NEW & RENEWABLE ENERGY DEPARTMENT, HARYANA

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To

1. M/s Himalayan Solar Private Limited
   Plot No.-237 HSIIDC Industrial Estate
   Alipur, Barwala, Panchkula-134118
   Email- clientmanager@himalayansolar.co.in
   Phone: - 86999-94870

2. M/s SUN N SAND EXIM INDIA PVT LTD
   Plot No.-106 Sector-16 HSIIDC
   Bahadurgarh, Haryana-124507
   Email- hardikverma@live.com
   Phone: - 92165-04644

3. M/s Gautam Solar Private Limited
   F-33, Okhla Industrial Area, Phase-I
   New Delhi-110020
   Email- shashanksingh@gautamsolar.com
   Phone:- 83769-80796

4. M/s Rajasthan Electronics and Instruments Limited
   2, Kanakpura Industrial Area
   Jaipur-302012
   Email- arun.dwivedi@reil.co.in
   Phone:-77277-11729

5. M/s Fujiyama Power Systems Pvt. Ltd.
   Khasra No.- 182/2, Village Naryal
   Near Sector-4 Barrier
   Parwanoo, Himachal Pradesh-173220
   Email- pushpendra@upsinverter.com
   Phone:- 85275-44116

Memo No/ DNRE/8768-72 Dated: 10/8/2021

Subject- **EMPANNELMENT LIST OF SUPPLIERS FOR SUPPLY, INSTALLATION AND COMMISSIONING OF 320 and 640 WATT SOLAR CHARGERS TO CHARGE THE BATTERIES OF EXISTING INVERTERS IN REFERENCE TO EOI NO. DNRE/SOLAR INVERTER CHARGER /2021-22/01 DATED 27.05.2021.**

You are hereby informed that your firm has been technically qualified for empanelment for the supply, installation and commissioning of 320 and 640 watt Solar chargers to charge the batteries of existing inverter in "Market Mode" with 5 years warranty of complete system including interface charge controller and with warranty of module for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

i. This empanelment shall be valid up to one year from the date of issue.

ii. The indicative rates, quantity allocated and description of items shall be as per Annexure-I

iii. The terms and conditions, technical specifications shall be as per Annexure-II and III and other terms and conditions shall be as per EOI.

iv. This empanelment contains 16 pages including this page.

Annexures:

1. Annexure"I" - Description of item and indicative Prices including GST etc...
2. Annexure "II" -Terms & Conditions of the empanelment.
3. Annexure "III" - Technical specifications.

(Manoj Jain)
Project Director,
For Director General, New and Renewable
Energy Deptt., Haryana.

Encls: As above

Annexure-I

Description of Systems and indicative Prices including of GST etc

Sr. No.	Name of firms	Make of SPV modules, charge controller & Wire	Total number of systems allocated as per Security Deposited till date (nos.)	Indicative rates for supply, installation and commissioning of 320 Watt solar inverter chargers with 5 Years warranty (In Rs) with GST@8.9%	Indicative rates for supply, installation and commissioning of 640 Watt solar inverter chargers with 5 Years warranty (In Rs) with GST@8.9%
1.	M/s Himalayan Solar Private Limited, Panchkula	Module-Himalayan Interface solar charge controller - Smarten, Su-vastika, Himalayan Wire-HPL, Polycab, Birla Unistar	**1000 Nos.** each for 320 watt and 640 watt	Rs.18000.00/-	Rs.28000.00/-
2.	M/s SUN N SAND EXIM INDIA PVT LTD, bahadurgarh	Solar Modules-Sun N sand Interface solar charge controller-Smarten, Geie Wire- Polycab	**1000 Nos.** each for 320 watt and 640 watt	Rs.18750.00/-	Rs.28730.00/-
3.	M/s Gautam Solar Private Limited, New Delhi	Solar module-Gautam Interface Solar charge controller- GALO Wire-KEI, Polycab, Shri Balaji, Nangalwalaa, Fexle, GALO	**1000 Nos.** each for 320 watt and 640 watt	Rs.19500.00/-	Rs.31300.00/-
4.	M/s Rajasthan Electronics and Instruments Limited, Rajasthan	Solar module-REIL Interface Solar charge controller-Genus, Ritika	**1000 Nos.** each for 320 watt and 640 watt	Rs.20691.00/-	Rs.30492.00/-

		Wire- Magni			
5.	M/s Fujiyama Power Systems Pvt. Ltd. Himachal Pradesh	Solar module- saatvik, ritika, sun N sand , Goldi, waree Interface Solar charge controller- Fujiyama Wire- Polycab	**1000 Nos.** each for 320 watt and 640 watt	Rs.24979.81/-	Rs.39792.06/-

Note:-The above rates of systems are not approved rates. These rates are indicatives rates and beneficiaries can install the systems at their own choice from any bidders after having negotiation in rates.

Description of Additional Systems and indicative Prices including of GST etc:-

1. Interface Charge controller is optional in said item as maximum existing inverter in market these days have inbuilt charge controller for solar charging. Accordingly, the bidders wise tentative cost of Interface Charge controller is mentioned in below table so that the same will be deducted in case existing inverter having inbuilt charge controller, as under:-

S.No	Description of Interface Charge controller	**Bidder Name**	Rates including GST @8.9%
1	20Amp Interface charge controller	Gautam Solar Private Limited	1089.00
		Rajasthan Electronics and Instruments Limited	1633.50
		SUN N SAND EXIM INDIA PVT LTD	1851.30
		Himalayan Solar Private Limited.	1851.30
		Fujiyama Power Systems Pvt. Ltd	3811.50
2	40Amp Interface charge controller	Gautam Solar Private Limited	1633.50
		SUN N SAND EXIM INDIA PVT LTD	1905.75
		Himalayan Solar Private Limited	1960.20
		Rajasthan Electronics and Instruments Limited	2722.51
		Fujiyama Power Systems Pvt. Ltd.	3811.50

2. The additional solar panel/module installation is optional in said item on beneficiary cost due to huge demand of higher capacity of Solar Inverter Charger. Accordingly, the bidders wise tentative cost of additional solar panel/module in the below mentioned table so that the beneficiary can install higher capacity solar panel at own cost, as under:-

S. No	Components	**Bidder Name**	Rates including GST@8.9%
1	160 Watt 12V Solar module for 12V System	SUN N SAND EXIM INDIA PVT LTD	4791.60
		Himalayan Solar Private Limited	4878.72
		Rajasthan Electronics and Instruments Limited	5445.00
		Gautam Solar Private Limited	5880.00
		Fujiyama Power Systems Pvt. Ltd.	6534.00
2	320 Watt 24V Solar module for 24V System	Himalayan Solar Private Limited	9060.48
		SUN N SAND EXIM INDIA PVT LTD	9583.20
		Rajasthan Electronics and Instruments Limited	9801.00
		Gautam Solar Private Limited	11760.00
		Fujiyama Power Systems Pvt. Ltd.	13068.00

Note:-The above rates of systems are not approved rates. These rates are indicatives rates and beneficiaries can install the systems at their own choice from any bidders after having negotiation in rates.

Terms and Conditions:- Annexure-II

1. SCOPE OF WORK

Supply, installation & commissioning of Solar Chargers of capacity 320 watt/ 640 watt in market mode at various locations in the State of Haryana, as per the technical specifications given in annexure-III with five years warranty of the complete system(s) from the date of commissioned and PV modules used in the power plant must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years as per latest

The scope of work shall include the following:

a. Supply, installation & commissioning of Solar Chargers of capacity 320 watt/ 640 watt. The Solar Charger consists of Solar PV Modules, Interface Charge Controller, connecting wires & other mechanical as well as electric/ electronics components etc.
b. Wiring up to the existing inverter from the Solar Panels will be in the scope of the bidder(s).
c. Performance testing of the complete system.
d. The installer shall undertake to supply spares free of cost for the maintenance of the offered items during the warranty period.
e. After sales service , directly or through local service network
f. A leaflet containing the details of the service centers shall be provided to each purchaser as well as to New & Renewable Energy Department.
h. If the operation or use of the system proves to be unsatisfactory during the warranty period, the installer shall replace the faulty ones or carry out necessary repairs as per the warranty terms and conditions.

2. GUIDELINES FOR IMPLEMENTATION OF SCHEME:-

1. Scheme:-

The Solar Inverter Charger consist solar panels and interface charge controller, it used for charging the battery of existing conventional inverter during day time. Presently, two models of Solar Inverter Charger:-

Solar inverter of 320 Watt capacity:-It consists of solar panels of total 320 watt capacity and interface charge controller of 20 Amp. The system shall be installed on the existing conventional inverter of 600-800 VA having single battery of 12V DC x 120-180 AH.

Solar inverters of 640 Watt capacity:-It consists of solar panels of total 640 watt capacity and interface charge controller of 40Amp. The system shall be installed on the existing conventional inverter of 1000- 1800 VA having double battery of 12V DC x 120-180 AH to form the 24 VDC battery bank.

2. Objective:-

i. To charge the battery bank of existing inverter from Solar Power thus availability of power during long power cuts.
ii. To serve as back up during power cuts.
iii. To generate electricity from clean and green energy which lead to saving of grid power in charging the batteries of inverter.
iv. DC power generated from Solar is converted into AC by the inverter and used to run domestic applications along with battery power during power cuts.
v. For Effective utilization of existing inverter in generation and utilization of clean and green energy.

3. **Implementation Methodology:-**

- The scheme shall be implemented in the market mode system means the beneficiaries will have freedom to choose any supplier from the DNRE empanelled supplier for said item. The list of empanelled suppliers will be available at the time of applying online on SARAL portal.
- The system shall be installed strictly meeting out the minimum technical specifications prescribed by New & Renewable Energy Department. The system with deviation and not meeting these minimum technical specifications will not be considered eligible for State Subsidy.
- The beneficiary has to pay only his share to supplier. The fixed subsidy @ Rs. 6,000/- and @ Rs. 10,000/- per system for 320 Watt and 640 watt Solar Inverter Charger respectively shall be provided to supplier by Director General, New and Renewable Energy Department/HAREDA after receipt of complete inspection report of installed and commissioning of system by Concerned ADC office.

4. **Empanelment of Suppliers:-**

All the technically qualified bidders will be empanelled. The successful bidders have to submit required Performance Security deposit as per policy of government. The list of empanelled suppliers with indicative rates will be made available at the time of applying at SARAl portal so that applicant can select any supplier. Further, the list of empanelled suppliers and Minimum Technical Specifications will also available on website of New & Renewable Energy Department at www.hareda.gov.in so that applicant can install from any supplier.

5. **Eligibility of Beneficiaries:-**

i. Any Haryana resident family with Pariwar Pahichan Patra (PPP) will be eligible to apply.

ii. All the households who have domestic inverter and not installed solar inverter charger on this existing inverter are eligible for this scheme on first come first serve basis.

iii. The applicant should not have installed Solar Inverter Charger in past 5 years under the Departments Scheme.

6. **Identification of Beneficiaries and Implementation Process :-**

i. The beneficiaries will be identified online on SARAL portal as per eligibility criteria on first come first serve basis. For this online application will be sought on SARAL portal form beneficiaries. Vide publicity is to done to sought applications. The Department shall display all the rates, quoted by the companies/firms at District level office & firms shall also keep their products at office for display along with price tag, so that the user/beneficiary may compare the rates & quality of the product, like the user generally do & companies do their business in open market thru show rooms/outlets.

ii. The sanction letter will be issued to the eligible beneficiary on first come first serve basis to install the said items within 2 months as per DNRE specifications from DNRE empanelled suppliers. Thereafter, the sanction shall be automatically cancelled. The beneficiaries can download sanction letter from http://dnreapplyonline.gov.in/hareda_api web portal **with User name will be your saral id and password will be - nre123.**

iii. The selected beneficiaries shall have to install said system from any DNRE empanelled firms as per the DNRE technical specifications. The plant not installed from the New & Renewable Energy Department empanelled supplier and not as per prescribed minimum technical specifications shall not be eligible for the subsidy.

7. **Disbursement of Subsidy:-**

- The subsidy @ Rs. 6,000/- and @ Rs. 10,000/- per system for 320 Watt and 640 watt Solar Inverter Charger respectively shall be released by the HQ to the supplier after inspection of installed system by respective ADC Office.
- The applicant has to make his share payment to the supplier on the mutual agreed terms and conditions between user and the supplier after mutual negotiation. DNRE will not be responsible for any dispute between user & supplier for beneficiary share.
- After installation of the system, the applicant/supplier has to submit Subsidy Claim form **at http://dnreapplyonline.gov.in/hareda_api with User name will be your saral id and password will be - nre123** (all the documents must be signed by the user & supplier) for the claim of State subsidy along with required documents mentioned below :
    a. Invoice of the supplier in the name of applicant
    b. Photographs of installed systems.
    c. Project Completion Report in prescribed format.
    d. The month and year of manufacturing of solar module and interface charge controller to be used in said system shall also be sought and it should be of not older than date of allocation of said item to the concerned beneficiary. The HAREDA logo and make in India logo shall be laminated inside solar module and pasted on interface charge controller.
- After receiving the online application in the O/o Additional deputy Commissioner cum chief Project officer, DRDA, of the concerned district, the system shall be physically inspected by the concerned District Project Officer and shall issue Project Completion Report (PCR) in the prescribed format and upload the same on portal and verified the system on portal.
- After verification by ADC office, the online application shall be received to HQ. Thereafter, the State subsidy shall be released to supplier by Director General, New and Renewable Energy Department/HAREDA after receipt of complete inspection report of installed and commissioning of system by Concerned ADC office on fortnightly basis.
- After sales services will be provided by the supplier during warranty period of 5 years as per term and conditions of tender.

3. MONITORING MECHANISM:

The project will be implemented under the overall supervision of New & Renewable Energy Department. For proper implementation of the scheme, 100% monitoring of systems shall be done by the concerned Project Officer of the district. The 10% monitoring of the scheme may also be done by the representative of Directorate office, on random basis. The monitoring of the systems can also be entrusted to third party.

4. Performance Security:

The successful bidders shall be required to deposit Performance Security Deposit (PSD) as per provisions contained in Govt. of Haryana G.O. No. 2/2/2016-4I BII(2) dated 20-10-2016 and its amendment vide order no. 8780-8959 dated 14.12.2020 as under:-

Sr. No.	Type of Firm/Enterprises	Value of Performance Security Deposit
1	Haryana based firms:- (i) # Haryana Based Micro and Small Enterprises (MSEs)	(i) @0.2% of the indicated price by bidder

	(ii) Haryana based other firms/enterprises	(ii) @2% of the indicated price by bidder
	Other States/ UTs based firms (General Bidder)	@3% of the indicated price by bidder
# Haryana based MSEs will be eligible for performance security deposit @ 0.2% who have filed SSI certificate/EM Part-II/Udyog Aadhar Memorandum/Udyam Registration (Micro or Small Enterprise category) in Haryana and who participate directly in the tendered/quoted items and offering to supply the entire quoted quantity from their own Haryana based unit.		

Once supplier installs 1000 systems then PSD will be increased by same amount for each 1000 numbers. The PSD shall be released on successful completion of the warrantee period of five years from the date of commissioning of the project. If required, the validity of the SD/PSD will be extended by the firm failing which it will be en-cashed. The Performance Security shall be denominated in the currency of the Country, and shall be in form of a Bank guarantee, issued by a Nationalized/ Commercial bank located in the purchaser's country, acceptable to the Purchaser, in the form provided in the EOI Documents or Demand Draft in favour of Director General, HAREDA, payable at Panchkula.

5. WARRANTY

(i) The Warranty period shall be five (5) years for complete system from the date of commissioning and handing over of the system (or as per latest MNRE, GoI guidelines). The contractor shall rectify defects developed in the system within Warranty period promptly.

(ii) During the warrantee period, the firm shall ensure proper functioning of the systems and complaint, if any, forwarded to the supplier against the system, will have to be attended within 72 hours of forwarding such complaints.

The complaints would be logged by the Department officers by e-mail/ fax in order to keep the proper delivery records. Further in case of failure to do so, penalty @ 0.1 % of the system cost per day (subject to max. 10% of the cost) after expiry of 72 hours shall be imposed. If the firm does not attend the complaint within the max penalty period then the system may be got repaired/ replaced from the performance security amount. In case whole performance security amount is utilized and complaint/s are still pending then an online / registered notice will be sent to the firm to attend the complaint and if failed to attend the complaint within 7 days then firm may be blacklisted and a legal proceedings may be initiated against the firm for breach the agreement.

(iii) If the firm still does not attend the complaint within the above mentioned period then the firm may be blacklisted and a legal proceeding may be initiated against the firm for Breach the agreement.

(iv) The supplier shall affirm as per standards for quality that anything to be furnished shall be new, free from all defects and faults in material, workmanship and manufacture, shall be of the highest grade and consistent with established and generally accepted standards for material of the type ordered, shall be in full conformity with the specifications, drawing or samples, if any and shall if operable, operate properly.

(v) Performance of Equipment: In addition to the warranty as already provided, the supplier shall guarantee satisfactory performance of the equipment and shall be responsible for the period or up to the date specified in sub-clause (iii) hereof after the equipment has been accepted by the DNRE or indenting organisation to the extent for any defects that may develop such defects shall be removed at his own cost when called upon to do so by the DNRE or indenting organization.

(vi) DNRE/the consignee will have the liberty to get the sample for the item(s) supplied tested from any of the Govt. approved laboratory at any time during the installation or warranty period to ascertain the performance of the item(s) as per DNIT specifications. The cost of testing will be borne by the supplier. If during the lab test, sample fails then supplier has to repair/ replace the defective systems within 15 days of issue of such notice. If on the request of the supplier more than one samples are drawn for lab test and any one of them fail the lab test, bidder has to replace all the defective system at his own cost.

(vii) The Contractor in consultation with concerned Project Officer will conduct training programme for users, focusing on main features, operation and maintenance of the systems. After successful supply/commissioning of the system and training, the system will be handed over to the person designated by the end user.

(viii) The Contractor/supplier shall continue to provide spare parts for 2 years after the expiry of warranty period at the users cost. If the contractor fails to continue to supply spare parts and services to users then DNRE shall take appropriate action against the firm which can be to ban the supplier for participating in future tenders of the DNRE.

(ix) **Service Centers**: Each successful bidder (either from Haryana or outside Haryana) will have to establish at least one service centre at the divisional level in their area of operation in the State, where a skilled technician and readily available spare parts will be made available during the entire period of Warranty/ Guarantee. The supplier will convey name & address of the outlet along with name of contact person, his/ her address, mobile number & e-mail address within 90 days of placing of the work order to the Director General, DNRE or indenting organization. The name & address of the service outlet and contact number will be displayed on the web portal of DNRE at www.hareda.gov.in.

(x) Suryamitra: There is a Programme under MNRE to provide training to ITI Certificate and Diploma holders on operation and maintenance of SPV devices and systems and it is called "Suryamitra Skill Development Programme". The successful contractor(s) may preferably engage them in their service centers to provide necessary repairs and maintenance service including installation of the systems during the time of execution.

6. ARBITRATION:

If any question, dispute or difference what so ever shall arises between DNRE and the contractor, in the connection with this agreement except as to matters, the decisions for which have been specifically provided, either party may forthwith give to the other notice in writing of existence of such question, dispute or difference and the same shall be referred to the sole arbitration of the Principal Secretary, Govt. Haryana, New & Renewable Energy Department or a person nominated by him/her. This reference shall be governed by the Indian Arbitration Act, and the rules made there under. The award in such arbitration shall be final and binding on both the parties. Work under the agreement shall be continuing during the arbitration proceedings unless the DNRE or the arbitrator directs otherwise.

7. JURISDICTION FOR SETTLING DISPUTES:

All disputes will be settled within the jurisdiction of the Head Quarters of Director General, New & Renewable Energy, Haryana at Panchkula.

Annexure-III

The detailed Specifications of the Store items as mentioned in Para B of the Schedule-A/NIT are as under:-

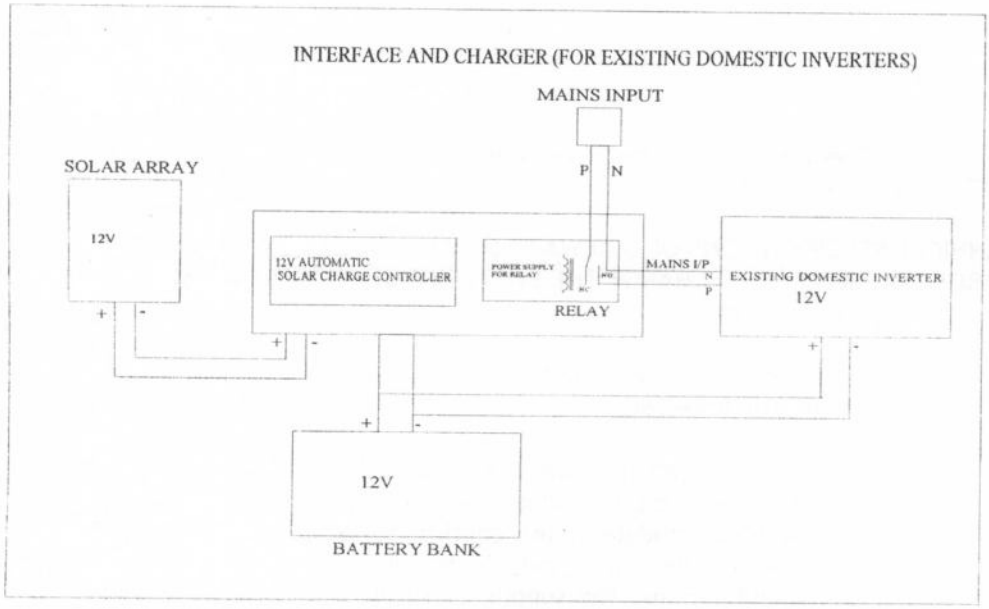
TECHNICAL SPECIFICATIONS OF 320 WATT SOLAR CHARGERS WITH INTERFACE CHARGE CONTROLLER TO CHARGE THE BATTERIES OF EXISTING DOMESTIC INVERTORS

Item	Description
CAPACITY	**320 Watt small solar power pack to charge the batteries of existing domestic inverters.**
SPV Module	• The Photovoltaic module should be Mono/ poly crystalline. • The Photovoltaic modules must be BIS certified as per IS 14286 and in addition modules must confirm to IS/IEC 61730-1 requirement for construction and part-2 requirement for testing, for safety qualifications. The supplier shall provide performance guarantee for the PV modules used in the power plant must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. • The efficiency of the PV modules should be minimum 15% and fill factor should be more than 70%. • Only indigenously produced PV modules with indigenously manufactured solar PV cells shall be allowed in PV array. The Solar Module must be comply with MNRE OM of even No. dated 02.01.2019 for enlistment under "Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirement of Compulsory Registration) order, 2019 and its subsequent amendments at the time of supply. Further, the models and manufacturers of PV Modules shall be included in the List of Models and Manufacturers for Solar PV Modules empanelled by MNRE as per its ALMM order at the time of invoicing of solar module. • The Potential Induced Degradation (PID) test for solar modules as per latest MNRE requirement is mandatory. • Module shall consists of Solar Cell of minimum 5 Bus Bar technology.
Open Circuit Voltage	The open circuit voltage of the PV modules under STC should be at least 21.0 Volts for 12 Volt panel
Power out put	**For 320 watt system:-** it will be combination of two panels , each of min 160Watt -12V The use of higher capacity modules shall be preferred.
-do-	Each PV module (IS approved) should have;- a. name of the Manufacturer b. model or type Number c. Serial Number d. Year of make e. Make in India f. HAREDA logo(laminated inside)

1. INTERFACE SOLAR CHARGE CONTROLLER:-

The systems of 320 Watt shall be for the existing inverters on 12V solar array and having single battery of 12VDC.

For example, the block diagram of 320 watt solar inverter chargers is given as under:-



Type	The controller should be PWM type.
Current rating	It should be rated at least 20Amp. for 12V system with 320 watt solar panels.
Operation	1. **In Morning condition-** • When Solar of low intensity is available and Grid is on and the battery is fully charged- Under such condition, the system should work on solar only, when solar current output reaches to 2.0 - 2.5 Amp in case of 320 watt solar inverter charger. • The grid should be automatically on/off from existing inverter to support the load from battery and solar panels. When battery voltage falls below preset level and solar is available sufficiently then priority should be from solar side. 2. **In Day time condition-** The system should be designed to give priority to solar power and use grid power only when solar power is insufficient to charge the batteries and battery charge is insufficient to meet the load requirement. When batteries are fully charged during day time, the interface unit shall automatically cut off AC grid power from the system and load should run through the inverter(using stored battery charge) 3. **In evening condition-** When solar power drops to 2.5-2.0 Amp in case of 320 W solar inverter chargers, the systems should be shift to Grid and becomes normal domestic inverters during night time.
Indicators	The controller should have LCD display to indicate showing of solar charging and AC charging and mains on
Protection	Fuses should be provided to protect against short circuit conditions.
To prevent reverse flow of current	Blocking diodes should be provided as part of the electronics, to prevent reverse flow of current through the PV module(s)
Warrantee	The system must be warranted for five years from the date of commissioned and PV modules used in the power plant must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

Structure for module frame	**Module frame structure to be made from rail type galvanized iron with minimum 80 micron anodized structure with dimensions 40*40*40*2mm for mounting on roof of user.** The module frame should be grouted in the RCC foundation columns of size atleast 150mmx150mmx150mm with concrete and cement having 4:2:1 (Minimum 4 legs in 320 watt systems)
Wires/Cables for SPV Modules and Battery	Cables of copper conductor of multi strand wires of size 2.5mm sq in case of 320 watt solar inverter suitable for DC supply from modules to charge controller and from charge controller to batteries.

Codes and Standards

The components of the solar Inverter Charger must be conform to the latest edition of IEC/ equivalent BIS Standards as specified below:

BoS item / component	Standard Description	Standard Number
Solar Modules	Crystalline silicon PV modules Conform to the latest edition	IS 14286 standards and in addition must conform to IS 61730 Part-I&II
Interface Smart Charge controller	Electronically performance test report	As per specification
Cables	General Test and Measuring Methods PVC insulated cables, UV resistant for outdoor installation	EN 50618 for DC cables

2. AUTHORISED TESTING LABORATORIES/CENTERS

2.1. The PV modules must qualify as per relevant BIS standards. Test certificates can be from any of the NABL / MNRE Accredited Testing/Calibration Laboratories.

2.2. Test certificates for the BOS items/components can be from any of the NABL Accredited Testing-Calibration Laboratories or MNRE approved test centers.

3. OPERATION AND MAINTENANCE MANUAL CUM WARRANTY CARD

An Operation, Instruction and Maintenance Manual cum Warrantee Card, in English and Hindi, should be provided with the Solar Inverter Charger. The following minimum details must be provided in the Manual:

- Basic principles of Photovoltaic.
- A small write-up (with a block diagram) on Solar Inverter Charger - its components, PV module, electronics and expected performance.
- Significance of indicators
- Clear instructions about mounting of PV module(s).
- Clear instructions on regular maintenance and trouble shooting of the Solar Inverter Charger.
- DO's and DONT's.

Name and address of the contact person for repair and maintenance engineer.

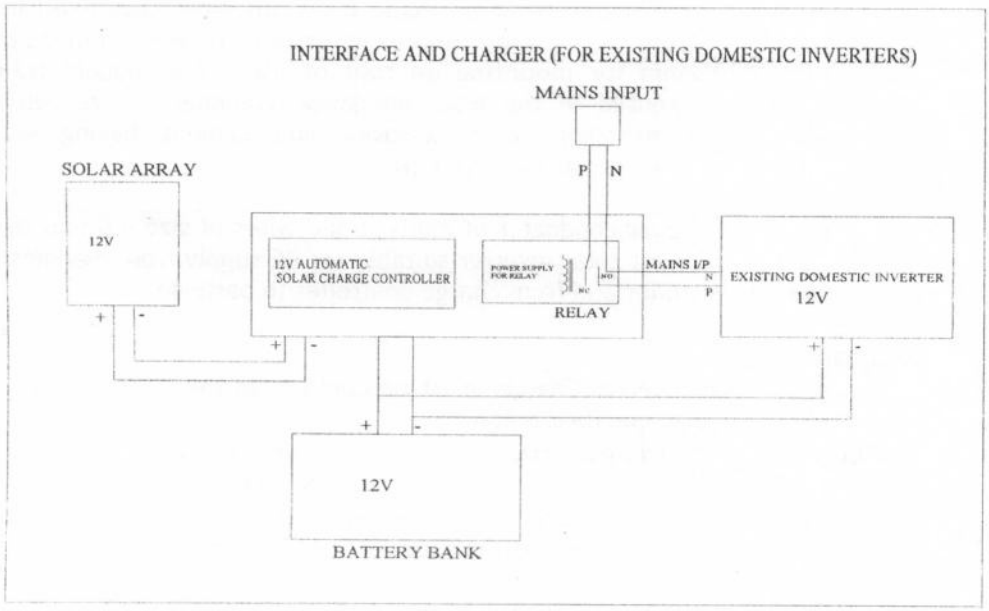
TECHNICAL SPECIFICATIONS OF 640 WATT SOLAR CHARGERS WITH INTERFACE CHARGE CONTROLLER TO CHARGE THE BATTERIES OF EXISTING DOMESTIC INVERTORS

Item	Description
CAPACITY	**640 Watt small solar power pack to charge the batteries of existing domestic inverters.**
SPV Module	• The Photovoltaic module should be Mono/ poly crystalline. • The Photovoltaic modules must be BIS certified as per IS 14286 and in addition modules must confirm to IS/IEC 61730-1 requirement for construction and part-2 requirement for testing, for safety qualifications. The supplier shall provide performance guarantee for the PV modules used in the power plant must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. • The efficiency of the PV modules should be minimum 15% and fill factor should be more than 70%. • Only indigenously produced PV modules with indigenously manufactured solar PV cells shall be allowed in PV array. The Solar Module must be comply with MNRE OM of even No. dated 02.01.2019 for enlistment under "Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirement of Compulsory Registration) order, 2019 and its subsequent amendments at the time of supply. Further, the models and manufacturers of PV Modules shall be included in the List of Models and Manufacturers for Solar PV Modules empanelled by MNRE as per its ALMM order at the time of invoicing of solar module. • The Potential Induced Degradation (PID) test for solar modules as per latest MNRE requirement is mandatory. • Module shall consists of Solar Cell of minimum 5 Bus Bar technology.
Open Circuit Voltage	The open circuit voltage of the PV modules under STC should be at least 42 Volt for nominal 24 Volt panel
Power out put	**For 640 watt system:-** it will be combination of two panels , each of minimum 320Watt -24V. The use of higher capacity modules shall be preferred.
-do-	Each PV module (IS approved) should have;- a. Name of the Manufacturer b. Model or type Number c. Serial Number d. Year of make e. Make in India f. HAREDA logo(laminated inside)

2. INTERFACE SOLAR CHARGE CONTROLLER:-

The system of 640 Watt will be for the existing inverters on 24V solar array and having double batteries to form 24VDC battery bank.

For example, the block diagram of 320 watt solar inverter chargers is given as under:-



Type	The controller should be PWM type.
Current rating	It should be rated at least 40 Amp. for 24V system with 640 watt solar panels.
Operation	**1.In Morning condition-** • When Solar of low intensity is available and Grid is on and the battery is fully charged- Under such condition, the system should work on solar only, when solar current output reaches to 2.0 - 2.5 Amp in case of 640 Watt solar inverter charger. • The grid should be automatically on/off from existing inverter to support the load from battery and solar panels. When battery voltage falls below preset level and solar is available sufficiently then priority should be from solar side. **2.In Day time condition-** The system should be designed to give priority to solar power and use grid power only when solar power is insufficient to charge the batteries and battery charge is insufficient to meet the load requirement. When batteries are fully charged during day time, the interface unit shall automatically cut off AC grid power from the system and load should run through the inverter(using stored battery charge) **3.In evening condition-** When solar power drops to 2.5-2.0 Amp in case of 640 watt solar inverter chargers, the systems should be shift to Grid and becomes normal domestic inverters during night time.
Indicators	The controller should have LCD display to indicate showing of solar charging and AC charging and mains on
Protection	Fuses should be provided to protect against short circuit conditions.
To prevent reverse flow of current	Blocking diodes should be provided as part of the electronics, to prevent reverse flow of current through the PV module(s)
Warrantee	The system must be warranted for five years from the date of commissioned and PV modules used in the power plant must be warranted for their output peak watt capacity, which should not be

	less than 90% at the end of 10 years and 80% at the end of 25 years.
Structure for module frame	**Module frame structure to be made from rail type galvanized iron with minimum 80 micron anodized structure with dimensions 40*40*40*2mm for mounting on roof of user.** The module frame should be grouted in the RCC foundation columns of size atleast 150mmx150mmx150mm with concrete and cement having 4:2:1 (Minimum 4 legs in 640 watt system)
Wires/Cables for SPV Modules and Battery	Cables of copper conductor of multi strand wires of size 4.0 mm sq in case of 640 watt solar inverter suitable for DC supply from modules to charge controller and from charge controller to batteries.

Codes and Standards

The components of the solar Inverter Charger must be conform to the latest edition of IEC/ equivalent BIS Standards as specified below:

BoS item / component	Standard Description	Standard Number
Solar Modules	Crystalline silicon PV modules Conform to the latest edition	IS 14286 standards and in addition must conform to IS 61730 Part-I&II
Interface Smart Charge controller	Electronically performance test report	As per specification
Cables	General Test and Measuring Methods PVC insulated cables, UV resistant for outdoor installation	EN 50618 for DC cables

2. AUTHORISED TESTING LABORATORIES/CENTERS

2.1. The PV modules must qualify as per relevant BIS standards. Test certificates can be from any of the NABL / MNRE Accredited Testing/Calibration Laboratories.

2.2. Test certificates for the BOS items/components can be from any of the NABL Accredited Testing-Calibration Laboratories or MNRE approved test centers.

3. OPERATION AND MAINTENANCE MANUAL CUM WARRANTY CARD

An Operation, Instruction and Maintenance Manual cum Warrantee Card, in English and Hindi, should be provided with the Solar Inverter Charger. The following minimum details must be provided in the Manual:

- Basic principles of Photovoltaic.
- A small write-up (with a block diagram) on Solar Inverter Charger - its components, PV module, electronics and expected performance.
- Significance of indicators
- Clear instructions about mounting of PV module(s).
- Clear instructions on regular maintenance and trouble shooting of the Solar Inverter Charger.
- DO's and DONT's.
- Name and address of the contact person for repair and maintenance.