Luminous Efficacy ≥ 120 lm/W, color temperature 4000K, Nominal Lifetime ≥ 40000 h, CRI ≥ 80 , 220-240V, compliant with IEC 62776	400
2	E27 LED, 20W, Luminous Efficacy ≥ 100 lm/W, color temperature 4000K, Nominal Lifetime ≥ 15000 h, CRI ≥ 80 , 220-240V, frosted diffuser, compliant with IEC 62560 and IEC 62612	70



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3	E27 LED, 40W, Luminous Efficacy ≥ 100 lm/W, color temperature 4000K, Nominal Lifetime ≥ 15000 h, CRI ≥ 80 , 220-240V, frosted diffuser, compliant with IEC 62560 and IEC 62612	20
4	Passive infrared motion sensor, power source hardwired, ceiling mounted, with a 360 degree detection angle and an adjustable time delay, standby consumption ≤ 1 W, rated voltage 230 V, 50 Hz, compliant with IEC 63180:2020 EN 61000-3-2 and EN 61000-3-3	60

- It is the bidder's responsibility to confirm the accuracy of the minimum quantity of goods specified in the table above. There won't be any additional new items added after the signature of the contract.



Section 8: Annex

Form 1 - Letter of Application

Date of Application

31 March 2022

To: The Lebanese Center for Energy Conservation (LCEC)
Ministry of Energy and Water
Corniche du Fleuve, First Floor, Room 303
Beirut, Lebanon

From: [Insert company name]
[Insert full legal address]
[Insert full applicant's authorized representative name]
[Insert applicant's authorized representative telephone/Fax]
[Insert applicant's authorized representative mobile phone]
[Insert applicant's authorized representative email]

Name of the Project: "Request for Proposals (RFP) to Implement Solar Photovoltaic (PV) Systems with Battery Storage and Lighting Retrofit in Two (2) Public Schools in Lebanon"

We, the undersigned, submit this proposal and declare that:

- (a) We have examined and have no reservations to the most recent version of the RFP document and all its addendums;
- (b) We hereby confirm that we will comply with the policy in regard to Corrupt and Fraudulent Practices, and we have no conflict of interest in accordance with the section mentioned on this issue in the RFP;
- (c) We hereby confirm that if our proposal is selected, we shall sign the agreement as per the proposal;
- (d) We plan to subcontract the following key activities and/or parts of the works:



[Insert any of the key activities, subcontractors, details of the sub-contractors, their qualification and experience]

- (e) We understand that you may, without incurring any liability to the applicants, a) cancel the RFP at any time and b) accept no proposal or invite no applicant to sign the agreement. We also understand and accept that we shall bear all costs associated with its preparation and submission and that LCEC will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the selection process;
- (f) All information, statements and description contained in the application are in all respect true, correct and complete to the best of our knowledge and belief;
- (g) We understand that LCEC and its authorized representatives are hereby authorized to conduct any inquiries or investigations to verify the statements, documents, and information submitted in connection with this application. This letter of application will also serve as an authorization to any individual or authorized representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by LCEC to verify statements and information provided in this application, or with regards to the resources, experiences, and competence of the bidder.

[Insert full name of person signing the application]

In the capacity of: [Insert capacity of person signing the Application]

Duly authorized to sign the Application for and on behalf of: [Insert full name of Applicant]

Signature and Stamp



Form 2 – Applicant Information Form

Applicant's name:	[insert full name]
Applicant's actual country of registration:	Lebanon
Applicant's actual year of incorporation:	[indicate year of Constitution]
Applicant's legal address in Lebanon	[insert street/ number/ town or city/ Lebanon]
Applicant's authorized representative information	[insert full name]
Name:	[insert street/ number/town or city/country]
Address:	[insert telephone/fax numbers, including country and city codes]
Telephone/Fax numbers:	[indicate e-mail address]
E-mail address:	

Attach copies of original documents of articles of incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above.



Form 3 - Bid Bond

The Bid Bond submitted by the Bidder shall be in conformance with the below sample form. Any alternate form/text would result in the rejection of the Bid.

To: The Lebanese Center for Energy Conservation (LCEC)
Ministry of Energy and Water
Corniche du Fleuve, First Floor, Room 303
Beirut, Lebanon

Name of the Project: "Request for Proposals (RFP) to Implement Solar Photovoltaic (PV) Systems with Battery Storage and Lighting Retrofit in Two (2) Public Schools in Lebanon" (hereinafter called "Bid")

By this guarantee we confirm that we, the undersigned, are bound unto LCEC in the sum of 4,000 USD (hereinafter called "Bid Deposit") for which a cash deposit has been well and truly made to LCEC.

The conditions of the obligation under this Bid Bond are:

1. If the Bidder withdraws the Bid during the period of bid validity specified in the project RFP; or
2. If the Bidder having been notified of the acceptance of its Bid by LCEC during the period of Bid validity:
 - Fails or refuses to execute the Engineering, Procurement, Construction (EPC) Contract,
 - Fails or refuses to furnish or to increase the Performance Bond,or
 - Refuses to accept the correction of the errors in the Bid.

The Bidder hereby constitutes and appoints LCEC as its attorney to assign, appropriate, transfer and apply the said Bid Deposit as a result of the occurrence of one or both of the two conditions, without notice.

This Bid Bond will remain in force up to and including the date 120 days after the deadline for submission of Bids and it may be extended automatically after this date, notice of which extension(s) is hereby waived.



The conditions under which the obligation under this Bid Bond will be null and void and the Bid Deposit will be released and returned to the Bidder are:

- If the Bidder is notified of the rejection of its Bid by LCEC,
- or
- If the Bidder having been notified of the acceptance of its Bid by LCEC executes the EPC Contract and furnishes the Performance Bond.

[Insert full name of person signing the application]

In the capacity of: [Insert capacity of person signing the Application]

Duly authorized to sign the Application for and on behalf of: [Insert full name of Applicant]

[Insert full legal address]

[Insert applicant's authorized representative telephone/Fax]

[Insert applicant's authorized representative mobile phone]

[Insert applicant's authorized representative email]

Signature and Stamp



Form 4 – Relevant Experience

[Name of Applicant]

- *Please only list the requested relevant experience in Lebanon*
- *Please list the most recent projects (starting from 2022 and 2021)*
- *Please only list the projects that were completed and commissioned*
- *Assignments completed by the bidder's individual experts working privately or through other firms, partners, or sub-contractors cannot be claimed as the relevant experience of the bidder*

1. Please list a minimum installed cumulative capacity of solar PV projects equivalent to 200 kWp (regardless whether they include batteries or not)

Project Ref.	Project Type	Project Size	Project Location	Completion Date	Client Contact Details
1					
2					
3					
4					
5					
6					
<i>[add rows as necessary]</i>					



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- Please provide a list of 20 solar PV with lithium battery storage systems in Lebanon, designed, installed, and commissioned by your company

Project Ref.	Project Size (kWp and kWh storage)	Storage Type (Lead Acid/Lithium)	Project Location	Completion Date	Client Contact Details
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					



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3. Please provide five (5) pictures from your solar with battery storage implementations, showing the metallic structure, PV array, batteries, inverters, cable routing, etc.

Please insert in the caption the size (kWp and kWh storage) and location of the system.

Picture 1	
Caption	
Picture 2	
Caption	
Picture 2	
Caption	
Picture 4	
Caption	
Picture 5	
Caption	



Form 5 - Financial Situation and Performance

[Name of Applicant]

- *The Applicant shall complete the below table.*
- *The Applicant shall provide copies of financial statements for 2019, 2020, and 2021. The financial statements shall: (a) reflect the financial situation of the Applicant, (b) be independently audited or certified in accordance with local legislation, (c) be complete, including all notes to the financial statements, (d) correspond to accounting periods already completed and audited*

Type of Financial information in (LBP)	Historic information for (LBP)		
	2022	2021	2020
Statement of Financial Position (Information from Balance Sheet)			
Total Assets (TA)			
Total Liabilities (TL)			
Total Equity/Net Worth (NW)			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital (WC)			
Information from Income Statement			
Total Revenue (TR)			
Profits Before Taxes (PBT)			
Cash Flow Information			
Cash Flow from Operating Activities			



Form 6 – Team Composition and Tasks Assignment

[Name of Applicant]

Please attach the CV of each team member separately.

Team Member Name	Position in this Project	Assigned Tasks	Experience in the design, supply, and installation of solar PV with storage systems	Number of operational solar with storage projects

Team Member Name	Position in this Project	Assigned Tasks	Experience in general electrical installations, lighting retrofits and motion sensors connection.	Number of lighting retrofit projects with motion sensors



Form 7 - Performance Bond – Cash Retention

- *At the bid submission stage, this form has only to be signed and stamped, no need to be completed.*
- *Once the contract is awarded, the contractor will complete the form and submit it, prior to the contract signature.*

To: The Lebanese Center for Energy Conservation (LCEC)
Ministry of Energy and Water
Corniche du Fleuve, First Floor, Room 303
Beirut, Lebanon

Name of the Project: “Request for Proposals (RFP) to Implement Solar Photovoltaic (PV) Systems with Battery Storage and Lighting Retrofit in Two (2) Public Schools in Lebanon” (hereinafter called “Bid”)

WHEREAS, [Applicant’s Name], duly represented by [Insert full name of person signing the application] [Insert full legal address], hereinafter called “the Contractor” has undertaken in pursuance of the Contract dated [Date of contract signature] between the Contractor to execute the Implementation of Solar Photovoltaic (PV) Systems with Battery Storage in Two (2) Public Schools in Lebanon, hereinafter called “the Contract” for the Lebanese Center for Energy Conservation having its address at the Ministry of Energy and Water Building, Corniche du Fleuve, 1st Floor, Room 303, Beirut, Lebanon hereinafter called “the LCEC”;

AND WHEREAS it has been stipulated in the said Contract that the Contractor shall furnish the LCEC with an unconditional and irrevocable Performance Bond for the sum specified therein as security for compliance with its obligations in accordance with the Contract;

AND WHEREAS LCEC has agreed to give the Contractor such a Performance Bond in exchange of a cash retention;

NOW THEREFORE the Contractor hereby affirms that LCEC will be withholding a total of [10% of the Contract Value in Euro (€)] from its first payment to the Contractor, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, hereinafter called “the Cash Retention”, and LCEC shall have recourse to the Cash Retention without cavil or argument, within the limits of [10% of the Contract Value in Euro (€)] as aforesaid without needing to prove or to show grounds or reasons for such recourse for the sum specified therein.



The Contractor hereby waives the necessity of LCEC demanding the said debt from the Contractor before having recourse to the Cash Retention.

The Contractor and LCEC, hereinafter jointly called “the Parties”, further agree that no change or addition to or other modification of the terms of the Contract or of the works to be performed hereunder or of any of the Contract documents which may be made between the Parties shall in any way release any Party from any liability under this guarantee.

This guarantee shall be valid for one (1) year from the date of issuance of the Final Acceptance Certificate by LCEC.

[Insert full name of person signing the application]

In the capacity of: [Insert capacity of person signing the Application]

Duly authorized to sign the Application for and on behalf of: [Insert full name of Applicant]

[Insert full legal address]

[Insert applicant's authorized representative telephone/Fax]

[Insert applicant's authorized representative mobile phone]

[Insert applicant's authorized representative email]

Signature and Fiscal Stamp



Form 8 - Performance Guarantee Letter

[Name of Applicant]

I the undersigned [Insert full name of person signing the application] in my capacity of [Insert capacity of person signing the Application] dully authorized to sign for and on behalf of [Insert full name of Applicant] hereby confirm that, within the “Request for Proposals (RFP) to Implement Solar Photovoltaic (PV) Systems with Battery Storage and Lighting Retrofit in Two (2) Public Schools in Lebanon” in co-operation with the LCEC, we guarantee the Performance Ratio (PR) listed in Table 1.

Table 11 Guaranteed Performance Ratio

Month	PR Guaranteed – George Sarraf	– PR Guaranteed – Abi Samraa Al Oula for Girls
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
Yearly Average		

- Once the Plant is connected to the grid, the Performance Ratio (PR) of the plant is measured and compared with the value guaranteed by the contractor.
- The PR is defined in this case as the ratio between the expected energy output in real conditions (at the inverter output), taking into account all of the losses in the energy generation (up to the inverter output), and the theoretical energy output in Standard Test Conditions (stc).
- The duration of the provisional acceptance test shall be 7 consecutive full days.



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- If a power outage happens for any reason, the days of the power outage are excluded and the duration of the PR Test shall be extended to reach the minimum period of 7 days of measurement.
- The acceptance test will be successful if the overall acceptance test PR (Metered Output / Theoretical Output) \geq Guaranteed PR
- The PR shall be calculated according to the following formula:

$$PR_{\text{commissioning}} = (E_{\text{produced at the inverter output}}) / (GTI * A_{\text{total module area}} * \text{Eff}_{\text{module @STC}})$$

- $E_{\text{produced at the inverter output}}$: Energy produced by the PV system (kWh), measured during the test period of 7 consecutive days, at the inverter output
- GTI: Global tilted irradiation (kWh/ m²), collected by the tilted pyranometer installed at the facility for the test period of 7 consecutive days
- $A_{\text{total module area}}$: Total area of PV modules (m²)
- $\text{Eff}_{\text{module @STC}}$: PV panels efficiency as per the datasheet (%)

Simplified Formula

$$PR_{\text{commissioning}} = (E_{\text{produced at the inverter output}}) / (GTI * \text{PlantSolarPower}_{\text{@STC}})$$

- $\text{PlantSolarPower}_{\text{@STC}}$: Total power of the PV system (kWp)

Performance Test for Batteries

The battery bank performance shall be test over one (1) cycle and at a maximum DoD of 90%.

The contractor shall fully charge the batteries in the two (2) sites and then connect them to a constant DC load until discharge, while disconnecting the solar PV modules and other AC power sources from the batteries. The batteries voltage shall be monitored through the data acquisition system and remote monitoring platform. The battery bank in each facility shall perform as per the below requirements:

George Sarraf: the battery bank shall be able to discharge 27A over 4 hours +/- 0.5%

Abi Samraa Al Oula for Girls: the battery bank shall be able to discharge 27A over 4 hours +/- 0.5%

The performance tests shall be done in coordination with LCEC.



Form 9 - Warranty Form

[Name of Applicant] *Please specify the full warranty period on each component, starting from the issuing of the Provisional Acceptance Certificate.*

Component	Full Warranty Period (Years)
Mounting Structure	[At least 10 years starting from the issuing of the Final Acceptance Certificate]
Solar PV Modules	[Free from defects and/or failures due to manufacturing or quality of materials, for a period not less than 10 years from the date of sale to the customer]
DC Protection Box and Components	[At least 2 years starting from the issuing of the Final Acceptance Certificate]
Inverters	[At least 5 years starting from the issuing of the Final Acceptance Certificate]
AC Protection Box and Components	[At least 2 years starting from the issuing of the Final Acceptance Certificate]
Solar Charge Controller	[At least 5 years starting from the issuing of the Final Acceptance Certificate]
Batteries	[At least 3 years starting from the issuing of the Final Acceptance Certificate]
Weather Station	[At least 5 years starting from the issuing of the Final Acceptance Certificate]
Remote Monitoring Equipemtn, Data Acquisition Softwares, and Remote Monitoring	[At least 3 years starting from the issuing of the Final Acceptance Certificate]
LED Lighting (Items 1,2 and 3 mentioned in BoQ)	[At least 1 year strating the issuing of the Final Acceptance Certificate]
Passive infrared motion sensor	[At least 1 year strating the issuing of the Final Acceptance Certificate]

[Insert full name of person signing the application]

Signature and Fiscal Stamp