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# Terms of Reference

Solar Water Pumping; Installation, Operation and Maintenance  
Training

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## 1. Background

South Sudan Red Cross (SSRC) is implementing a three-year-long SWISS funded project under the Swiss water and sanitation consortium with project title the Blue Schools: WASH and environmental improvement for schools and communities'. This project, running from 1<sup>st</sup> January 2024 to June 2027, targets Juba county, central Equatoria State. The project is implemented through South Sudan Red Cross (SSRC) while the Swiss Red Cross (SRC) provides technical support

SSRC has constructed 4 solar powered mini-water yards, Each of the solar water pumping units is composed of: Crystalline solar panels (8 panels of 200W each), a Submersible pump installation, a 6m high steel elevated water tower, 5,000-liter PE water reservoirs, pipe networks including two tap stands.

In the project's mid-term, SSRC seeks to implement a robust operation and maintenance framework. This includes:

- Provision of seed stocks for fast-moving spares parts and tools.
- Prepare/develop solar water system inspection, monitoring and routine maintenance plan
- Capacity building for troubleshooting, repair, and installation.
- Development of market linkages for replenishment supplies.

To enhance technical capacity SSRC is seeking external expertise to conduct comprehensive training on the installation, operation, and maintenance of solar-powered water pumping systems.

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## 2. Objectives

The training aims to build the capacity of stakeholders, including SSRC staff, the State Department of Water, and County Water Departments. This will ensure participants can effectively manage solar-powered water systems. The objectives include:

- 1. Technical Skills Development:**
  - Equip participants with the skills to assemble, install, and maintain solar-powered water pumping systems.
  - Provide hands-on experience in troubleshooting and repairing system components.
- 2. Operational Understanding:**
  - Enhance understanding of energy fundamentals such as electrical circuits and PV panel configurations.
  - Develop knowledge of submersible pump operations, including sizing, assembly, and maintenance schedules.
- 3. System Sustainability:**
  - Foster capacity for designing and implementing maintenance schedules.

- Strengthen linkages to suppliers and service providers for spare parts and system upgrades.

Specific deliverables shall include:

- Five days hands on training covering
  - Basics of solar water pumping systems
  - Field visits to installed solar water pumping units for practical sessions, including dismantling, installation and troubleshooting.
  - Pretest and Post test, including training report for the participants
- Recommendations on components of operation and maintenance toolkit to facilitate procurement of the same for the water departments, SSRC and county departments.
- Development of maintenance schedules and resource lists for system components.

### 3. Outputs

The training should cover in addition to other topics deemed fit:

- Overall set-up and assembly for solar powered water pumping systems and its components
- Electrical energy basics to include circuit measurements, different types of circuits (serial, Parallel, Mixed)
- PV panel connections; to include introduction, serial and parallel connections of PV panels, maximum power point tracking.
- Reticulation systems for the solar powered systems; installations, troubleshooting mechanisms, the distribution and storage
- Solar-powered water pumps; submersible pumps sizing, pump curves, assembly and dissembling of submersible pumps, borehole casings, mechanical seals, regular maintenance schedules, suppliers/ stock lists.
- Solar charge controllers; to cover the internal circuits, maximum power point tracking, installation and operation.
- Shading to include declination of the sun, forms of shading, cell shading, panel shading
- DC safety (overcurrent protection, arc flashes) and Motor drives DC, AC to cover startup methods and motor protection
- System performance to consider the life cycle, cost calculations and system hydraulics
- Recommended toolkits assembly list for overall components of solar powered water yards; PV panels installation and troubleshooting, Submersible pumps trouble shooting, reticulation plumbing works
- Develop an operation and maintenance schedule for the overall components of solar powered water yards

### 4. Activities & Itinerary

When	What	Where	Who
Day – Sunday	Briefings/ Training preparations/Arrival of participants from per areas	Training Venue	SSRC
Day 1 – Monday	Training in Juba - Theory	Juba	Trainers/ Facilitators
Day 2 – Tuesday	Training in Juba- Theory	Juba	Trainers/ Facilitators
Day 3 – Wednesday	Practical Training in Field	Juba	Trainers/ Facilitators
Day 4 – Thursday	Practical Training in Field	Juba	Trainers/ Facilitators
Day 5– Friday	Practical Training in Field and Closer	Juba	Trainers/ Facilitators

### 5. Who will be involved?

People who will be involved:

- Trainers/ Facilitators; 2 people from reputable institutions
- Field teams; State Water Department, County Water Department, SSRC branch WASH staff
- HQ team; SSRC HQ WASH staff
- Total participants/ trainees 15

## 6. Other Details; Changes to the TOR and Submission of Expression of interest

### Changes to the TOR

The trainers/facilitators may propose changes to the TOR where they deem fit. However, the changes have to be discussed both with SSRC before they are adopted as part of the TOR/ contract.

This TOR (including any changes made), thereafter, shall form part of the service contract agreement upon completion of the competitive selection process.

### Submission of Expression of Interest, EOI

South Sudan Red Cross, requests submissions from the firms/ reputable institutions, 3-4 page technical and financial proposals as per below guideline.

### Technical Proposal

- Provide understanding of tasks as indicated in the TOR.
- Provide a clear time frame, and tentative workplan for undertaking the training.
- Share the Firm or institution profile/ documentation of previous work done as relates to Solar PV operation and maintenance trainings in recent two years.
- Attach relevant documentation as a registered institution/ firm.
- Staffing capacity: provide details especially for the Two trainers/ facilitators to be engaged on the assignment including recent CV.
- Confirm availability to start the tasks as per the TOR as from 1st February 2025.

### Financial Proposal

Financial proposal shall form part of the contract agreement/ final signed by both the South Sudan Red Cross and the training institution.

The financial proposal should include all costs (professional fees, external flights where needed, transportation, accommodation, training report, etc.) necessary for the trainers/facilitators to effectively complete the tasks as per the TOR.

Indicate total cost in USD for the task. The table below is as a guide.

#	Description of costs	Unit	Rate	Amount
1.	Preparatory Costs			
2.	Flights (only for international flights), including visas if applicable			
3.	Professional training costs – 5 days, 15 participants			
4.	Training materials – Handouts, practical training items (specify)			
5.	Others – please specify			
	Total			

NB:

- **SSRC will facilitate and cater for all in-country travel costs; field level travels and training venue and all costs for breakfast, meals and venue for the training within the specified time-frame above.**

## Submission

The deadline for submitting EOI will be Monday 11<sup>th</sup> August 2025. Sealed envelopes should be addressed and delivered to SSRC offices, Tongping Area, Ministries Block, Juba, South Sudan. Soft copies of the application are acceptable and should be sent to [vacancy@ssdredcross.org](mailto:vacancy@ssdredcross.org) or [tender@ssdredcross.org](mailto:tender@ssdredcross.org). Please include the name and telephone number of the contact person for the application.

Interviews may form part of the selection process, if necessary, after analysis of the technical and financial proposals.

For any questions, clarifications or further information regarding the TOR, please contact: David Mitu email: [david.mitu@ssdredcross.org](mailto:david.mitu@ssdredcross.org)

