THE KERALA AGRO INDUSTRIES CORPORATION LIMITED
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DISCLAIMER

The information contained in this Expression of Interest document (the "EoI) or subsequently provided to Applicant(s), whether verbally or in documentary or any other form, by or on behalf of Kerala Agro Industries Corporation Limited Head Office : Kissan Jyothi, Fort.P.O Thiruvananthapuram hereinafter called KAICO or any of its employees or any of its employees or advisors, is provided to Applicant(s) on the terms and conditions set out in this EOI and such other terms and conditions subject to which such information is provided.

This EOI is not an agreement and is neither an offer nor invitation by KAICO to the prospective Applicant(s) or any other person. The purpose of this EOI is to provide interested parties with information that may be useful to them in the formulation of their application for qualification pursuant to this EOI.

KAICO also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Applicant(s) upon the statements contained in this EOI.

The issue of this EOI does not imply that KAICO is bound to select and shortlist Applicants for next stage or to enter into any technology tie-up Agreements with shortlisted Applicants for the project.

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EXPRESSION OF INTEREST IS INVITED FROM INTERESTED PARTIES FOR SUPPLY OF SOLAR POWERED ENERGY EFFICIENT LOW VOLTAGE PUMPSETS FOR ASSEMBLY AND MARKETING OF PUMPSETS AS CO BRANDED/KAICO BRANDED

Managing Director, KAICO, Thiruvananthapuram invites expression of interest for supply of Solar powered energy efficient low voltage pumpsets for assembly and marketing of pumpsets as co branded/ KAICO branded.

1.0 Introduction:

1.1 Background

Agriculture in India has undergone tremendous development over the years. The advent of new machinery and equipment has resulted in increased level of mechanised farming and irrigation. This, in turn, has increased the productivity of their

The Kerala Agro Industries Corporation Ltd (KAIC), a premier organization in the agricultural sector, was incorporated in the year 1968 jointly by the Government of India and Government of Kerala, with the object of promoting agro based Industries in the State of Kerala for the production of farm implements, for the supply of machinery and equipments required for the development of agriculture and to cater to the needs of the farming community. Corporation is functioning under the control of Department of Agriculture, Cooperation & Farmers Welfare, Government of India and Department of Agriculture Development and Farmers' Welfare, Government of Kerala.

KAICO's product range includes power tiller, tractor, power reaper power weeder, brush cutter and diesel engine. Its unparalleled success can be attributed to its unique marketing strategy. Today, KAICO's marketing efforts have gone above the confines of India to the overseas agro machinery market.

KAICO also organizes various training programmes for people engaged in agricultural activities, to guide them and keep them abreast with newer farming techniques. Many of the villages in our country do not have clectricity to run electric pumpsets. Here, the importance of solar powered energy efficient low voltage pumpsets comes into the picture. KAICO wishes to use their time tested market knowledge and expertise in agricultural scenario all over India by marketing such pumpsets.

KAICO wishes to enter into agreements with manufacturers of Solar Powered Pumpset to assemble and market the pumpsets co branded/KAICO branded.

2.0 Eligibility of Applicants

2.1 a) The Applicant should be the original manufacturer or represented by its authorised dealer.

b) The group turnover of the manufacturer should be above Rs 50 crores or equivalent for at least two years in the last three years.

2.2 An Applicant shall not have a conflict of interest that affects the EOI process. Any Applicant found to have a conflict of interest shall be disqualified. An Applicant shall be deemed to have a conflict of interest if a constituent of such Applicant is also a constituent of another Applicant.

2.3 Documents

All the documents necessary to prove the above eligibility criteria may be enclosed along with the application.

Annexure-I

TECHNICAL SPECIFICATIONS FOR 3/5/7.5/10 HP SOLAR WATER PUMPING SYSTEMS

Pump Type and Capacity	PV Module Capacity	Motor Pumpset type
3 HP (DC, Surface type)	2700 Wp	3 HP Surface with controller
3 HP (DC, Submersible)	3000 Wp	3 HP submersible with controller
3 HP (AC, Submersible)	3000 Wp	3 HP submersible with controller
5 HP (DC, Submersible)	4800 Wp	5 HP submersible with controller
5 HP (AC, Submersible)	4800 Wp	5 HP submersible with controller
7.5 HP (DC, Submersible)	6750 Wp	7.5 HP with controller
7.5 HP (AC, Submersible)	6750 Wp	7.5 HP with controller
10 HP (DC, Submersible)	9000 Wp	10 HP with controller
10 HP (AC, Submersible)	9000 Wp	10 HP with controller

DISCHARGE TABLE OF SOLAR PUMPS WITH VARIOUS DYNAMIC HEADS

SN	Type Of Pump	Pump Capacity	Module Capacity, Wp	Discharge LPD at various Head (Mtrs)			
				20	30	50	70
1	DC Submersible	03 HP	3000	--	1,05,000	--	--
2	AC Submersible	03 HP	3000	--	96,000	--	--
3	DC Surface	03 HP	2700	1,35,000	--	--	--
4	DC Submersible	05 HP	4800	--	--	1,00,800	--
5	AC Submersible	05 HP	4800	--	--	91,200	--
6	DC Submersible	7.5 HP	6750	--	--	--	94,500
7	AC Submersible	7.5 HP	6750	--	--	--	87,750
8	DC Submersible	10 HP	9000	--	--	--	1,26,000
9	AC Submersible	10 HP	9000	--	--	--	1,17,000

* Water output figures are on a clear sunny day with three times tracking of SPV panel, under the "Average Daily Solar Radiation" condition of **7.15 KWh/ sq.m. on the** surface **of PV array (i.e. coplanar with the PV Modules)**.

Notes:

1. If surface pumps are used in lieu of submersible pumps, the water output must match that of the submersible pumps as specified in this table.
2. Module mounting **structure shall** be MS hot dipped galvanized, with a facility of manual tracking at least three times a day.

II. PERFORMANCE SPECIFICATIONS AND REQUIREMENTS

Under the "Average Daily Solar Radiation" condition of 7.15 KWh / sq.m. on the surface of PV array (i.e. coplanar with the PV Modules), the minimum water output from a Solar PV Water Pumping System at different "Total Dynamic Heads" should be as specified below:

For D.C. Motor Pump Set with Brushes or Brush Less D.C.(B.L.D.C.) :

1. 100 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 metres (Suction head, if applicable, minimum of 7 metres) and with the shut off head being at least 12 metres.
2. 50 liters of water per watt peak of PV array, from a Total Dynamic Head of 20 metres (Suction head, if applicable, up to a maximum of 7 metres) and with the shut off head being at least 25 metres.
3. 35 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 metres and the shut off head being at least 45 metres.
4. 21 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 metres and the shut off head being at least 70 metres.
5. 14 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 metres and the shut off head being at least 100 meters.
6. ***9.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 100 metres and the shut off head being at least 150 metres.***

The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

For A.C. Induction Motor Pump Set with a suitable Inverter :

1. 90 liters of water per watt peak of PV array, from a Total Dynamic Head of 10 metres (Suction head, if applicable, minimum of 7 metres) and with the shut off head being at least 12 metres.
2. ***45*** liters of water per watt peak of PV array, from a Total Dynamic Head of 20 metres (Suction head, if applicable, up to a maximum of 7 metres) and with the shut off head being at least 25 metres.
3. 32 liters of water per watt peak of PV array, from a Total Dynamic Head of 30 metres and the shut off head being at least 45 metres.
4. 19 liters of water per watt peak of PV array, from a Total Dynamic Head of 50 metres and the shut off head being at least 70 metres.
5. 13 liters of water per watt peak of PV array, from a Total Dynamic Head of 70 metres and the shut off head being at least 100 metres.
6. **8.5 liters of water per watt peak of PV array, from a Total Dynamic Head of 100 metres and the shut off head being at least 150 metres.**

The actual duration of pumping of water on a particular day and the quantity of water pumped could vary depending on the solar intensity, location, season, etc.

III. PV ARRAY

The SPV water pumping system should be operated with a PV array capacity in the range of ***200 Watts peak to 10 kW peak,*** measured under Standard Test Conditions (STC). Sufficient number of modules in series and parallel could be used to obtain the required PV array power output. The power output of individual PV modules used in the PV array, under STC, should be a minimum of 125 Watts peak, with adequate provision for measurement tolerances. Use of PV modules with higher power output is preferred.

Indigenously produced PV module (s) containing mono/ multi crystalline silicon solar cells should be used in the PV array for the SPV Water Pumping systems.

- Modules supplied with the SPV water pumping systems should have certificate as per BIS14286/IEC 61215 specifications or equivalent National or International/ Standards.
- Modules must qualify to IEC 61730 Part I and II for safety qualification testing.
- The efficiency of the PV modules should be minimum **14%** and fill factor should be more than **70%**.
- The terminal box on the module should have a provision for "Opening" for replacing the cable, if required.
- There should be a Name Plate fixed inside the module which will give:
  - **i. Name of the Manufacturer or Distinctive Logo.**
  - **ii. Model Number**
  - **iii. Serial Number**
  - **iv. Year of manufacture**
  - **v. HAREDA logo (available on-line)**
  - **vi. Made in India**

IV MOTOR PUMP-SET

1. The SPV water pumping systems should use the following types of motor pump sets:

   a. Surface mounted motor pump-set
   b. Submersible motor pump set

2. The "Motor Pump Set" should have the following features:

   a) The mono block DC/ AC centrifugal motor pump set with the impeller mounted directly on the motor shaft and with appropriate mechanical seals which ensures zero leakage.

   b) The motor of the capacity 3HP and 10 HP should be AC, PMDC or BLDC type. The suction and delivery head will depend on the site specific condition of the field.

   c) Submersible pumps could also be used according to the dynamic head of the site at which the pump is to be used.

3. It is recommended that all parts of the pump and the motor of the submersible pumps should be made of stainless steel.

   The manufacturers of pumps should self certify that, the pump and ***all external parts of motor used in submersible pump which are in contact with water, are of stainless steel.*** The pumps used for solar application should have a 5 years warranty so it is essential that the construction of the pump be made using parts which have a much higher durability and do not need replacement or corrode for at least 5 years.

4. Provision for remote monitoring of the installed pumps must be made in the controllers or the inverters either through an integral arrangement or through an externally fitted arrangement. It should be possible to ascertain the daily water output, the power generated by the PV array, the UP TIME of the pump during the year,

Number of days the pump was unused or under breakdown/repairs**.**

5. The following details should be marked indelibly on the motor pump set
   i. Name of the Manufacturer or Distinctive Logo.
   ii. Model Number.
   iii. Serial Number.
6. The suction/ delivery pipe (GI/HDPE), electric cables, floating assembly, civil work and other fittings required to install the Motor Pump set.
7. **The Motor Pump set must be Made in India**

V. MOUNTING STRUCTURES AND TRACKING SYSTEM.

The PV modules should be mounted on metallic structures of adequate strength and appropriate design, which can withstand load of modules and high wind velocities up to 150 km per hour. The support structure used in the pumping system should be hot dip galvanized iron with minimum 80 micron thickness.

To enhance the performance of SPV water pumping systems, manual or passive or auto tracking system must be used**.** For manual tracking, arrangement for seasonal tilt angle adjustment and three times manual tracking in a day should be provided.

VI. ELECTRONICS AND PROTECTIONS

1. Maximum Power Point Tracker **(MPPT)** should be included to optimally use the Solar panel and maximize the water discharge.
2. Inverter could be used, if required, to operate an A.C. Pump. The inverter must have IP 54 protection or must be housed in a cabinet having at least ***IP54*** protection.
3. Controller for BLDC motor driven pumps, if required be used. The controller must have ***IP 54*** protection or must be housed in a cabinet having at least IP 54 protection.
4. Adequate protections should be incorporated against dry operation of motor pump set, lightning, hails and storms.
5. Full protection against open circuit, accidental short circuit and reverse polarity should be provided.

VII. ON/OFF SWITCH

A good reliable switch suitable for DC use is to be provided. Sufficient length of cable should be provided for inter-connection of the PV array, Controller / Inverter and the motor pump set.

VIII. WARRANTY

The PV Modules must be warranted for output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. The whole system including submersible/ surface pumps shall be warranted for 5 years. Required Spares for trouble free operation during the Warrantee period should be provided along with the system.

IX. OPERATION AND MAINTENANCE MANUAL

An Operation and Maintenance Manual, in English and the local language, should be provided with the solar PV pumping system. The Manual should have information about solar energy, photovoltaic, modules, DC/AC motor pump set, tracking system, mounting

structures, electronics and switches. It should also have clear instructions about mounting of PV module, DO's and DONT's and on regular maintenance and Trouble Shooting of the pumping system. Name and address of the person or Centre to be contacted in case of failure or complaint should also be provided. A warranty card for the modules and the motor pump set should also be provided to the beneficiary.

X. NOTES

Wherever the "Water table" or the level of water in the reservoir or the water source (e.g. Diggie) from which the water is to be pumped, is within 10 metres depth, 'Surface Motor Pump sets" should be preferred.

The type of pump set used must match the total dynamic head requirement of the site (i.e. the location at which it is installed). Moreover, it should be appropriately tested and certified by the authorized test centres of the Ministry to meet the performance and water discharge norms specified above.

XI. Testing

The following organizations will provide technical help and testing facilities.

a. National Institute of Solar Energy (NISE), Gurgaon
b. CPRI, Bangalore
c. TUV Rheinland India Pvt. Ltd., Banglore (letter no. – 32/47/2014-15PVSE dated 1/5/2015).
d. M/s UL Block-1, 3rd Floor, Kalyani Platina, 24, EPIP Zone Whitefield, Bengaluru.
e. Scientific and Industrial Testing and Research (SITRAC) 83 & 84 A, M G Road, Avarampalayam Rd, Coimbatore, Tamil Nadu 641004

Note:

a. The material should confirm to the latest MINIMAL TECHNICAL REQUIREMENTS / STANDARDS FOR **SPV WATER PUMPING SYSTEMS** UNDER THE PROGRAMMES OF MINISTRY OF NEW AND RENEWABLE ENERGY, GOI and as amended from time to time.

b. Material shall be strictly as per DNIT specifications. If there is any left out specification, the same shall be considered as per the latest specifications applicable as per MNRE/ BIS/International Standards.

2.4 Methodology of selection

Applications will be scrutinized and manufacturers will be empanelled. The Solar Powered Pumpsets will be procured from the empanelled manufacturers or their representative dealers after following necessary purchase procedures.

2.5 Right to accept or reject any or all applications

2.5.1 Notwithstanding anything contained in this EOI, KAICO reserves the right to accept or reject any application and to annul the EOI process and reject all applications, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons therefor. In the event that KAICO rejects or annuls all the applications, it may, at its discretion, invite all eligible bidders to submit fresh applications.

2.5.2 KAICO reserves the right to disqualify any Applicant during or after completion of EOI process, if it is found there was a material misrepresentation by any such Applicant or the Applicant fails to provide, within the specified time, supplemental information sought by KAICO.

KAICO reserves the right to verify all statements, information and documents submitted by the Applicant in response to the EOI. Any such verification or lack of such verification by KAICO shall not relieve the Applicant of his obligations or liabilities hereunder nor will it affect any rights of KAICO.

3.0 SCOPE

3.1 Scope of this work includes the following:

a) To manufacture and supply various Solar Powered Pumps and when required by KAICO for assembling pumpsets and marketing as co branded/ KAICO branded.

b) To provide their technical expertise in this field for all the after- market activities through their authorized agents.

c) To assist KAICO in formulating the marketing strategies specific to these products.

d) Any other activity in connection with (a) above.

4.0 How to apply:

Applications may be sent on or before 15.01.2019 5.00 PM to The Kerala Agro Industries Corporation Limited, Kissan Jyothi, Fort.P.O Thiruvananthapuram.Application should enclose Rs.10,000/- as processing fee as DD drawn in favour of Managing Director, The Kerala Agro Industries Corporation Limited payable at Thiruvananthapuram

5.0 Miscellaneous:

The EOI process shall be governed by, and construed in accordance with, the laws of India and the Courts at Trivandrum, Kerala state shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the EOI process.