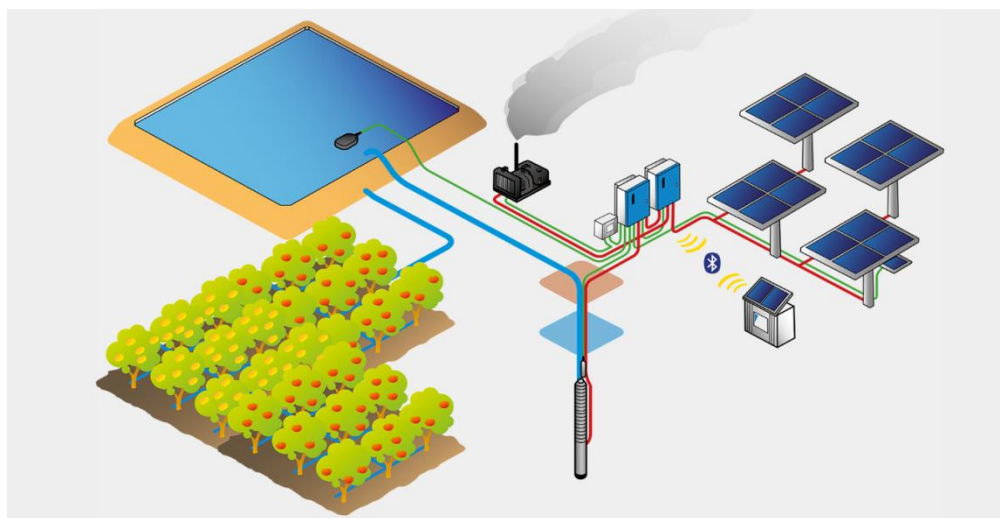


TENDER REFERENCE: RACIDA-SOM1035-010
SOLAR POWERED IRRIGATION SOLUTIONS



INTRODUCTION

Agriculture is the single largest employer in the world, sustaining the livelihoods of 40 percent of the world's population, many of whom continue to live in poverty (United Nations, 2015).

Irrigation is among the measures that can improve yields, reduce vulnerability to changing rainfall patterns and enable multiple cropping practices (FAO, 2011). As such, irrigation is often seen as the engine that helps to ensure food security, generates incomes, provides jobs and drives rural development. Energy is a key input for irrigation services.

As investment costs for solar powered irrigation systems (SPIS) are coming down and subsidy schemes for SPIS are being rolled out, solar technologies are becoming a viable option for both large and small-scale farmers. SPIS provide reliable and affordable energy, potentially reducing energy costs for irrigation. In rural areas where diesel fuel is expensive or where reliable access to the electricity grid is lacking, they can provide a relatively flexible and climate friendly alternative energy source. SPIS can be used in large-scale irrigation systems as well as for decentralized, small-scale irrigation.

SPIS have many advantages, providing a clean alternative to fossil fuels and enabling the development of low-carbon irrigated agriculture. In areas with no or unreliable access to energy, they contribute to rural electrification and reduce energy costs for irrigation. This improves the access to water of many farmers and can have knock-on effects on agricultural productivity and incomes.

SYSTEM DESIGN FOR DOLLO FARM IRRIGATION

SITE DATA

Site Location	Dollo
Source of Water	River water
Point of Pumping	Borehole catchment near River
Proposed Pump Type	Surface Mounted centrifugal pump
Daily Water demand	100,000 Litres
Point of water delivery	To Irrigation canals
Daily Average Solar irradiation	4.5KWh/m ²
Average Sky clear Index	6
Average Daily sun hours	7

Pump and Solar system Sizing

- To pump, 100,000 litres of water in 7 hours, the minimum required flow-rate is;

$$\text{minimum required flow – rate} = \frac{100,000}{7} = 14,286 \text{ litres/hour}$$

- *Taking into account frictional and pipes loses; the required flow-rate is adjusted to 20,000 litres per hour.*
- The total dynamic head is assumed to be less than 100 meters.
- We recommend water lubricated, vertical multi-stage centrifugal pump powered by at least 7.5KW motor with effective motor starter and controller. GRUNFOS CR20-7 Series will be a good choice. The pump and motor Assembly should comply with IEC and DIN standards.
- The required power from Solar system to run the 7.5KW motors is at minimum 10KW solar PV system. Note the overall solar power is designed higher than motor rating to cover for conversion losses, systems inefficiency losses and to cater for higher starting current required for Induction motors.

- 150 watts Solar panel is recommended due to availability in the market and ease of transport. The Maximum Open-circuit Voltage (V_{oc}) for such panel is 22.5V and maximum system voltage is 600V DC. The Panels short circuit current (I_{sc}) is 8.88A

Number of Solar Panels in a string (Connected in series) is 20 Panels giving a system voltage of $22.5V \times 20 \text{ Panels} = 450V$. Hence a system voltage of 450 ($450 < 600$) is a safe operating voltage.

The Number of strings in the PV array is therefore recommended to be 2 strings. This will give a higher system current output of $8.88A \times 2 \text{ Strings} = 17.76A$. This higher current is suitable for the required high starting current.

Number of panels therefore is $2 \times 20 = 40$ Panels. You could add 5 panels in case some break during transportation as often happens.

BILL OF QUANTITIES

S/N	Description	Unit	Quantity	Unit Price (USD)	Total (USD)
1	150 Watts Polycrystalline Solar PV Panels	No.	40		
2	7.5KW GRUNFOS CR20-7 Centrifugal pump Complete with installation accessories	No	1		
3	7.5KW RSI Controller	No.	1		
4	Cables and Cable Accessories	Ls	1		
5	Solar PV Mounting Structures and accessories	Ls	1		
6	Assorted pipes, gate valves and accessories	Ls	1		
7	30A Isolators	No.	2		
8	Earth Rods, Earth lead cables and clumps	Ls	1		
9	Civil works	Ls	1		
10	Transport				
11	Labour				
12	Sub-Total				
13	Add Tax				

14	TOTAL	
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General Bid Requirements

1. Contact Information: Full name, address, telephone numbers of your company and contact persons.
2. Supplier's acceptance of RACIDA's Prohibition on Assistance to Drug Traffickers, and Certification Regarding Terrorist Financing Declaration (enclosed, Appendix I). RACIDA cannot issue a Purchase Order in the absence of a Supplier's acceptance of these declarations.
3. Prices: RACIDA will pay only for the goods actually accepted at final destination after inspection at unloading point(s) and deduction of actual damages and/or liquidated damages for late delivery and/or quality deviations, if any. Applicants without this will not be considered.
4. Delivery time: The preferred delivery date/time for goods on site is 2-weeks after receipt of RACIDA Purchase Order. Suppliers are therefore requested to quote their best delivery time in calendar days/weeks following receipt of eventual Purchase Order.
5. Validity: Bids must remain valid with firm and fixed prices for 90 days after Tender Closing Date.

The submission of applications

Completed tender documents are to be submitted through email with the subject name: Supply of solar Materials for the Canal in Dollow, Gedo Region, Somalia and Tender Number RACIDA-SOM1035-010 in accordance with the Instructions to Tenders in the tender documents.

Tender Name: Supply of Solar Materials for the Canal in Dollow, Gedo Region, Somalia

Tender Reference Number: RACIDA-SOM1035-010

Bids must be emailed to: procurement@racida.org

Closing date of reception of Submission of applications: at the latest the 20th of May 2023 at 10am.

Conditions of attribution

Selection Criteria

The attribution will be decided on the basis of our selection criteria. Be precise on your quotation concerning each ones of these criteria's and if there are some you are not able to fulfill explain why in order for us to possibly review our position.

Type of Criteria	Basis on which criteria is used
1. Price	<ul style="list-style-type: none">Competitive price and corresponding to our budget,
2. Delivery	<ul style="list-style-type: none">Lead timeDelay for deliveries
3. Previous experience	<ul style="list-style-type: none">References provided by the supplier (3),
4. Bank guarantee	<ul style="list-style-type: none">Bank statement
5. Signed declaration form	<ul style="list-style-type: none">Signed declaration form in Appendix I of tender document

APPENDIX I

DECLARATIONS

1. Prohibition on Assistance to Drug Traffickers

RACIDA reserves the right to terminate this contract or take other appropriate measures if the supplier is found to have been convicted of a narcotics offense or to have been engaged in drug trafficking as defined in United Nations Convention Against Illicit Traffic in Narcotics Drugs and Psychotropic Substances, 1988.

1a. Key Individual Certification Narcotics Offenses and Drug Trafficking: I hereby certify that within the last ten years: 1. I have not been convicted of a violation of, or a conspiracy to violate, any law or regulation of Kenya, Somalia or any other country concerning narcotic or psychotropic drugs or other controlled substances. 2. I am not and have not been an illicit trafficker in any such drug or controlled substance. 3. I am not and have not been a knowing assister, abettor, conspirator, or colluder with others in the illicit trafficking in any such drug or substance. 4. I understand that RACIDA may terminate my contract if it is determined that I engaged in the above conduct during the last ten years or during the period of engagement with RACIDA.

Signature:

Name:

Company:

Date:

Address:

2. Certification Regarding Terrorist Financing

By signing and submitting this contract, the prospective supplier provides the declarations set out below:

2a. The Supplier, to the best of their current knowledge, did not provide, within the previous ten years, and will take all reasonable steps to ensure that they do not and will not knowingly provide, material support or resources to any individual or entity that commits, attempts to commit, advocates, facilitates, or participates in terrorist acts, or has committed, attempted to commit, facilitated, or participated in terrorist acts, consistent with numerous United Nations Security Council resolutions, including S/RES/1269(1999), S/RES 1368(2001) and S/RES1373(2001) and the European Union. RACIDA is firmly committed to the international fight against terrorism and in particular against the financing of terrorism. It is the policy of RACIDA to seek to ensure that none of its and its donor funds are used, directly or indirectly, to provide support to individuals or entities associated with terrorism or money laundering. I understand that RACIDA

may terminate my contract if it is determined that I engaged in the above conduct during the last ten years or during the period of engagement with RACIDA.

2b. For purposes of this Certification - a. "Material support and resources" means currency or monetary instruments or financial securities, financial services, lodging, training, expert advice or assistance, safe houses, false documentation or identification, communications equipment, facilities, weapons, lethal substances, explosives, personnel, transportation, and other physical assets, except medicine or religious materials." (i) "Training" means instruction or teaching designed to impart a specific skill, as opposed to general knowledge. (ii) "Expert advice or assistance" means advice or assistance derived from scientific, technical, or other specialized knowledge.

Signature:

Name:

Company:

Date:

Address:

