



SELCO Foundation – Call for Vendors
Expression of Interest for the selection of Vendors for
Solar Powered Cold Storages

SELCO Foundation – Procurement Officer
690, 15th Cross Rd, Jeewan Griha Colony, 2nd Phase, J P Nagar, Bengaluru,
Karnataka 560078
Email ID- procurement@selcofoundation.org

Standard Bidding Document

FOR

Empanelment of Vendors

FOR

Design, Supply, Installation, Commissioning and comprehensive Maintenance of Solar Powered Cold Storage Units for a period of 12 months (up to 31st December 2024)

The link for the tender is:

<https://selcofoundation.org/tender/>

which can be downloaded from 10-11-2023. Bids, as per the terms and conditions should be submitted to the undersigned, at the above-mentioned address by 4pm on or before 24-11-2023.

Chief Executive Officer – SELCO Foundation



SELCO FOUNDATION

**TENDER NOTIFICATION FOR EMPANELMENT OF VENDORS
TO DESIGN, SUPPLY, INSTALLATION, COMMISSIONING & COMPREHENSIVE
MAINTENANCE
OF
SOLAR POWERED COLD STORAGE UNITS
FOR A PERIOD OF 12 MONTHS**

TENDER DOCUMENT

Address for Communication

SELCO Foundation

#690, 15th Cross Rd, J P Nagar – 2nd Phase

Bangalore, Karnataka – 560078

Telephone: 080-26493145

e-mail: procurement@selcofoundation.org

DISCLAIMER

NIT No:10

This tender by SELCO Foundation is for empanelment of vendors for Design, Supply, Installation, Commissioning & Maintenance for Solar Powered Cold Storage Units for a Period of 12 months.

NOTE:

1. Though adequate care has been taken while preparing the Notice Inviting Tender (NIT) document, the Bidders shall satisfy themselves that the document is complete in all respects. Intimation of any discrepancy shall be given to this office immediately. If no intimation is received from any Bidder within seven (7) days from the date of notification of Request for solution (RfS)/Issue of the RfS documents, it shall be considered that the RfS document is complete in all respects and has been received by the Bidder.
2. SELCO Foundation reserves the right to cancel/ withdraw this invitation for bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision
3. SELCO Foundation reserves the right to modify, amend or supplement this document.
4. While this RfS has been prepared in good faith, neither SELCO Foundation nor their employees or advisors make any representation or warranty, express or implied, or accept any responsibility or liability, whatsoever, in respect of any statements or omissions herein, or the accuracy, completeness or reliability of information, and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of this RfS, even if any loss or damage is caused by any act or omission on their part.

1. CONTENTS OF BID DOCUMENT

Section No.	Description	Page No.
Section 1	Bid Invitation	05
Section 2	Instruction to Bidders	06-10
Section 3	Technical Specifications	11-23

2. List of Documents to be Submitted in First Cover (In technical bid)

Table	Description	Page No.
Table 1	Details of the organization	24
Table 2	Check list of documents to be submitted in first cover	25

3. List of Documents to be Submitted in Second Cover (In financial bid)

Table	Description	Page No.
Table 1	Price Schedule	26 - 27

SELCO FOUNDATION

#690, 15th Cross, J P Nagar 2nd Phase,

Bangalore - 560078

Telephone: 080-26493145

e-mail: procurement@selcofoundation.org

NIT No: 10/2023-2024

Dated:10-11-2023

NOTICE INVITATION TENDER

Chief Executive Officer of SELCO Foundation, Karnataka State, India hereby invites bids for empanelment of vendors for Design, Supply, Installation, Commissioning & Maintenance for Solar Powered Cold Storage for a Period of 12 months.

1.	Tender Ref No.	10/2023-2024
2.	Last date & time for the bid submission	24-11-2023, 4.00 PM
3.	Opening date of first cover (technical bid) & second cover (financial bid)	27-11-2023, 2.00 PM
4.	Venue of acceptance and opening of tenders.	SELCO Foundation, Bangalore

Interested and eligible bidders may furnish the Technical & Commercial Bids for empanelment of vendors for supply of Solar Powered Cold Storage to the below mentioned address:

SELCO Foundation - Tender 10/ 2023-24

#690 15th Cross J P Nagar 2nd Phase Bangalore - 560078

Telephone: 080-26493145

e-mail: procurement@selcofoundation.org

Any further information or clarification may obtain either in person or through phone during office hours from the office of the SELCO Foundation Ph: 080-2649 3145 or through the email – procurement@selcofoundation.org

sd/-

Chief Executive Officer
SELCO Foundation

INSTRUCTION TO BIDDERS

Scope of the Work

The broad scope of the tender is empanelment of vendors/manufacturers for Design, Supply, Installation, Commissioning & Maintenance of Solar Powered Cold Storage Units for a Period of 12 months.

Empaneled vendors are eligible for release of work orders.

During the release of work order; selection of vendors will be based on the site condition, geography, commodity and suitable technical specifications.

The detailed scope of this work is as under:

A. Design

- i. The bidder will design the system as per the requirements given in the subsequent technical specification section.
- ii. The solar based cold storage unit must have a valid test certificate in the name of the bidder from MNRE/ NABL/ BIS* or equivalent accredited test laboratory.

** In case, the test certificate is not available at the time of bidding, documentation pertaining to availing the same i.e Test Acknowledgement copy etc. should be furnished along with the bid. In that case, the bidder shall have to submit the valid test report at the time of acceptance of agreement. The formal work order will be issued only after receiving of valid test certificate.*

- iii. Adequate Protection must be provided as per the requirement of the site by taking lightening and other climatic conditions etc.

B. Installation and commissioning

- i. The successful bidder will transport the system to the site, install and commission it on the field of beneficiaries as per the work order/ purchase order as given in the list.
- ii. Issued materials shall be kept at site in the safe custody of the System Integrator (SI). SELCO Foundation shall not be responsible for any loss or damage of any material during the installation or transportation.
- iii. All the electrical works should be done as per Indian Electricity Act. The persons engaged for carrying out electrical works should have a valid license of required category accordingly.
- iv. The installation process to be documented with specification of place, date and acknowledgement from the farmer/ end user who receives.
- v. After completion of installation work, each unit have to be tested and commissioned in presence of the end user and SELCO Foundation/ its representative.
- vi. The date & time for testing and commissioning must be decided in consultation with end user and SELCO Foundation/ its representative.
- vii. A display board (size preferably 3ft X 3ft) to be provided at the prominent place. The design and content to be provided at time of issuing work order.

C. Maintenance services

- i. The successful bidder is required to undertake scheduled maintenance as well as corrective maintenance for a period of 12 months starting from the date of commissioning of the project.
- ii. To ensure proper maintenance of the installed systems, the bidder is required to appoint a technically qualified person to look after maintenance and upkeep of the plant/System. Sufficient spare should also be kept with the service personnel so as to attend to any breakdown forthwith.
- iii. The cold room will be equipped with a remote monitoring system for monitoring its performance which will feed into the maintenance service of unit.
- iv. The bidder must be willing to provide extended service or enter into a Comprehensive Maintenance Contract (CMC) beyond the period of warranty for the next 10 years.
- v. Scheduled maintenance of each unit has to be taken up every quarter.
- vi. The bidder is also required to undertake on-call maintenance as and when required upon receipt of service request from end user or SELCO Foundation/ its representative.
- vii. The bidder must adhere to maintenance procedure by end user or SELCO Foundation/ its representatives from time to time.
- viii. Following service request intimated by SELCO Foundation/ its representatives, the system must be made functional within 72 hours. The losses occurred beyond downtime of 72 hours will be borne by the bidder and paid directly to the end- user.

D. Training

- i. The successful bidder shall have to organize a training program for the beneficiaries for operation and maintenance of the unit.
- ii. A list of DOs and DON'Ts shall be prepared and displayed at a prominent place at the site along with warning signs wherever necessary.
- iii. The beneficiary shall be equipped with copies of a pictorial (for easy understanding) operation manual preferably in the local language or Hindi and English.

Eligibility Criteria for Participating in the Bidding

- I. Organization should be in operation for the last 3 years in the field of supply, installation and maintenance of cooling solutions.
- II. The company should be able to provide excellent service. It is expected that complaints will be addressed within 72 hrs of lodging.
- III. Solar panels used by the bidder should be of a supplier in India and all the components should have manufacturing company name and the technical specifications.
- IV. Audited IT return for last 3 financial years.
- V. PAN card for the Organization.
- VI. Service provider should provide service for the system for a minimum period of 12 months. This should include one schedule service for every three months.
- VII. The bidder must be a company (registered under Indian Companies Act 1956) or a Partnership Firm (registered under Indian Partnership Act 1932) or a Sole Proprietorship Firm.
- VIII. The bidders must have minimum cumulative turnover of Rs 1,00,00,000/- over last three financial years (2020-23) exclusively in the solar powered cold storage business. As proof of this, the bidder must submit the relevant documents.
- IX. Net Worth of the bidder in the last Financial Year (2022-23) should be Positive.
“Net Worth” as per section 2 (57) of the Companies Act, 2013 means the aggregate value of the paid-up share capital and all reserves created out of the profits and securities premium account, after deducting the aggregate value of the accumulated losses, deferred expenditure and miscellaneous expenditure not written off, as per the audited balance sheet, but does not include reserves created out of revaluation of assets, write-back of depreciation and amalgamation.
- X. The bidder should have cumulative experience of executing contracts of supply of at least 5 nos. of Solar Powered Cold Storage to any Central Govt/ Any State Govt./ PSUs/ Govt Agency/ Bodies, Registered Co-operative, Society, NGO, FPO in the last 3 years from the date of issue of this tender. As proof of installation the bidder must submit the work completion certificates in the format below in favour of each work order issued. If the PO is from any private firm, then it is mandatory to submit TDS certificate which mentions the bidder’s name, along with completion certificate issued by-private-firm

SL. No.	Name of the Organization/ Beneficiary	Reference of Work Order/Supply Order issued	No. of Solar Cold Storage unit supplied	Date of Commissioning	Reference of Work Completion Certificate

- XI. The bidder's company/firm must have established quality assurance systems and organization in line with the requirements under ISO 9001:2015 and ISO 14001:2015.

Cost of bidding:

The bidder shall bear all costs associated with the preparation and submission of Bid to the Chief Executive Officer, SELCO Foundation herein after referred to as "the Purchaser" will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

Technical proposal shall contain:

- I. Particulars of the Firm as per [Annexure - 2](#)
- II. Checklist of Documents to be submitted in First Envelope as per [Annexure - 3](#)
- III. The bidder has to submit acceptance letter of warranty for 12 months for the total performance of the Solar Powered Cold Storages.
- IV. The bidder has to provide list of service center details all over India.
- V. The bidder has to sign all the pages of the documents as token of acceptance of all terms and conditions.

Financial bid shall contain:

The rate quoted for supply of Solar powered cold storage units should include all taxes levied by the State & Central Govt. Packing, handling charges including loading, installation & commissioning, insurance and annual maintenance contract for 12 months. The cost of transportation will be on actuals.

Price schedule:

The Bidder shall complete the price schedule as per [Annexure 4 - PRICE SCHEDULE](#) furnished in the Bidding Documents, indicating the total cost towards supply, installation, commissioning and Maintenance of solar powered cold storage units as per the Technical specifications mentioned in the [Annexure – 1 - TECHNICAL SPECIFICATIONS](#). The SELCO Foundation will not pay any extra charges over and above rate quoted by the Bidder except for transportation.

Fixed price:

Prices quoted by the Bidder are firm final and binding and not subject to variation on any account. A bid submitted with an adjustable price quotation will be treated as nonresponsive and rejected. The quotation will remain valid till 31st December 2024 from the date of opening the second envelope (financial bid). A Bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.

Format and Signing of Bid:

The Bidder shall give a set of hard copies of all the documents in the sealed cover. The Bids could be submitted by hand or post/courier to the below mentioned address

Procurement Officer- Tender 10/2023-24,

SELCO Foundation,

#690, 15th Cross, 2nd Phase, JP Nagar, Bengaluru- 78.

Deadline for Submission of Bids:

Bids must be received by the Purchaser not later than the time and date specified in the invitation for Bids (Section I). The Purchaser may, at its discretion, extend this deadline for submission of bid by amending the bid Documents in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

Tender Opening and Evaluation:

The Technical & Financial bids will be opened on same day itself or later separately. The financial bids (Second Cover), of only technically qualified bidders will be opened. The Bidders Names, Bid Modifications, or Withdrawals, bid prices, Discounts and the presence or absence of the requisite details as the Purchaser, at its discretion, may consider appropriate will be recorded by the Purchase Committee of SECLO Foundation. No Bid shall be rejected at bid opening, except for late bids, which will be rejected.

Clarification of Bids:

During evaluation of Bids, the purchaser may, at its discretion, ask the Bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in prices or substances of the Bid shall be sought, offered or permitted.

Preliminary Examination:

The purchaser will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished whether the documents have been properly signed, and whether the bids are generally in order.

Arithmetical errors will be rectified on the following basis. If there is a discrepancy between words and figures, the lowest of the two shall prevail and the bid shall stand corrected to that effect. The purchaser may waive any minor infirmity or non-conformity or irregularity in a bid, which does not constitute a material deviation, provided such a waiver does not prejudice or affect the relative ranking of any bidder.

Acceptance or rejection of bids:

- **Chief Executive Officer**, SELCO Foundation reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to award of contract, without there by incurring any liability or any obligation to inform the affected bidder or bidders of the grounds for the said action.
- Any Bid with incomplete information is liable for rejection.

ANNEXURE 1:

TECHNICAL SPECIFICATION FOR SOLAR POWERED COLD STORAGE WITH THERMAL STORAGE SYSTEM FOR COLD STORAGE CAPACITY

INTRODUCTION

The cold storage unit runs on power generated from Solar Photovoltaic. During sunshine hours the electricity generated from solar photovoltaic is used to provide cooling to cold storage unit as well as charging in the Thermal Storage System. The thermal storage solution is configured in a manner that solar energy generated from solar photovoltaic panels is converted into cold form through a vapour compression cycle. This cold energy is stored in a phase change material such as water or water salt eutectic mixture and transferred to the cold storage unit depending on the usage needs. During non-solar hours, the cooling needs of cold storage unit are met through the stored cooling in the thermal energy storage.

The proposed project shall be commissioned as per the components and its technical specifications given below. Any shortcomings will lead to cancelation of work order & SELCO Foundation's decision will be final and binding on the bidder.

1. COLD STORAGE

The cold storage shall be configured in a PPGI body of minimum 0.5 mm thickness. An appropriate concrete foundation is to be provided as a base for the cold storage system.

Item	Description									
	STAGING					PRECOOLING				
	5 MT	10 MT	20 MT	30 MT	40MT	5 MT	10 MT	20 MT	30 MT	40MT
External Body	Pre-painted galvanized iron (PPGI) with minimum of 0.5 mm thickness									
External dimensions (L x W x H)	Indicative dimension s of 20' x 8' x 8'	Indicative dimension s of 40' x 8' x 8'	Indicative dimensions of 80' x 8' x 8'	Indicative dimensions of 120' x 8' x 8'	Indicative dimensions of 160' x 8' x 8'	Indicative dimensions of 20' x 8' x 8'	Indicative dimensions of 40' x 8' x 8'	Indicative dimensions of 80' x 8' x 8'	Indicative dimensions of 120' x 8' x 8'	Indicative dimensions of 160' x 8' x 8'
Internal Volume of Cold Storage	Minimum 750 CFT	Minimum 1500 CFT	Minimum3000 CFT	Minimum 4500 CFT	Minimum 6000 CFT	Minimum 750 CFT	Minimum 1500 CFT	Minimum3000 CFT	Minimum 4500 CFT	Minimum 6000 CFT
Temperature range (Setpoint control available to user)	4 to 20 Deg C									
Internal Walls & Ceiling	Minimum 100 mm Polyurethane Foam with density of 40+/-2 kg/m3 and 0.5mm PPGI sheet on the inner side									

Flooring	Minimum 80 mm Polyurethane Foam with density of 40+/-2 kg/m ³ + 1mm Anti-skid aluminium plate									
No. of door (As per need)	1	1-2	1-2	1-3	1-4	1	1-2	1-2	1-3	1-4
Door type	Minimum Opening of 6 feet Height x 2.5 feet Width. 100 mm Polyurethane Foam with density of 40+/-2 kg/m ³ ,									
Door curtain	PVC curtain before the door									
Chamber curtain	PVC Air curtain (As applicable)									
Material of the structure (Door, hinges, floor, ceiling etc.)	Should be non-rusting material									
Display	Digital display of temperature & humidity Temperature probe - 5 No's, Humidity probe - 1 No's									
Emergency Switch	Alarm enabled with Push button inside the cold room for communication during emergency									
Light	Proper lighting should be provided inside the cold room									
Control unit to set the temperature & humidity	The control unit to set the temperature & humidity should be secured & kept in a location where it won't be accessible for public or others									

2. REFRIGERATION UNIT

The refrigeration system consists of a condensing unit and an evaporating unit working on HFC refrigerants with zero Ozone Depletion potential.

Item	Description									
	STAGING					PRECOOLING				
	5 MT	10 MT	20 MT	30 MT	40MT	5 MT	10 MT	20 MT	30 MT	40MT
Refrigeration Rated Capacity @ -5°C evaporating, 45°C condensing	1.9 - 2.5 TR	2.5 - 3 TR	3 -3.5 TR	4.5 -5 TR	6- 6.5 TR	2.5- 3 TR	3.5 -4 TR	6 - 6.5 TR	9- 10 TR	12-13 TR
Compressor Make	Bitzer/Frascold/GEA/Dorin/Emerson									
Temperature Range by using set point control as per requirement	4 to 20°C									
Cooling system type	Air Cooled Vapor Compression System with Variable Speed Compressor									
Refrigerant	R134a/ R407F/R407C									
Evaporator Unit	Tube: Copper Fins: Aluminium (or) Copper									
Power backup	Single Phase, 230 VAC (or) 3 Phase 440 VAC (As per end user availability)									

Once the desired temperature is achieved inside cold room, temperature variation within the air of cold room should not be more than +/- 1° C at any location inside the cold storage. Datasheet of the compressor from the manufacturer is required to ascertain its rated capacity.

The following details should be marked indelibly on the compressor

- Name of the Manufacturer or Distinctive Logo.
- Model Number
- Serial Number
- Rated Capacity

3. Thermal Energy Storage:

There should be a provision to store cooling in a thermal storage system to provide cooling during the off-sunshine period and store excess solar energy in case it is not utilized. The charging and discharging of the thermal storage shall occur simultaneously. The energy storage medium should be phase change material (PCM) such as water or water salt eutectic mixture. The purpose of using phase change material is that it has longer life than electrical batteries to store energy.

In case of use of water salt eutectic mixture, the useful life of phase change material shall be minimum 10 years to minimize long-term expenditure associated with PCM replacement, and it should be non-toxic for usage with food commodities. The supplier shall provide a Material safety data sheet and life cycle test report from the original equipment manufacturer of the water salt eutectic mixture.

When cold storage is not operational, thermal storage shall not be providing any cooling to the cold storage. The purpose is to avoid energy wastage of already harvested solar energy. It shall be estimated based on the latent heat of the phase change material and the overall quantity of phase change material. The need for high energy storage capacity is due to avoid wastage of solar energy on days when cold storage is not utilized for its full load capacity. The excess solar energy will be stored in thermal storage, which will be utilized to provide higher pull-down (precooling) capacity or increased autonomy for cloudy/rainy days.

The energy storage capacity of thermal storage should be monitored and displayed with a minimum of four linear graduations from minimum to maximum storage capacity. It will allow the user to pre-plan the cold storage operations and avoid spoilage of agriculture commodities.

Item	Description									
	STAGING					PRECOOLING				
	5 MT	10 MT	20 MT	30 MT	40MT	5 MT	10 MT	20 MT	30 MT	40MT
Thermal storage medium	PCM (Water or other relevant PCM which maintains ~ -2oC in TES)									
Cooling Storage Capacity (Minimum)	120 -200 MJ	240 - 300 MJ	480 – 600 MJ	720 - 900 MJ	960 - 1200 MJ	120 -200 MJ	240 - 300 MJ	480 - 600MJ	720 - 900 MJ	960 - 1200 MJ
Precooling on a daily basis (Minimum)	10% of cold storage capacity from 30 Deg C to 7 Deg C* (*Grid-Solar hybrid mode)					70% of cold storage capacity from 30 Deg C to 7 Deg C (*Grid-Solar hybrid mode.)				
Precooling of agriculture commodities from	30°C to 7°C									

(Temperature)	
Door opening	Assuming the door is opened for maximum 8 times in 24 hours with each opening cycle is less than 30 seconds.
Thermal Storage Capacity Indication	Linear with minimum 4 graduations between maximum and minimum thermal cooling capacity
Self-leakage from thermal storage/unit to ambient	Maximum 100 Watt per 150 MJ of TES at the ambient temperature of 40 Deg C

4 . Solar Photovoltaic

Solar PV

The PV modules used must qualify to the latest edition of IEC PV module qualification test. The total solar PV array capacity should not be less than allocated capacity and should comprise of solar crystalline modules of minimum Wp mentioned in the bill of materials/ above wattage. Module capacity less than the minimum of the mentioned Wp shall not be accepted. PV modules must be tested and approved by one of the IEC authorized test centers. The module frame shall be made of corrosion-resistant materials, preferably having anodized aluminum.

The following information must be mentioned in the ID used on each module (This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions).

- * Name of the manufacturer of the PV module.
- * I-V curve for the module Wattage, I_{max}, V_{max}, and FF (Fill Factor) for the module
- * Unique Serial No and Model No of the module

Materials Warranty

*Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (5) years from the date of sale to the original customer ("Customer")

- * Defects and/or failures due to manufacturing.
- * Defects and/or failures due to quality of materials
- * Non-conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option.

Performance Warranty

The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25-year period and not more than 10% after first ten years period of the full rated original output.

Item	Description									
	STAGING					PRECOOLING				
	5 MT	10 MT	20 MT	30 MT	40MT	5 MT	10 MT	20 MT	30 MT	40MT
Photovoltaic panels type	Polycrystalline/Monocrystalline									
Solar Power Capacity (Minimum)	5 kW _p (Minimum)	7 kW _p (Minimum)	12 kW _p (Minimum)	18 kW _p (Minimum)	24 kW _p (Minimum)	6 kW _p (Minimum)	10 kW _p (Minimum)	20 kW _p (Minimum)	30 kW _p (Minimum)	40 kW _p (Minimum)
Auxiliary Battery Electrical batteries	Auxiliary components such as cooling pump, evaporator fan, lighting, controller etc., but not condensing unit									
Battery Type	Lead acid/Li-Ion									
Battery Capacity (Minimum)	24 V, 200 AH	48 V, 200 Ah	60 V, 200 AH	72V, 200 AH	120V, 200 AH	48 V, 200 Ah (Minimum)	60 V, 200 AH (Minimum)	72V, 200 AH (Minimum)	120V, 200 AH (Minimum)	144V, 200 AH (Minimum)

Solar Photovoltaic Module	Solar PV.
	Module type: Monocrystalline/Polycrystalline
	The PV modules used must qualify to the latest edition of IEC PV module qualification test. The total solar PV array capacity should not be less than allocated capacity and should comprise of solar crystalline modules of minimum W _p mentioned in the bill of materials/ above wattage. Module capacity less than the minimum of the mentioned W _p shall not be accepted. PV modules must be tested and approved by one of the IEC authorized test centers. The module frame shall be made of corrosion-resistant materials, preferably having anodized aluminum.
	The following information must be mentioned in the ID used on each module (This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions).
	Name of the manufacturer of the PV module.
	I-V curve for the module Wattage, I _{max} , V _{max} , and FF (Fill Factor) for the module
	Unique Serial No and Model No of the module
	Module Warranty
	Module Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (5) years from the date of sale to the original customer ("Customer")
	Defects and/or failures due to manufacturing.
	Defects and/or failures due to quality of materials

	Non-conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option.
	Performance Warranty
	The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25-year period and not more than 10% after first ten years period of the full rated original output.
	Should have a positive power tolerance
	Should be Anti - LeTID & PID Resistant
	Panel degradation should be linear over a period for 25+ years
	Should have temperature coefficient of power (Pmax) $\leq -0.38\% / ^\circ\text{C}$
	Should be able to withstand downward force ≥ 5400 pascals & uplift force of ≥ 2400 pascals
	Should have tempered/toughened solar glass of 3.2 mm (about 0.13 in) thickness
	<p>Additionally, modules should be certified with:</p> <ul style="list-style-type: none"> ● PV module safety standards ● PID-d. ● Ammonia corrosion Resistance test ● Dynamic Mechanical Load ● Hailstone (35mm) ● Ignitability test ● FSI Tested. ● EL Tested. ● Enlisted Module Manufacturer of DGS&D. ● Application class - Class A (Electric hazard test - Operating voltage >50 Vdc & Modules area can be accessed by public) ● Module fire performance - Type 1 (Burning test & spread of flame test)
Module Mounting structure (MMS)	Mounting structure:
	a) Anodized Aluminum Structure (General mountings): (Anodized aluminum with a minimum 70 micron's thickness
	For very low elevation & flat surface mounting (Coastal region/Very high wind loads - 200 - 250 km/hr):
	<ul style="list-style-type: none"> ● RCC roof ballast structure with wind deflectors
	<p>For inclined sheet roofs (General purpose mounting):</p> <ul style="list-style-type: none"> ● Mini rails to be incorporated ● Anodized mini rails of 70 microns thickness. ● Rail dimension should be of 300 mm X 100 mm X 2.6 mm ● Mini rails can be fastened to the purlins using self-driven screws. (Pop riveting can be incorporated as and when required.)

	<ul style="list-style-type: none"> ● EPDM strips to be used as sealant for waterproofing.
	b) Hot dip galvanized MS/ anodized aluminum of size, not less than 50 mm x 50 mm x 6 mm size shall be used for mounting the modules/ panels/arrays. Each structure should have an angle of inclination as per the site conditions to take maximum irradiation
	The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels. Installation of solar structures should not damage the roof in any way. If any concrete or foundation is required, it should be pre-cast type.
	<p>Orientation of the MMS:</p> <ul style="list-style-type: none"> ● The orientation of the MMS should be due south in general case/flat mounting surfaces. ● If the roof orientation of the building is deviated away from the south (by less than 30 degrees), then the existing orientation of the building roof can be used for mounting the panels. If the deviation is more than 30 degrees, then action to correct the deviation should be taken. ● Each structure should have an angle of inclination as per latitude of the site take maximum irradiation
Array Junction box (AJB) & DC combiner box	DC combiner box/Array junction box:
	The junction boxes are to be provided in the PV array for the termination of connecting cables. The Junction Boxes (JBs) shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands
	Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification
	<ul style="list-style-type: none"> ● IP rating: IP-67. ● Proper cable lugs (Fork, pin type) with insulation should be provided for the cables connected with the boxes. ● Should comply with the RoHS. Directive 2002/95/EC ● Should be weatherproof & UV resistant
Battery	Battery:
	<p>Battery type: Lead acid</p> <ul style="list-style-type: none"> ● Plate technology: Tall tubular plate ● Terminal type: L - Type ● Electrolyte: Free flow electrolyte ● Operating temperature: -20oC to +55oC ● Application - Cyclic application, Float application above 1 hour discharge rate ● Self-discharge @ STC - Low self-discharge < 3.0 % per month ● Life cycle @ 80% D.O.D @ 27°C - 1500 cycles ● A_h Efficiency: >90 % ● W_h Efficiency: >80 %
	All the batteries should have a C/10 rate of discharge. The voltage of each battery should be 12 V.

	Battery should conform to the latest BIS/ International standards. A copy of the relevant test certificate for the battery should be furnished.								
	The battery should be warranted for a minimum of 5 years.								
	The battery should be installed inside the premises of consumers on a Battery rack of acid resistant material to bear the required battery load. The non-reactive acid proof mat should be provided around the floor space of battery bank								
	Protections:								
	Over voltage (automatic shutdown)								
	Under voltage (automatic shutdown)								
	Overload - Short circuit (circuit breaker & electronics protection against sustained fault)								
	Over Temperature								
	Battery, PV reverse polarity								
Inverter/Power Conditioning Unit (PCU)	Inverter/PCU								
	The PCU will have the following features:								
	a. MPPT charging as per solar panel kW _p connected								
	b. Inverter efficiency should be more than 85%								
	C. The inverter should be compatible with alternators / Generators.								
	c. Output voltage 230 V, +/-3% with pure sine wave.								
	d. Output frequency: 50 Hz, +/- 0.5 Hz								
	e. Capacity of PCU is specified at minimum 0.8 lagging power factor								
	f. THD: less than 3%								
	h. Ambient temperature 50 degree Celsius (max.)								
	i. Operating humidity 95% maximum								
	J. Shall be equipped with RS 485/RS 232/MODBUS data port output								
	Protections:								
	Over voltage (automatic shutdown)								
	Under voltage (automatic shutdown)								
	Overload - Short circuit (circuit breaker & electronics protection against sustained fault)								
	Over Temperature								
	Battery, PV reverse polarity								
	The PCU/ inverters should be tested from the MNRE approved test centers / NABL /BIS accredited testing- calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.								
	Indicators								
	Array on								
	MPPT charger on								

	Battery connected, charging
	Inverter ON
	Load on solar/ battery
	Grid charger on
	Load on Grid
	Grid on
	Fault
	Display Parameters
	Charging current
	Charging voltage
	Voltage of PV panels
	Output voltage
	Grid voltage
	Inverter loading (kW) & Energy Generation (kWh)
	Output frequency
	Fault / fault code
	Cooling: Air Cooled
Cables	GENERAL Cables
	Cables of the appropriate size to be used in the Project shall have the following characteristics:
	Cables, junction box & switches should be IP65 protected
	High thermal stability and temperature withstanding range: -15°C to +85°C).
	<ul style="list-style-type: none"> ● Should have a temperature index of 250°C. ● Should have excellent resistance to heat, cold, water, oil, abrasion & UV radiation. ● Should have flexibility & higher bending capacity- 8D minimum bending radius (EFFR wires). ● Should have anti-rodent & anti-Termite resistant properties. ● Should have a high oxygen index (LOI) of > 21%. ● Should have high insulation resistance/Rated for nominal voltage (Uo/U): 600/1100 V. ● Should have low conductor resistance (Maximum conductor resistance at 20°C < 7.41 Ω). ● Should have low smoke density and emissivity (Corrosive halogen acid & toxic gasses below 18%). ● Should be 100% bunching & 100% conductive. ● Should be lead free.
	Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter, etc. shall be so selected to keep the voltage drop (power loss) of the entire Project to the minimum. The cables (as per IS) should be insulated with a special-grade PVC compound formulated

	for outdoor use.
	The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. twenty-five (25) Operational Years.
	SOLAR CABLES/D.C. CABLES/OUTDOOR CABLES:
	(Panels -> arrays -> A.J.B -> inverter) Solar cables should have these specified constructional features:
	<ul style="list-style-type: none"> ● Type PV1 - F (With double insulation) ● Conductor: Fine stranded Wire Tinned Copper Conductor according to BS EN 60228:2005 cl. 5 ● Insulation: UV resistant, cross linkable, halogen free, flame-retardant compound for core insulation ● Core Identification: Red/Black ● Sheath: UV resistant, cross linkable, halogen free, flame-retardant compound for Sheath over insulation ● Cable Colour: Red/Black ● Voltage Rating: 0.6 / 1.0 kV
	BATTERY CABLES:
	(Battery -> Battery -> Inverter) Battery cables should have these specified constructional features:
Safety Measures and Protection	<ul style="list-style-type: none"> ● Cable type: Flexible cable ● Cable thickness: 10mm to 25mm ● Insulation type: Double Insulation ● Insulation material: Rubber with Flame-retardant, Oil-resistant ● Conductor: Fine multi stranded wires, Tinned Copper Conductor ● Cable colour: Black ● Core Identification: White ● Crimping: Both ends crimped ● Voltage Rating: 0.6 / 1.0 kV
	Protections
	The system should be provided with all necessary protections like Lightning, Earthing, and grid islanding as follows:
	Lightning protection
	The main aim of this protection shall be to reduce the overvoltage to a tolerable value before it reaches the PV or other sub-system components. The source of overvoltage can be lightning, atmosphere disturbances, etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying the required number of Lightning Arrestors. Lightning protection should be provided as per IEC 62305 standards.
	Franklin Rods/Passive type lightning arresters should be incorporated.
	<ul style="list-style-type: none"> ● The entire lightning arrester set up (Air terminal pole, spikes and base plates should be of solid copper only). ● Minimum size of the lightning arrester should be 10 mm by diameter and 4 feet by length. ● The base plate should be 90 mm X 90 mm X 5 mm in dimension

	<ul style="list-style-type: none"> ● The lightning protection system incorporated in the installation is only for the protection of the solar PV systems installed. ● The lightning arrestor setup should always be vertical and should be stable against high wind loads. ● In case of RCC flat roofs, the support structure for lightning arrestor should be provided with anchor fasteners along with civil work made at its base plate. ● A concrete cube (Civil work) of 1.5 ft x 1.5 ft x 1.5 ft (L x B x H) dimensions should be set. ● If required, support wires should be used for additional stability of the lightning arrestor. ● In case of metal sheet roof, the lightning arrestor should be placed at the apex of the roof with proper clamping and supporting wires may be used for additional support. ● The base of the clamp should be given EPDM strips which are to be used as sealant for waterproofing. ● The lightning arrestor should be placed preferably at the back of the array and at the sides, with a separation distance of 0.5 meters only (From the panel edges). ● Down conductor for lightning arrestor should be a GI Strip of (25 x 3) mm and should have 120 microns of galvanized thickness. ● Each Joints Should consist of two hexagonal nut and bolts assembly. There should be the least number of joints in the connection made between the lightning arrestor and the earth pit. ● The down conductor should be given UPVC capping-casing protection along its entire run (From the lightning arrestor till the earthing pit). ● UV resistance cable ties should be used to keep the GI strip & capping-casing together. ● The copper lightning arrestor & G.I strip interface at the roof should be given a G.I. spray protection to prevent galvanic corrosion. <p>The bidder shall take entire responsibility for the electrical safety of the installation(s) and follow all the safety rules & regulations applicable as per the Electricity Act, 2003 and CEA guidelines etc</p>
Earthing	<p>Earthing</p> <p>Code of practice for protective earthing and protection against electric shocks as per the IEC 60364 and IS 3043 standards should be followed. Earthing is a way of transmitting any instant electricity discharge directly to the ground by providing a low resistance path (using electrical cables wires with no joints or metal strips with lesser joints). This instant electricity discharge is mostly in the form of lightning, surge voltages entering through grid lines and due to fault current/leakage current in the system. The goal is to protect the appliances from voltage surges and protect the users from the risk of electrocution due to leakage/fault current in the system.</p> <p>Earthing type - Chemical Earthing</p> <ul style="list-style-type: none"> ● Electrodes used should be a copper-bonded electrode with 250 microns of copper thickness ● The electrode should be minimum of 70 mm by diameter and maximum of 4 feet by length ● Earth backfill compound - Graphite based (For normal soil conditions) and Bentonite based (For rocky soil conditions) should be used. ● Earth pit should contain 50+ kilograms of back fill compound ● Earth pit should be 12-inch by diameter and 4 ft by depth (As long as the electrode's length.) <p>Individual earthing should be provided for these components: Lighting arrestor, A.J.B, Grid input protection box, Inverter/PCU and connected loads.</p> <ul style="list-style-type: none"> ● Minimum of 3 m distance between each pit must be maintained and 1.5 m from building foundations and sumps. ● Lightning arrestor earthing pit should not be mixed with other earth pits and should be well spaced away from them. ● Should not combine AC earthing & DC Earthing.

	<ul style="list-style-type: none"> ● Earthing pits should have a chamber set above the ground and should be closed with a metallic lid/F.R.P lid and should have access for maintenance. ● Cable lugs of 10 Sq.mm with insulation should be used for cable-type down conductors to connect with the electrode. ● Proper cable-to-rod & strip-to-rod clamps should be used. ● Lightning arrester's earthing pit - The interface of the G.I strip & the copper electrode should be given a G.I. spray to prevent galvanic corrosion. ● Clamp materials should be that of copper alloys. ● Earth pit resistance should ideally be 0.5 Ohms and should not exceed 5 Ohms ● All the earth pits should be given an identification/markings to the devices/structures they are connected to. ● The earthing electrodes used in the project should have CPRI test certification.
Tools & Spares	Tools & tackles and spares After completion of installation & commissioning of the COLD STORAGE, necessary tools & tackles shall be maintained by the successful bidder for maintenance purposes.

ANNEXURE 2

DETAILS OF THE ORGANISATION

1	Name of the Supplier	
2	Year of starting the organization & registration number (photocopy of registration certificate or any other relevant document to be enclosed)	
3	Name of the authorized signatory for agreement with Designation	
4	Address of the Supplier (along with phone no.& pin code)	
5	Status of Supplier	Proprietorship / Partnership/ Pvt Ltd / Limited/others
6	GSTIN	
7	PAN No	
6	Audit reports for the last 3 year (Certified copy of Chartered Account' report in P&L account to be enclosed)	
7	Experience of Supplier relating to supply of solar energy-based cold storages (supporting certificates to be enclosed)	
8	Particulars of Physical Infrastructure and total strength of staff available in the organization relating to Supplier/supply/testing etc.,	

Signature of the bidder and address with seal

Date:

ANNEXURE 3

Sl.No.	Description	Whether the Document is enclosed or not	Page No. From and to
1	Details of Organization as per Table –I	YES/NO	
2	Copies showing the legal status, places of registration and principal place of business of the firm	YES/NO	
3	Copies of audited financial statements for the last 3 financial years	YES/NO	
4	Copies of GST registration	YES/NO	
5	GST returns filled in the last financial years	YES/NO	
6	PAN Card Copy	YES/NO	
7	Income tax returns filled in the last financial years.	YES/NO	
6	Letter of Acceptance to undertake AMC for the next 10 years for trouble free operation and maintenance at end-user's cost	YES/NO	
7	Address of the official Service Centres.	YES/NO	
8	Letter of declaration to confirm that the bidder has not been blacklisted by any entity or institution	YES/NO	

I abide by all the above terms & conditions.

PLACE:

DATE:

SIGNATURE OF THE BIDDER and with office seal

ANNEXURE 4

PRICE SCHEDULE

PARTICULARS TO BE SUBMITTED IN THE FINANCIAL BID (SECOND COVER).

PRICE SCHEDULE FOR THE DESIGN, SUPPLY, INSTALLATION, COMMISSIONING & COMPREHENSIVE MAINTENANCE FOR SOLAR POWERED COLD STORAGE UNITS FOR 12 MONTHS.

Rates quoted by the bidder should include all taxes levied by the State & Central Govt. Packing, handling charges including loading & unloading, installation & commissioning, insurance and annual maintenance contract for 12 months. The cost of transportation will be on actuals.

Type	Capacity	Unit Price for below quantity range			
		1	2 - 5	6 - 10	11 - 25
STAGING	5 MT				
	10 MT				
	20 MT				
	30 MT				
	40 MT				
PRECOOLING	5 MT				
	10 MT				
	20 MT				
	30 MT				
	40 MT				

CONDITIONS:

1. If our tender is accepted, we here by undertake to abide as per the stipulated Terms and Conditions, to supplier and supply, installation and maintenance of solar energy-based solutions.
2. We agree to abide by this tender for and if the award is made to us, in executing the above contract we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of corruption act 1988".
3. We understand that you are not bound to determine the benchmark price based on the lowest offer that you may receive.
4. We accept that all disputes between parties will be adjudicated by a competent court in Bangalore, India.

I, _____ (Name of signatory) on behalf of the bidder _____ (Name of the bidder), hereby certify that I have noted the technical specifications of solutions mentioned and the prices quoted above are as per the details specified and in compliance with Annexure 1.

Dated this day of 2023

Signature

(Name and Address of the Tender with seal)

(In the capacity of Duly authorized to sign the Tender for and on behalf of
.....)