Enhancing Community Resilience and Local Governance Project Phase II (ECRP II)

TERMS OF REFERENCE

Project description: Solar power system Assessment, Design, Supply, Installation and after sales support for the subprojects in Wau, Raja, Renk and Pariang.

1. INFORMATION

1.1. Background

International for Migration (IOM), South Sudan Mission, is implementing the Enhancing Organization Community Resilience and Local Governance Project (ECRP). ECRP is providing training to boma and Payam level development committees which have prioritized infrastructure for selected Payams in eight Counties and two Administrative Areas.

IOM South Sudan therefore is seeking contractors to procure and install a renewable off grid solar energy system to supply electrical power at subprojects with various community infrastructure projects to the required standards of ECRP for construction, quality control, and health, safety, and environmental protection in four counties of Wau, Raja, Renk and Pariang in accordance to the local safety and electrical regulations. If no local regulations are in place the installation should follow the International Electro Technical Commissions standard on Electrical Installations for Buildings (IEC 60364).

IOM requires prompt and immediate action in mobilization of a team for the supply and installation of the solar system. As a result, the Contractor must provide a suitable and experienced team that can quickly and efficiently carry out the required installation work, as well as any required tools and transportation for the team to and from the sites. The Contractor shall furnish all the necessary materials, tools and equipment, labor supervision and other services for the satisfactory and timely completion of the works in accordance with this agreement.

. Objective of the Assignment

The objective of this assignment is to assess, validate the design, supply and install solar power system for four counties: Wau, Raja, Renk and Pariang that will be a basis for sustainable electrical power for the subprojects categorized under health, Community centers and administrative blocks in school.

3. Scope of assignment & expected deliverables

The vendor shall:

- Conduct site visit to assess the electrical power demand of the four counties for the highlighted subprojects and the suitability of solar power system installation
- Revalidate the solar power system for the selected subprojects

- Draw a computer aided Single Line Diagram (SLD) of the designed system. The diagram should include the sizing of circuit components, and detailed labelling identifying each circuit. Earthing and Air Terminal system should also be included in the same diagram or a different one.
- Prepare / recommend technical specifications that shall ensure sustainability, cost-efficiency, durability and ease of the solar power system maintenance
- Prepare cost estimates and bill of quantities for the complete Installation of solar power system for the selected subprojects.
- Recommend appropriate technologies to be adapted for installation of the solar power system and justify it
- Prepare and submit a final report of the site assessment, load profile, system design, technical specifications for system main components, project implementation work plan, and efficient energy conservation improvements to IOM team for study and subsequent consideration

4. Place of Work

The work will be conducted in four counties (Wau, Raja, Renk and Pariang).

5. Time Schedule and Deliverables.

The overall assignment together with system commissioning and submission of post solar system installation report shall be completed within four weeks after signing of the contract agreement.

6. Report Requirement

All reports should be submitted in electronic form on USB flash and 2 printed & bound hard copies. All reports should be submitted in the English Language.

Qualification and Experience

- The company must have a minimum of five years' experience on the field.
- The company must have contracted a minimum of five similar projects in the past three years.
- The company is required to clearly provide assigned expert(s) CV(s), clearly stating their roles and responsibilities for this project.

The proposed expert should include the technical expertise and practical experience required to deliver the scope of work with regards to:

- Relevant subject matter knowledge and experience
- Management experience
- Ability to work in a team
- Regional experience: it is particularly important that the vendor has the appropriate regional knowledge/experience and language proficiency required to conduct the required work.

The company should provide evidence of previous project experience for the provision of similar supply and installation work required by this ToR.

1.2. Project Details

Project Name	**Solar system design and installation Supply and installation of Hybrid Inverter and solar Accessories**
Project Site 1	Hai Dinka PHCU, Wau County, Wau North Payam and Hai Darja Boma
	GPS Coordinates N: 7.71475 E: 27.99871995
Project Site 2	Ngisa PHCU, Bagari Payam, Wau county, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.5897667 E: 27.7500138888888
Project Site 3	Ngomba PHCU, Bessilia Payam, Wau county, Western Bhar-El Ghazal.
	GPS Coordinates N:7.7630325 E: 27.6339873
Project site 4	Kaabi PHCU, Bessilia Payam, Wau county, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.7506475, E: 27.758923
Project site 5	Khorghana PHCU, Bessilia Payam, Wau county, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.7883358; E: 27.152781
Project site 6	Abushaka PHCU, Bessilia Payam, Wau county, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.7170349; E: 27.8333206
Project site 7	Bussere PHCU, Baggari Payam, Wau county, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.711705; E: 27.98654
Project site 8	Biringi PHCU, Baggari Payam, Wau County, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.6275; E: 27.9019444
Project site 9	Abul PHCU, Raja County, Uyujuju Payam, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.723339; E: 26.698167
Project site 10	General wards-Male & Female in Pariang Main Hospital, Guengalath, Pariang County, RAA
	GPS Coordinates N: 9.911666; E: 29.98273
Project site 11	PHCC at Abayok, Renk Town Payam, Renk County, Upper Nile State
	GPS Coordinates N: 11.4349; E: 32.4938
Project Name	**Supply and installation of Solar Security light for the wall fence at:**
Project site 12	Hai Bafra Primary School, Wau North, Wau County, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.7030423; E: 27.9795725
Project site 13	Kalvario Girls Primary School, Wau North, Wau County, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.7012463; E: 27.9825082
Project site 14	Lokoloko PHCC, Wau North, Wau County, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.7035; E: 27.9734
Project site 15	Chum Alling Primary School, Renk Town Payam, Renk County, Upper Nile state
	GPS Coordinates N: 11.4349; E: 32.4938
Project site 16	Biringi PHCU, Baggari Payam, Wau County, Western Bhar-el Ghazal.
	GPS Coordinates N: 7.6275; E: 27.9019444
Project site 17	Hai Dinka PHCU; Wau North Payam, Wau County, Western Bhar-el Ghazal.
	GPS Coordinates N: 7.71475; E: 27.99871995
Project Name	**Solar system design, Supply and installation of Hybrid Inverter and solar Accessories for the Office blocks at:**
Project site 18	Jerebana P/S Office block, Geiger Payam, Renk County-Upper Nile state
	N: 12.0375481; E: 33.0288326143
Project site 19	Gosfami Primary School Office block, Geiger Payam, Renk County, Upper Nile State
	GPS Coordinates: N: 11.925247; E: 32.8731341
Project site 20	Mukta p/s office block, Wau North Payam, Wau County, Western Bhar-El Ghazal.

	GPS Coordinates N: 7.710009; E: 27.9928996
Project site 21	Jebel Andi P/S Office block, Bessilia Payam, Wau county, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.7658639; E: 27.70512222
Project site 22	Teachers' quarter Lokoloko SS, Music & Dance Theater & Office block Lokoloko SS, Wau North Payam, Wau County, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.6937872; E: 27.9584535
Project site 23	office rehabilitation in Bessilia primary school, Bessilia Payam, Wau County, Western Bhar-El Ghazal.
	GPS Coordinates: N: 7.7656484; E: 27.7050948
Project site 24	Biringi p/s Office & Library block, Baggari Payam, Wau County, Western Bhar-El Ghazal.
	GPS Coordinates N: 7.6275; E: 27.90194444
Project site 25	women Resource Center in Abon-2 Pariang,
	GPS Coordinates N: 9.92255; E: 29.987002
Schedule	The project is expected to commence in January 2025 and be completed within two (02) months with a twelve-month warranty period.

2. SUPERVISION

The installation site and supply and installation activities will be supervised by the IOM designated Site Engineer and Project Engineer. A Community Site Supervisor will support the team in monitoring the work daily.

The Lead Engineer is responsible for the overall project management of the contractor work with oversight from the ECRP Programme Coordinator.

To avoid double reporting, the Contractor is not allowed to report externally to any other platform of coordination.

These General Specifications are to be used with reference to the following documents:

Annex A. Design Drawings
Annex B. Bill of Quantities (BoQs)
Annex C. Guideline for Standards on Workmanship and Materials
Annex D. ECRP IOM Project Health and Safety Management Plan (HSMP)
Annex E. ECRP IOM Quality Management Plan (QMP)
Annex F. ECRP Environmental and Social Requirements for Contractors (ESRC)
Annex G. ECRP Labour Management Procedure (extract from ESMP)

The following detailed scope of work is supplementary to the site pictures. Any discrepancies between the pictures and these specifications shall be brought to the attention of the Site Engineer for clarification.

Only IOM may approve any changes, modifications, deviations, and substitutions in the scope of work.

3. SPECIFICATIONS: Solar supply and its accessories

Duties and Responsibilities

a) Conduct site visit at the subproject site in the four counties and to assess the facility's electrical/ power requirements.

b) Based on the site visit, conduct a power analysis of the community infrastructure at the four counties to estimate the facility's current and future daily electrical energy/ power demand.

c) Develop/ recommend a suitable solar power system design that meets the electrical power demand. The design should highlight which national or international standards the project should comply with.

d) Develop a technical/engineering Bill of Quantities (BoQs) based on the solar array system design. The BoQ should include costs for all materials, accessories, taxes, transportation installation, training and testing.

e) Provide engineer estimates for the BoQ to be used in the tendering and procurement process.

g) Develop a project management plan highlighting approximate time requirements (in days) for the contractor: materials delivery, installation, operational training and system testing. Ultimate result of service

a) A technical/ engineering design of the proposed solar power (photovoltaic array) system.

I. Preferred location and security risks of the solar energy system. Clearly state whether it's ground or rooftop-mounted and provide the GPS coordinates for the proposed installation.

ii. Estimate of the total daily electrical power demand for the facility. The design should factor in all the electrical requirement for each facility.

iii. Specifications of the solar panels/ Pv modules (type, brand, power rating, quantity) required.

iv. Specifications of the smart solar DC-AC Inverter system and Charge controllers (type, brand, input/ output load rating and range, quantity) required.

v. Specifications of the solar energy Cables/ wiring (type, brand, gauge/ rating, length) required.

vi. Specifications of the solar backup Batteries (type, brand, capacity (Ah), quantity) required.

vii. Technical specifications of the other accessories (brand, input/ output load rating/, quantity) required: DC/AC disconnects, junction boxes, combiner boxes, circuit breakers, meters (s), change over switch box, fuses, PVC pipes, plugs and sockets etc. for integration with the existing wiring system.

viii. Technical specifications for the rooftop, solar Racking / Mounting structure system (dimensions, metal types/ gauges, inclination angle, sketch drawings etc.) required. This should also include accessories to ensure maximum security (anti-theft) for the installation.

b) Technical/engineering Bill of Quantities (BoQs)

c) Engineer cost estimates (prefilled BoQ) to be used in the procurement process.

d) Develop a technical design of the solar power/ Pv system that includes:

Estimates of the total daily electrical power demand and deficit to be supplied through the solar system.

- Specifications for the solar panels/ Pv modules.
- Specifications for the solar inverter system.
- Specifications for the charge controllers.
- Specifications for the solar wiring/ cabling system.
- Specifications for the solar backup batteries
- Specifications of the accessories: DC/AC disconnects, junction boxes, combiner boxes, circuit breakers, meters (s), change over switch box, fuses, PVC pipes, plugs and sockets etc.
- Specifications for the rooftop racking / mounting system.
- Design national or international standards for compliance.
- Demonstrated knowledge of off-grid energy systems within South Sudan
- Proven experience in designing and installing solar energy systems within South Sudan for UN Agencies, government or NGO clients.
- Solar energy experts who have worked for reputable renewable energy companies in South Sudan will have an added advantage
- Excellent communications skills.
- Good computer skills

Academic Qualifications

• Bachelor's degree in electrical/ renewable energy engineering or related courses required. South Sudan nationals with other qualifications, but extensive demonstrable experience in large-scale solar energy installations within South Sudan will also be considered.

Experience

• At least three years' experience in designing and installing solar systems within South is required.

• Proven experience in designing, installing and testing solar energy systems within South Sudan for UN Agencies, the private sector, residential premises, government agencies, or NGO clients is required.

• Solar energy experts who have worked for reputable renewable energy companies in South Sudan will have an added advantage.

3.1.

3.2. Electrical installation and Lightning protection

The contractor shall supply and install UPVC electrical conduits for passage of wires in walls and ceiling, rates inclusive of wall chiseling where neccessary. In addition, other primary (first phase) electrical fittings shall be fitted as well before the appliances are fixed or connected for all infrastructures with no such provision, this can be integrated to the BoQ.

The contractor shall also provide and install a complete lightning protection system in compliance with the specifications and standards of the most current editions of the BS EN 62305. This comprises of air termination, down conductors, horizontal conductor and earthing termination. Inspection and Certification shall also be provided to satisfy the requirement of the BS EN 62305. Earthing shall be done to allow for earthing the entire electrical installation comply with engineer’s requirements

4. Role of the Contractor

The Contractor will have to provide for the Installation and completion in every detail of the work described in the contract documents. All labor, materials, tools, equipment, transportation, supplies required to complete the work in accordance with the specifications and terms of the contract should be well furnished. The Contractor cannot deviate from the solar designs or specifications without seeking permission and approval from IOM.

IOM reserves the right to reject any materials, equipment, or resources and to delete or reduce any work item, whether in whole or in part and update Annexes, as necessary and a reduced contract price shall be agreed.

If the Contractor is not able to finish the solar installation works or must abandon the works due to loss of tools, accidents or any unforeseeable circumstances, the Contractor should remove all unused materials from the site. IOM will pay only for the work done as per rates in the filled Bill of Quantities in the contract document.

The ECRP IOM Project Health and Safety Management Plan (HSMP) outlines the Contractor's roles and responsibilities in the management of activities to prevent dangerous acts that could lead to injuries, illnesses or serious incidents in the workplace and damage or loss of assets.

The ECRP Quality Management Plan (QMP) outlines the Contractor's roles and responsibilities for meeting the quality standards expected of this program and the process and procedure for verifying each step.

To complete the task timely and efficiently the Contractor should:

1. Deploy qualified and well experienced managers, site electrical engineers and workers to complete the required tasks.
2. Prepare and submit staff deployment plan/organogram for the project implementation assigning the specific persons in charge of communication and coordination with the project supervisor.
3. Prepare and submit Work Plans, Emergency Preparedness and Response Plan, Waste Management Plan, Labour Management Plan and Environmental and Social Management Plan as per the HSMP
4. Preparation of "Resource Plan" (materials, machine/tools, manpower) in accordance with the submitted Work Plans.
5. Develop Risk Assessments using Form HS05 as per the HSMP
6. Based on the approved work plan, the Contractor shall execute multiple work activities simultaneously to save time.
7. The Contractor shall allow unlimited access to solar installation sites for the ECRP staff as required.
8. Follow Guideline GHS12 – Site Establishment in the HSMP,
    A. The Contractor is responsible for maintaining pollution/contamination-free surrounding environment.
    B. The contractor should display both work plan and resource plan at each site.
    C. The debris from any demolition activity and garbage at the installation sites should be removed by the Contractor and disposed of in a safe area away from the site.

9. As per the Quality Management Plan (QMP),
    A. Ensure that solar materials are properly packed and covered during transportation to ensure that the materials are not damaged.
    B. Ensure that all solar materials, in particular solar panels, batteries, hybrid inverters etc. are properly stored on sites to prevent any deterioration of functionality and efficiency by water, moisture, or heat.

5. Health, Safety and Environment

The Contractor is required to comply with the *ECRP IOM Project Health and Safety Management Plan (HSMP)* and the *Environmental and Social Management Plan (ESMP)*. The following information is provided to guide the Contractor in the key aspects of the HSMP only.

The main health and safety legislation and other relevant compliance requirements in South Sudan are described in the *South Sudan Legal Register* (Form HSE03).

Risk assessments for hazard identification and activities are required for safety-critical activities prior to each stage of work commencing. These shall be documented using Form HS05. All IOM personnel have the authority to stop any activity that has the potential to cause injury or damage property until such times as the works are managed in a safe manner.

The Contractor's team leader shall take all reasonable precautions to prevent any death or injury to persons during said undertaken activities. These precautions shall include but not be limited to ensuring the crew wears the protective equipment such as safety helmets, hard-toed boots (safety boots) or gumboots, heavy-duty gloves and ensuring that all tools and equipment are in a safe condition and ensuring that their employees adopt safe working methods as instructed by IOM. No military-looking clothing will be accepted at any time. *Health, Safety, Social and Environmental inspection Site Reports* shall be carried out weekly on Form HSE05.

The project sites The Contractor's team leader has the obligation and responsibility to safeguard the safety and security of its personnel, the construction crew's equipment and other property, and personnel's personal effects and other property. The Contractor's team leader shall develop an *Emergency Preparedness and Response Plan* in consultation with IOM, including detailed procedures to cover evacuation, personnel, equipment, unlawful interference, and prevention of sabotage.

The Contractor is required to hire skilled and unskilled labour from the local project area to execute the contract where applicable. The Contractor shall submit their *Labour Management Plan* in accordance with the guidelines in Annex F on the ECRP *Labour Management Procedures*. Justification must be submitted to IOM for approval before the Contractor can recruit non-local skilled labour.

All selected staff to work as part of the solar installation crew are to abide by the Code of Conduct in the Construction Contract on the prohibition and prevention of sexual exploitation and abuse (SEA). The crew shall undertake a *PSEA (Prevention of Exploitation and Abuse), 1-day training* with IOM prior to conducting any work.

The Contractor is to ensure that all materials, solid or liquid, are stored in a manner so as not to damage or contaminate any surface by spillage. Further guidance is provided in *Guidelines on Environmental Management*: GEM02 Waste Management & Hazardous Substances, GEM03 Protection of Water,

GEM05 Borrow Pit Management, and GEM06 Preservation of Historical, Archaeological and Cultural Remains.

6. Quality Management

The ECRP *Quality Management Plan (QMP)* outlines the Contractor's roles and responsibilities for meeting the quality standards expected of this program and the process and procedure for verifying each step. The following information is provided to guide the Contractor in the key aspects of the QMP only. A more detail guidance on quality of workmanship is provided in Annex B.

Section 5 of the QMP provides the framework for project staff responsibilities during solar installation. From IOM, each site will be assigned a Site Engineer and Community Site Supervisor who are supervised by a Project Engineer whose main task is to monitor and report on the performance of works being implemented. The Lead Engineer is responsible for the overall contract management.

The QA process, in brief, starts with approval from the Lead Engineer for a solar installation activity to proceed (Form QM06). Once approval is obtained, the work can proceed. During the work phase and upon completion, the Contractor must allow testing of solar performance and efficiency, inspection of solar installation activity and survey compliance checks to be performed. For *solar and power bank testing*, relevant forms include QM07A Request for Inspection and Testing Results, QM07B Inspection of solar Materials on Site, and QM09 Inspection and testing plan. For inspection, the Contractor is responsible for submitting *QM10 Daily Logbook*, and *QM11 Weekly/Monthly Progress Report and Summary*.

Any solar materials or works that do not conform to the technical specifications, design drawings or BoQ shall be rejected with a *Non-Conformance Report (NCR)*. The Contractor will then be responsible for dismantling and removal of the rejected materials from the sites immediately. Rectification and reconstruction of works shall be carried out at the cost of the Contractor prior to continuing with the next phase of work. Refusal of this instruction will lead to immediate termination of the contract.