ANNEX C: SCOPE OF SERVICES

Services and Deliverables

The required services are divided into 3 main areas or lots as follows:

1. Energy Audit Services
2. Services for Solar PV Systems
    1. Load assessment & Project Design
    2. Site Inspection, Quality Assurance (QA) and Commissioning
    3. Engineering Support for Project Evaluation
    4. Failure Analysis
    5. Training and Capacity Building
    6. Site Supervision and QA of Electro-Mechanical and Civil components
3. Services for Solar Water Heater
    1. Project Design
    2. Site Inspection, QA & Commissioning
    3. Engineering Support for Project Evaluation
    4. Failure Analysis

The following services' description is non-exhaustive. Service requirements, tasks, and deliverables will depend on the nature of each project and therefore they must be agreed with UNICEF on a project-by-project basis.

1. ENERGY AUDIT SERVICES

1.1. Service Description:

The energy audit is a systematic process to assess and analyze the energy use and consumption of a given facility. Its primary purpose is to identify energy-saving opportunities, and inefficiencies, and to recommend ways to reduce energy waste. By conducting an energy audit, one can understand how energy is used in a facility and then prioritize improvements to increase energy efficiency and reduce energy-related costs.

The energy audit entails assessing the building's energy performance by analyzing its systems, operations, and energy use patterns then providing a comprehensive understanding of the economic and technical feasibility of energy efficient intervention measures such as LED upgrade and solar systems installation.

1.2. Service Deliverables:

A detailed energy audit report, based on international standards (i.e., ASHRAE), is expected to include but not limited to the following:

a) Facility examination and general information collection
b) Inventory of existing systems and equipment
c) Determine energy use intensity (kWh/m^2) and water use intensity (L/m^2)
d) Develop a list of potential EEMs.

e) EEMs cost estimates.
f) Cost-saving estimates and impact on energy consumption savings for each EEM such as LED and solar systems.

2. SERVICES FOR SOLAR PV SYSTEMS

The solar PV system design service consists of the following descriptions and deliverables.

2.1. Load assessment:

The services should include but not be limited to the following:

a) Performing desk and on-site analysis, determine the actual energy loads (i.e., kW; kWh, the consumption curve, consumption patterns, etc.) per facility or at the project level.
b) Supporting UNICEF and relevant partners to prioritize loads and define strategies for energy supply.
c) Overall analysis for project implementation, assessment of the country infrastructure, in terms of the electrical grid, conditions of the roads in case of need to mobilize heavy equipment or large volume, etc.
d) Specify the ownership status of the space where the solar system will be installed.
e) Analysis of the electric infrastructure of the facility where the solar project will be located, condition of the grid service, status of the substation and switchboards, ownership status, etc.
f) Analysis of the capabilities of the administrative/technical team that is managing the energy/electric infrastructure is part of the expected activities.
g) Assessing environmental and social risks as per UNICEF standard form (Annex F attached to this RFP).

2.2. Project design:

The services should include but not be limited to the following:

a) Conducting on-site analysis and determining the infrastructure gaps for solar project implementation (i.e., feasibility analysis). This might include an analysis of the soil for the foundation of the solar panel structure, as well as an analysis of the roof conditions, space availability, orientation, obstacles, waterproofing system conditions, and building structure in case of a roof-mounted project.

b) Based on the load assessment, the consultant should provide consultancy services on solar PV system design. The consultant should consider different design scenarios in case specific EEMS shall be implemented (such as LED lighting, etc.)

c) Definition of technical specifications, selection of main equipment and critical components, including manufacturing and supply sources' information, power distribution plan, sizing of cables, electrical protection, civil works, mechanical requirement for mounting structure, etc. The technical specifications should include components for electrical power distribution in facilities where the site assessment data determines the current distribution arrangement is unsafe, non-existent, or inadequate.

d) Development of technical specifications for remote performance monitoring package of essential parameters inclusive of energy supply/demand parameters with dashboard

accessible to 3rd parties. Provide a schematic of the proposed performance monitoring package.

e) Definition of electrical architecture, over the integration of existing energy infrastructure or other sources of energy such as the grid or diesel generators.

f) Support for the design of operational strategies, depending on specific needs, e.g., water supply, critical health care, oxygen supply, etc.

g) Develop a protocol of standards for systems' commissioning and maintenance to be adhered to Government of Lebanon and International Norms as per LCEC.

h) Technical support for tendering documents, preparation of terms of references, and BOQ.

2.2.1. Service Deliverables:

a) An assessment matrix in a format approved by UNICEF including, but not limited to, the following information:

- Facility profile: provide basic information, GPS coordinates of the facility, etc.
- Record the names and contact details of key facility personnel.
- Building layout (dimensioned plan), structural condition, and physical infrastructure integrity assessment for the installation of solar PV system.
- Determine current and planned energy loads in kWh/month per day/night load needs.
- Determine if critical equipment is present to provide uninterrupted electric supply.
- Grid power availability, quality (reliability), connectivity arrangements.
- Determine diesel fuel usage, generator size, and operating hours.
- Determine if remote monitoring technology can be deployed at the site for solar PV.

b) Assessment Data Entry and Management:

The collected data including the facility coordinates should be stored and managed on an online platform, such as ArcGIS, for geospatial mapping and analysis.

To ensure data integrity and quality, the consulting company should utilize a standardized digital form designed/approved by UNICEF for data entry. Accordingly, the company shall be responsible for delivering the following:

- Data Collection: the consulting company shall collect all required data outlined in the assessment matrix approved by UNICEF.
- Online Survey Data Entry: the consulting company shall enter the assessment results of all designated facilities into the online platform (i.e., the ArcGIS) provided/approved by UNICEF.

c) A Project Report including, but not limited to the following:

- System description and components selection per site for the most feasible solar design.
- A layout plan indicating the number of modules, dimensions of arrays, tilt and

orientation, and distances between rows and passages.

- Technical specifications for the design of the most appropriate solar panel mounting systems to withstand extreme weather conditions (fixed tilt, flush mount, or carport structure), including optimal angles and cooling mechanisms when required.
- Software simulation showing the sizing, shading analysis, energy, and data analysis of the solar PV system (ex. Helioscope, PVSyst).
- Cost-benefit analysis of the proposed solar systems (on-grid, hybrid, and off-grid).
- Economic analysis of the solar system that includes mainly the following economic metrics: net present value (NPV), return on investment (ROI), and payback period.
- Bill of Quantities and internal cost estimates, including for each system component, EEMs, and electrical system upgrading when required.
- Protocol of standards.
- Environmental and Social Assessment Report.

2.3. Site Inspection, QA & Commissioning

The purpose of this stage is to ensure the proper installation of solar systems in compliance with the project requirements.

The duration of the Site Inspection, Quality Assurance (QA) and commissioning Services shall extend from the signing of the contract with the selected Supplier to the system commissioning and beyond, and/or maintenance period.

The Consultant's responsibilities include but are not limited to the following activities:

a) Review and/or approve the Supplier's contract documents including installation layout and other related shop drawings.
b) Review and advise UNICEF on the Supplier's request for variation orders.
c) Advise UNICEF on any potential risks to the project(s), regarding quality of the works, timeline, and budget.
d) Ensure that appropriate safety measures are taken on-site to minimize the risks of accidents to the workers and the public, including proper storage and security of its material and equipment.
e) Review the model of the protocol of standards for systems' commissioning and maintenance to be adherent to the Government of Lebanon and International Norms as per LCEC.
f) Certify the commissioning of installed equipment with the collaboration of UNICEF and LCEC within MEW according to the approved protocol of standards stating both installation quality and performance.
g) Ensure rectification of any defect that might appear during the commissioning.

The consulting company's obligations are included in the UNICEF standard for the provision of engineering services attached as Annex B of this RFP.

2.3.1. Services Deliverables:

- Approval of the Supplier's contract documents.
- Approval of variation orders including relevant documentation
- Progress Reports (as per project requirements)
- Snag list rectification report
- System Certification as per standards
- Final Report.

2.4. Site Supervision and QA of Electro-mechanical and Civil components

The purpose of this stage is the supervision of project implementation including electro-mechanical and civil works.

Engineers will be present on-site during the progress of works, from commencement to completion and start of DLP. Other experts including but not limited to Mechanical Engineer must be on-site whenever necessary and supervise works related to their respective fields.

The Consultant's responsibilities include but are not limited to the following activities:

a) Review and/or approve the Supplier's contract documents including mounting system design, and civil works for the solar array's foundation, as well as reinforcement of the roofing structure, when required, and the Environment Social Management Plan (ESMP).
b) Revise and approve the Supplier's work plan and timeline schedule.
c) Revise and approve samples of project material.
d) Establish/ensure proper project monitoring.
e) Review and advise UNICEF on the Supplier's request for variation orders.
f) Review the Supplier's payment request documents to ensure consistency with certified works.
g) Validate certification of the works in compliance with standards (Substantial Completion)
h) Submit Final Report (at the end of the DLP)
i) Advise UNICEF on any potential risks to the project(s), regarding quality of the works, timeline, and budget.
j) Ensure that appropriate safety measures are taken on-site to minimize the risks of accidents to the workers and the public, including proper storage and security of its material and equipment.

2.4.1. Services Deliverables:

a) Approval of the Supplier's contract documents.
b) Approval of variation orders including relevant documentation
c) Approval of sample of material
d) Submission of Progress Reports (as per project requirements)
e) Snag list rectification report
f) Submission of Substantial Completion Certification
g) Submission of Final Report.

2.5. Training and Capacity Building

The Company will be required to provide capacity-building services as follows:

a) Organize in coordination with UNICEF, end users, and the systems' supplier orientations on the use of all installed equipment and maintenance. The orientation should cover the use, basic care, preventive maintenance, security, and troubleshooting of equipment.

b) Undertake hands-on orientation sessions at each project facility about the following:

- Use of the equipment
- Security of the equipment
- Preventive maintenance of the equipment
- Preventive service and maintenance schedule, including activities and frequency.
- Understanding of digital performance monitoring displays
- Basic troubleshooting techniques
- Contact details of the Company for the Defect Liability Period.
- any other items that the Company deems necessary or advisable.

2.5.1. Services Deliverables:

a) Submission of operation manuals during the orientation, to ensure that use and preventive maintenance of the equipment can be completed by on-site staff.

b) Submission of a basic orientation manual.

2.6. Engineering Support for Project Evaluation

The evaluation shall include but not be limited to the following:

a) Assess and evaluate third-party project design, including sizing, equipment selection, calculation reports in case of need, structural design, electrical topology, and interconnection with existing facilities.
b) Review of operational procedures and strategies.
c) Review of design compliance with local regulations on safety, electrical codes, environmental permits, and other regulations that may apply to a particular project.
d) Perform on-site inspections related to:
   - Approval of payment milestones.
   - Commissioning and operational test.
   - Compliance with design, standards, environmental permits, etc.
   - Quality check of equipment and project after installation.
   - Independent review is a case of claims and no-compliance disputes.
   - Compliance with BOQ and progress reports.

2.6.1. Services Deliverables:

An Evaluation Report including recommendations and improvements.

2.7. Failure Analysis

a) In case of total or partial failure of a solar project, support UNICEF to understand the root of the failure by conducting data analysis and/or site inspections and providing reports for different levels.

b) Support UNICEF in communication with suppliers in case of project failures and provide

technical support for those communications.

c) Provide technical support for warranty claims, providing independent reports and analysis in case of need.

d) Provide support on technical communication with suppliers and manufacturers on warranty claims.

e) Provide guidance and technical support and potential solutions in case of a dispute between UNICEF and the service providers.

2.7.1. Services Deliverables:

A Failure Report including the following:

- Analysis of failure and impact on the system's efficiency
- Identification of corrective actions and benefit
- Implementation plan
- Correction validation and monitoring

3. SERVICES FOR SOLAR WATER HEATER SYSTEMS

3.1. Solar Water Heater Design

Throughout the implementation period provide selective presence of Civil and Electrical Engineers on site for supervision, Quality Assurance (QA), and certification of executed work. The Engineers will be present on-site during the progress of works, from commencement to completion and start of DLP. Other experts including but not limited to Mechanical Engineer must be on site whenever necessary and for the supervision of works related to their respective fields.

3.1.1. Services Deliverables:

Deliverables under this service include but are not limited to the submission of a Detailed Preliminary SWH Design report to be approved by UNICEF with the following:

- Facility profile: provide basic information, GPS coordinates of the facility, etc.
- Building layout (dimensioned plan), structural condition, physical infrastructure integrity assessment
- Report showing the type of technology recommended for SWH, shadow analysis, and piping SLD.
- A layout plan indicating the number of collectors, dimensions, tilt and orientation, distances between rows, passages, and clearance from parapets per site.

3.2. Relevant Services

Relevant services are those provided for solar PV systems but are applicable within the context of solar water heaters. Services include the following:

- Site inspection, QA, and commissioning
- Engineering support for project evaluation
- Failure analysis

4. REPORT REQUIREMENTS

a) All reports shall be submitted for review, remarks, and approval by UNICEF on digital and softcopies (DWG, PDF, Ms word, Ms Excel, and Ms Project) as per format and scale agreed with UNICEF.

b) Reports shall be in the English language. Where the information has been gathered in a language other than English, the Consultant shall include an English translation of all such information in the report and a copy of the information in the original language included as an addendum to the report.