REGD.
From

RATE CONTRACT

The Director General, Supplies & Disposals, Haryana,
S.C.O. No. 09 (1st & 2nd Floors), Sector-16, Panchkula.
Tel. Nos. 0172-2570121-124.
E-mail: supplies@hry.nic.in

To

DGNRE
11/11/2024

T-E

1. M/s Inixy Power solution Pvt. Ltd.
Milton Road, Opp. Atlas Mandir,
Sonipat-131001.
M.No. 08571981350, 09215092999
Email:- inixygroup@gmail.com, inixypower@gmail.com

2. M/s GEIE SOLAR PRODUCTS INDIA PVT LTD
80G RAJENDER NAGAR INDUSTRIAL
AREA SAHIBABAD GHAZIABAD UP, GHAZIABAD
Mb. No. 9711807786
Email:- kadariya@geie.co.in

Memo No :- 92/HR/RC/E-5/2023-24/
Dated Panchkula the:-

Sub:- **Annual Rate Contract for (9000 nos.) supply, installation and commissioning of Solar Street Lighting Systems in the State of Haryana with seven years warranty of complete system (without Remote Monitoring System) and (600 nos.) Solar High Mast Lighting System required by the New & Renewable Energy Department, Haryana & HAREDA. (Sr. No. _____).**

Dear Sir,

With reference to your Tender No. & dated and this office acceptance letter No. & Dated and your letter No. and Dated given in Schedule "A", on the subject noted above, I have to inform you that your offer has been accepted for the supply of stores to the terms & conditions given in the Schedule "A" and "B".

2. I enclose herewith an agreement form in duplicate and request that the agreement may be executed on a non-judicial stamp paper of Rs.15/- signed and returned to this office within 10 days from the date of issue of this letter. One copy of the agreement will be sent to you duly executed on behalf of Governor of Haryana for your record. You may kindly send power of attorney in favour of the person/persons who is/ are authorized to signed the agreement together with/their specimen signature duly attested by a Magistrate or Oath Commissioner or Resolution of the firm authorizing the persons to sign the documents on behalf of the firm.

3. The Contract shall come into force from the date of its issue and shall remain operative **upto i.e 27.10.2025.** Government reserves the right to bring any other party on the rate contract at any subsequent stage during the pendency of this rate contract.

4. The store must confirms to the approved specification as given in Schedule "A" attached, failing which the same shall be rejected at your risk and cost.

5. The inspection of the material will be carried out by the Indenting Officers or their authorized representatives at your premises before dispatch.

6. The supply must be completed within the stipulated delivery period failing which the risk purchase will be affected against you and the excess cost thus incurred will be recovered from you. Delayed supplies shall be accepted under penalty clause of the Schedule "B" unless the delivery period is extended by the competent authority.

7. The Director, Supplies & Disposals, Haryana reserves to himself the right to obtain contracted items of stores when available from any Govt. Deptt./ approved source without prejudice to this contract.

8. Failure to execute agreement/effect supplies within the stipulated period, repeatedly offering supplies liable to rejection or without prior inspection may render your earnest money/security liable to forfeiture, debarring your firm in addition to other remedies as available under the terms of the contracts.

9. All cases, where payments are not made within time, should be referred to this office for taking necessary action against the defaulters.

10. Your attention is particularly invited to the provision of Schedule "B" regarding the compliance with requisitions, preparation and submission of bills and quarterly submission of statement of supplies.

11. **PRICE FALL CLAUSE**:- The price charged for the stores shall not exceed in any way the lowest price at which you quote/ supply the stores of identical description of stores to GeM/State Govt./Central Govt./Institutions/undertaking/ any other person during the delivery period/ currency period of the rate contracts. If at any time during the delivery/ currency period, you reduce the rate, sale price of quoted stores to any person at the price lower than the price chargeable under this supply order/ contract, you are required to inform this office and price payable under the supply order/contract for the stores supplied after the date of coming into force of such reduction of rates shall stand correspondingly reduced to that level. You shall promptly notify the reduction of rates to this office as well as to concerned Indenting Officers/ consignees. You shall also give a certificate on your bills that the rates charged by you are not in any way higher to these quoted to the GeM and other state govt. central govt. Institutions etc. during the corresponding period. The Indenting Officer shall be required to ensure that requisite certificate is given by the concerned firm on the bills before releasing their payments.

12. All disputes will be settled only within the jurisdiction of Head Quarters of the Directorate of Supplies & Disposals, Haryana, Panchkula.

Please acknowledge the receipt of this letter.

Yours faithfully,

Executive Engineer
Director General, Supplies & Disposals,
For & On behalf of Governor of Haryana

Endst. No- 92/HR/RC/E-5/2023-24/ 7143 **Dated:-** 28-10-24

A copy of Schedule 'A' showing the prices accepted along with conditions of supply (ii) Schedule "B" i.e. conditions of contract are forwarded to the the Director General, New & Renewable Energy Department Haryana & HAREDA, Akshay Urja Bhawan, Institutional Plot No. 1, Sector-17, Panchkula Email:- hareda@chd.nic.in.

1. He may indent for the requirement of the goods included in the Schedule "A" attached direct on the approved contractors under intimation to this office.

2. The security deposited by the firms would be released after two months of the termination of the contract and he is therefore, requested to send the complaints, if any, against the contractors to this office within this limit for settlement, failing which no complaint or claim will be entertained.

3. The Inspection shall be arranged by the Indenting Officer/Consignees or their authorized representatives at destination before releasing the payment of the supplies. The stores should be accepted only after satisfactory inspection and issue of proper inspection note showing the acceptance of the material as per approved specifications.

4. Please report all cases in which contractor fails to effect supply within the delivery period stipulated in the Schedule "A" after the expiry of stipulated delivery period to this office for effecting purchase at the risk and cost of the contractors failing which all responsibility will rest with Indenting Officers/Consignees for not effecting risk purchase within prescribed period.

Executive Engineer
Director General, Supplies & Disposals,
For Director General, Supplies & Disposals, Haryana

Endst. No- 92/HR/RC/E-5/2023-24/ **Dated :-**

A copy is forwarded to the following for information & necessary action:-

1. The Deputy Excise & Taxation Commissioner, Sonipat.
2. The Deputy Excise & Taxation Commissioner, Ghaziabad.

They are requested to ensure that the GST is paid by the firm to government against this rate contract.

Executive Engineer
Director General, Supplies & Disposals,
For Director General, Supplies & Disposals, Haryana

Endst. No-92/HR/RC/E-5/2023-24/ **Dated :-**

A copy is forwarded to the following for information and action:-

1. The Accountant General (Audit), Haryana, Sector-33, Chandigarh.
2. The Controller of Stores, Punjab, Chandigarh.
3. The Controller of Stores, Himachal Pradesh Nigam Vihar, Shimla.
4. The Controller of Stores/Director of Industries and Commerce, J&K, Shrinagar.
5. St. Section O/o DGS&D, Haryana.
6. Programmer O/o DGS&D, Haryana.
7. Departmental Processing Charges branch o/o DGS&D, Haryana

Executive Engineer
Director General, Supplies & Disposals,
For Director General, Supplies & Disposals, Haryana

SCHEDULE -"A"

Accepted rates of M/s Inixy Power solution Pvt. Ltd. Milton Road, Opp. Atlas Mandir, Sonipat-131001 Email:- inixygroup@gmail.com, inixypower@gmail.com , offer No. 1059811 dated 11.03.2024 and your letter dated 23.07.2024, this office acceptance letter No. 5334 dated 08.08.2024 & your letter No. PS/24/0504 dated 17.09.2024.

Sr. No.	Name of items	Qty	Rates in Rs. per system., inclusive of all taxes/ duties, GST, FOR Destination etc
1	SPV Street Lighting (without Remote)	9000 Nos.	Rs. 16,500/-
	Make:-		
	Solar Module:-	(i) Ritika (ii) Senza	
	Battery :-	Inixy	
	Luminaire:-	Inixy	

TECHNICAL SPECIFICATIONS FOR 12 W WHITE-LED BASED SOLAR STREET LIGHTING SYSTEM

Sr. No.	Components	Specification for Solar Street light fitting
1	PV module	75 Wp under STC
2	Battery	Minimum 12.8V, 30AH capacity Lithium Ferro Phosphate (LiFePo4) battery.
3	Light Source	White Light Emitting Diode (W-LED) 12 Watt, W-LED Luminaire, dispersed beam, soothing to eyes with the use of proper optics and diffuser. LED Chip should be compliance to IES: LM-80 (Approved Method for Measuring Lumen Maintenance of LED Light Source and LED lumen depreciation time to L70). Test report for same should be submitted.
4	Light Out put	The luminaire must use high efficacy W-LED with minimum 135 lumens per watt (and UV free).[A certificate to be submitted by the System supplier to the Test Lab during certification] **For single Light level:** Minimum 24 Lux when measured at a point 4 meters below the light. The illumination should be uniform without dark bands or abrupt variations and soothing to the eye. Higher light output will be preferred. **For Multiple Light Levels:** The luminaire should have two levels of light to take care of different lighting needs during the night. Minimum 24 Lux when measured at a point 4 meters below the light (at "High"

		illumination level). The illumination should be uniform without dark bands or abrupt variations. Minimum 12 Lux at lower illumination level. (Higher light output will be preferred) The luminaire shall be tested for Electrical, Photometry and Color parameters as per IES LM-79:2008 or IS: 16106:2012 for following performance parameters like: 1) Total luminous flux :≥1500 lm. 2) Luminous efficacy (i.e. system efficacy): ≥125 lm/W. 3) Color Temperature: Between 5500 K to 6500K. 4) CRI ≥ 70 5) Luminous intensity distribution should follow the batwing patterns in polar curves. 6) Require validation report using .ies file, which is generated during luminous intensity distribution test and using maintenance factor 0.9 and pole height of 4m., road width 5m and Pole span 15m. The average illuminance level and uniformity should comply with requirement as per IS 1944, wherever applicable. 7) The luminaire should be tested for all type tests as per IS 10322 Part 5 Sect 3 or IEC 60598-2-3 standards.
5	Mounting of light	Pole height 5m above the ground level and 1m below the ground. Luminaire shall be at least 4.5m above the ground level.
6	Electronics Efficiency	Overall Total Efficiency of the Electronics should be Minimum 90%.
7	Duty Cycle	Dusk to dawn: First 4 hours full light (min. 24 Lux), rest of the time at lower light (50%, min.12 Lux) level. (Higher light output will be preferred.
8	Autonomy	3 days or Minimum 36 operating hours per permissible discharge with fully charged Lithium-Ferro Phosphate Battery.
9	Ingress Protection-IP	Optical and Control gear compartment-IP 65/IP 66
10	Impact resistance of casing	≥IK 08
11	Radiated Emission Test	As per CISPR-15
12	ESD (Electro Static Discharge) and Radiated susceptibility test	As per IEC 61547

TECHNICAL DETAILS:

PV MODULE

(i) Domestically manufactured PV Module with domestically manufactured solar PV cells should be used.

(ii) The PV modules should be made up of crystalline silicon solar cells and must have

BIS certificate for IS 14286& IS 61730 (Part-I, Part II).

(iii) The efficiency of the PV modules should be minimum 19%.

(iv) PV modules must meet the latest specification of MNRE. The PV modules used must qualify to the latest BIS standards Crystalline Silicon Cell Modules. In addition, the modules must conform to IS 61730 Part-1 - requirements for construction & Part 2 - requirements for testing, for safety qualification or equivalent IS.

(v) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.

(vi) Other general requirement for the PV modules and subsystems shall be the Following:

a) The rated output power and efficiency of any supplied module should not be less than the power and efficiency defined in the bid. However, higher wattage Solar PV Module can be accepted. No negative tolerance shall be allowed.

b) The module shall be provided with a junction box with weather proof lid of sealed type and IP-65 rated.

c) I-V curves at STC shall be provided with the module.

(vii) The module should have the following minimum information laminated inside the module.

- Made in India (to be subscribed in words)
- Company name /logo
- Model number
- Serial number
- Year of make

(viii) Warranties:

a) Material Warranty:

(i) Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures for a period of twenty five (25) years from the date of commissioning of the system

(ii) Defects and/or failures due to manufacturing (it should indicate the voltage and rated wattage of the module)

(iii) Defects and/or failures due to quality of materials

(iv) 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 owner's sole option.

b) Performance Warranty:

(i) 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 ten years period of the full rated original output.

Note: PV Module/s must have to be supplied as per the latest MNRE guidelines/office memorandum and specifications applicable at the time of supply.

BATTERY

i. Minimum 12.8V, 30AH capacity Lithium Ferro Phosphate Battery.

ii. Battery bank should consist of prismatic LiFePo4 cells of minimum 3.2V (nominal) 10Ah rating.

iii. Battery pack should have proper 'Battery Management System' (BMS) for cell balancing, over charge and over temperature protection.
iv. Battery should BIS certified with IS: 16046 (Part-2): 2018 from approved laboratory.

LIGHT SOURCE

i. The light source will be a white LED type.
ii. The colour temperature of white LED used in the system should be in the range of 5500^0 K.
iii. W-LEDs should not emit ultraviolet light.
iv. The light output from the white LED light source should be constant throughout the duty cycle.
v. The lamps should be housed in an assembly suitable for outdoor use.
vi. The temperature of heat sink should not increase more than 20^0C above ambient temperature during the dusk to dawn operation.

ELECTRONICS

i. The total electronic efficiency should be at least 90%.
ii. Charge Controller should be MPPT Type.
iii. Electronics should operate at an appropriate voltage suitable for proper charging of the battery.
iv. No load current consumption should be less than 20mA.
v. The PV module itself should be used to sense the ambient light level for switching ON and OFF the lamp.
vi. The PCB containing the electronics should be capable for solder free installation and replacement.
vii. Necessary lengths of wires/cables, switches suitable for DC use and fuses should be provided.

ELECTRONIC PROTECTIONS

i. Adequate protection is to be incorporated under "No Load" conditions e.g. when the lamp is removed and the system is switched 'ON'.
ii. The system should have protection against battery overcharge and deep discharge conditions.
iii. The system should have protection against short circuit conditions.
iv. Protection for reverse flow of current through the PV module(s) should be provided.
v. Adequate protection should be provided against battery reverse polarity.
vi. Load reconnect should be provided at 80% of the battery capacity status.

MECHANICAL COMPONENT

i. A corrosion resistant metallic frame structure should be fixed on the pole to hold the SPV module.
ii. The frame structure should have provision so that the module can be oriented at the suitable tilt angle.
iii. Pole should be Hot dip galvanized pipe as per IS1161 & IS4736 i.e. Class B of outer diameter of 4 inch.
iv. Pole height 5m above the ground level and 1m below the ground. Luminaire shall be at least 4.5 m above the ground level.
v. The pole should have the provision to hold the luminaire.

vi. Pole should have to be grouted in concrete mortar size platform of 1.5ft x 1.5ft x 3ft so that it may bear the wind velocity of 200 Km/Hr.

vii. The battery shall be either included in the luminaire enclosure, which should be water proof (IP 65) and corrosion resistant or outside the luminaire enclosure in a vented, acid proof and corrosion resistant, hot dip galvanized metallic box (IP 65) with anti-theft locking arrangement for outdoor use.

CABLE

2.00 mm DC cable with EN 50618 standards shall be used in the systems.

INDICATORS

- The system should have two indicators, green and red.
- The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the battery is fully charged.
- Red indicator should indicate the battery "Load Cut Off" condition.

QUALITY AND WARRANTY

i. The street lighting system (including the battery) will be warranted for a period of seven years from the date of commissioning.

ii. The PV module(s) will be warranted for a minimum period of 25 years from the date of commissioning. The PV modules must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Ten (10) years and 80% at the end of twenty five (25) years.

iii. The Warranty Card to be supplied with the system must contain the details of the system.

OPERATION AND MAINTENANCE MANUAL

An Operation, Instruction and Maintenance Manual, in English and the local language, should be provided with the Solar Street Lighting system. The following minimum details must be provided in the Manual:

- Basic principles of Photovoltaic.
- A small write-up (with a block diagram) on Solar Street Lighting System- its components, PV module, battery, electronics and luminaire and expected performance.
- Type, Model number, Voltage & capacity of the battery, used in the system.
- The make, model number, country of origin and technical characteristics (including IESNA LM-80 report) of W-LEDs used in the lighting system.
- About charging and significance of indicators.
- Clear instructions about erection of pole and mounting of PV module (S) and lamp housing assembly on the pole.
- Clear instruction on regular maintenance and troubleshooting of the solar street lighting system.
- DO's and DON'T's.
- Name and address of the contact person for repair and maintenance, in case of non-functionality of the solar street lighting system.

List of BIS standards applicable for components of Solar PV Applications

Sr. No. (1)	Product (2)	Indian Standard Number (3)	Title of Indian Standard (4)
1.	Crystalline Silicon Terrestrial Photovoltaic (PV) modules (Si wafer based)	IS 14286	Crystalline Silicon Terrestrial Photovoltaic (PV) modules-Design Qualification and type approval
2	Thin Film Terrestrial Photovoltaic (PV) Modules (a-Si, CiGs and CdTe)	IS 16077	Thin-firm Terrestrial Photovoltaic (PV) Modules-Design Qualification and Type Approval
3.	PV Module (Si wafer and thin film)	IS/IEC 61730 (Part 1) IS/IEC 61730 (Part 2)	Photovoltaic (PV) Module safety Qualification Part 1 Requirements for Construction Photovoltaic (PV) Module Safety Qualification Part 2 Requirements for testing
4	Power converters for use in photovoltaic power system	IS 16221 (Part 1) IS 16221 (Part 2)	Safety of Power Converters for use in Photovoltaic Power systems Part 1-General Requirement Safety of Power converters for Use in Photovoltaic Power systems Part 2-Particular Requirements for Inverters
5	Storage batteries	IS 16270 IS16046	Secondary Cells and Batteries for solar Photovoltaic Application General-Requirements and Methods of Test Standard for Lithium ion battery
6.	LED Lights & Luminaires	IS 16101 IS 16102 IS 16103 IS 16107	General Lighting-LEDs and LED modules-Terms and Definitions Self-Ballasted LED lamps for General Lighting services Led Modules for General Lighting Luminaires Performance

(Details specifications as per DNIT & sample submitted by you and approved by the Technical Committee)

TERMS & CONDITIONS

1- **F.O.R.:-** The above rates are for destination anywhere in Haryana at supplier's risk.

2- **G.S.T. :-** Inclusive in above rates.

3- **Delivery period (includes supply, installation & commissioning):-** Three months from the date of placement of work order.

4- **Payment :-**

i. 60% payment will be released within one month time on submission of material receipt of physical delivery of inspected/ accepted goods in physically good condition at consignee go down on submission of bill of material supported by material receipt duly signed by PO/APO of the department/ office.

ii. 30% will be released within one month time after satisfactory installation / working of the items on submission of joint commissioning report (JCR) along with photograph of the system in the attached format duly signed by the user & PO/APO of the consignee department/ office with countersignature of head of the office (ADC-cum-CPO).

iii. 10%payment will be released on completion of 07years from the date of commissioning of the systems on submission of satisfactory performance report of the systems duly certified by the concerned PO/APO OR said amount may be released against submission of bank guarantee of equal amount valid for seven years from the date of commissioning of the system.

The Indenting Departments would have option to release payments in RTGS/ Electronics mode also.

Delay in payments to the suppliers beyond the stipulated credit period indicated in the supply order, unless supported by cogent reasons and approved by a higher authority, will attract penal interest on the defaulting amount @ Rs.25/- per rupees one lakh per day of delay beyond the stipulated credit period. Non provision of adequate budget will be no ground for delay in payments to the supplier..

5. **Warranty :-** Seven years from the date of commissioning (including batteries) and PV module(s) will be warranted for a minimum period of 25 years from the date of supply. PV modules used in Solar Lighting system must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Ten (10) years and 80% at the end of Twenty five (25) years.

6. **INSPECTION:-** The inspection of the material will be carried out by the committee constituted by Indenting Department or their authorized representatives at the premises of the supplier before dispatch.

In case, the material offered for inspection by the firm fails to meet the specifications stipulated in NIT/Order/Contract and the samples are rejected by the Inspecting Committee, the Indenting Department will have the right to levy a penalty at 0.1% of the total order value. In case, the material offered for inspection fails during the 2nd inspection also, the Indenting Department will have the right to increase the penalty to 0.25% of the total order value. In case, the material offered fails during the 3rd and final inspection also, the firm will be liable for penal action including forfeiture of EMD, risk purchase, debarring/ blacklisting in future, and no further opportunity for inspection would be provided to the supplier firm.

(OTHER TERMS & CONDITIONS WILL BE AS PER DNIT AND SCHEDULE-B ATTACHED).

Encls.a/

Executive Engineer,
Director General Supplies & Disposals, Haryana,
For & On behalf of Governor of Haryana.

SCHEDULE -"A"

Accepted rates of M/s GEIE SOLAR PRODUCTS INDIA PVT LTD, 80G RAJENDER NAGAR INDUSTRIAL AREA SAHIBABAD GHAZIABAD UP, GHAZIABAD Email:- kadariya@geie.co.in, offer No. 1055787 dated 11.03.2024 and your letter dated 23.07.2024, this office acceptance letter No.5336 dated 08.08.2024 & your letter No. NIL dated NIL received in this office on 09.10.2024.

Sr. No.	Name of items	Qty	Rates in Rs. per system., inclusive of all taxes/ duties, GST, FOR Destination etc
1	Solar High Mast Lighting System	600 Nos.	Rs. 1,03,265/-
	Make:-		
	Solar Module:-	Senza	
	Battery :-	Senza	
	Luminaire:-	GEIE	

TECHNICAL SPECIFICATIONS

A Solar PV White- LED High Mast Light consists of white LED luminary of maximum 4 X22 Watt (LED + Driver) as per configuration along with solar PV modules and battery of given capacity, necessary control electronics-inter connecting wires / cables, module mounting structures etc. to operate the load for dusk to dawn or as per provision in the charge controller. The broad performance specifications of a White Light Emitting Diode (W-LED) light source based solar street lighting system are given below:-

BROAD PERFORMANCE PARAMETERS

PV Module	Only indigenous modules shall be used in the Project. SPV module aggregate capacity 440 Wp (110 Wp X 4 Nos.) at under STC. Module Voc minimum of 21V
Battery (LiFePO4)	Lithium Ferro Phosphate battery aggregative capacity 12.8 Volt 200 Ah (50Ah x 4 nos) 12.8 Volt 50 Ah of one unit.
Light Source	White Light Emitting Diode (W-LED) 4x22 Watt (LED +Driver) Using LEDs which emits ultraviolet light will not be Permitted
Light Out put	White colour (colour temperature 5500-6500 K). Lumen efficacy of LED- min 150 lumens/Watt @350 mA. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. The lumens output of each luminaire should not be less than 3000 lumens. The lux level over a 16 meter of radius should not be less than 5% at the point mentioned below in the lux level distribution chart. The average

	Lux should be min 8.0 lux and average/min = min 0.25. Higher light output will be preferred.
Pole	Pole of hot deep Galvanized Iron Octagonal in single length for 7.0 mtr height
Duty cycle	Dusk to dawn with following inbuilt dimming provision in the Charge Controller :- First 3 hours full light (min. 8.0 lux), 60% for next 3 hours (min. 5 lux) and rest of time at lower light (50%, min. 4 lux) level. (Higher light output will be preferred).

MINIMUM TECHNICAL REQUIREMENTS / STANDARDS

SPV MODULES:

(i) Domestically manufactured PV Module with domestically manufactured solar PV cells should be used.

(ii) The PV modules should be made up of crystalline silicon solar cells and must have BIS certificate for IS 14286& IS 61730 (Part-I, Part II).

(iii) The efficiency of the PV modules should be minimum 19%.

(iv) PV modules must meet the latest specification of MNRE. The PV Modules used must qualify to the latest BIS standards Crystalline Silicon Solar Cell Modules. In addition, the modules must conform to IS 61730 Part-1 - requirements for construction & Part 2 - requirements for testing, for safety qualification or equivalent IS.

(v) The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.

(vi) Other general requirement for the PV modules and subsystems shall be the Following:

(a) The rated output power and efficiency of any supplied module should not be less than the power and efficiency defined in the bid. However, higher wattage Solar PV Module can be accepted. No negative tolerance shall be allowed.
(b) The module shall be provided with a junction box with weather proof lid of sealed type and IP-65 rated.
(c) I-V curves at STC shall be provided with the module.

(vii) The module should have the following minimum information laminated inside the module.

- Made in India (to be subscribed in words)
- Company name /logo
- Model number
- Serial number
- Year of make

(viii) Warranties:

a) Material Warranty:

(i) Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures for a period of twenty five (25) years from the date of commissioning of the system.
(ii) Defects and/or failures due to manufacturing (it should indicate the voltage and rated wattage of the module)
(iii) Defects and/or failures due to quality of materials
(iv) 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 owner's sole option.

b) 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 ten years period of the full rated original output.

Note: PV Module/s must have to be supplied as per the latest MNRE guidelines and specifications applicable at the time of supply.

LITHIUM-FERRO-PHOSPHATE (LI-FE-PO4) BATTERY:

1- Battery bank should consist of prismatic LiFePo4 cells of minimum 3.2V (nominal) 10Ah rating.
2- Battery pack should have proper 'Battery Management System' (BMS) for cell balancing, over charge and over temperature protection.
3- Battery should BIS certified with IS: 16046 (Part-2): 2018 from approved laboratory.
4- Capacity of the battery shall not be less than 12.8 V (nominal), 50 Ah at STC, 640 Watt Hour for one unit. The total capacity of battery should be 640x4=2560 Watt Hour.
5- The battery cycle life should be 2000 cycle at 95%discharge.
6- BMS (Battery Management System) should be part of battery pack and battery pack enclosure should be as per standard. The battery pack should be integrated with the system in such way that it is theft proof and not removable from system. It should be installed with combination of module structure/luminaire. The height of battery pack will be approximate, 6.5 meters above the ground.
7- The system must withstand wind velocity of 180 km/hr. The battery pack should be capable of high rate of heat dissipations. The battery box should be acid proof and corrosion resistant, hot dip galvanized metallic box (IP 65) with anti-theft locking arrangement.
8- The battery should operate between temperature range of 0 degree C to 55 degree C. The other feature of the battery should be:

Sr. No.	Description	Specifications
1	Battery Configuration	12.8V- 200AH; Li-fe-PO4 (4x50AH)
2	Working Temperature Range (both for charging & discharging)	0-60 deg C
3	Storage Temperature Range	@ 0-25 Deg- 6 months

4	Cycle Life (Full charge to full discharge@25degCbeforecapacity of battery falls below 75%	more than 2000 Cycles
5	Battery Warranty	5 years
6	Min. Capacity of Individual Cells	3.2V cell of 10 AH, 50AH
7	Type of Cell	Prismatic
8	Nominal Capacity	12.8 volt - 50AH of one unit
9	Nominal Voltage	12.8V
10	Voltage Range	10.5V - 14.6V
11	Total Energy	640 WHr
12	Rated Charging current	25 Amps
13	Maximum Charging current	20 Amps
14	Maximum Discharging Current	25 Amps
15	Discharge Cut off Voltage	>10.5V
16	Over Charge Cut off Voltage	14.4V+/- 0.2V
17	Charging Time	Around 5 - 5.5 Hours

LIGHT SOURCE:

1- The light source will be of white LED type The color temperature of white LEDs used in the system should be in the range of 5500 degree K - 6500 degree K. Use of LEDs which emits ultraviolet light will not be permitted. The temperature of heat sink should be not increase more than 20 degree centigrade above ambient temperature during the dusk to dawn operation.

2- The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred. The light output from the white LED light source should be almost constant. The lamps, DC-DC driver and battery with battery management system (BMS) should be housed in aluminum die-casted casing suitable for outdoor use and shall comply with IP65.

3- The lamps should be housed in an assembly suitable for outdoor use and shall comply with IP65. The LED housing should be made of pressure die cast aluminum having sufficient area for heat dissipation and heat resistant toughened clear glass/ high quality poly carbonate fitted with pressurized die cast aluminum frame with SS screws.

The temperature of heat sink should not increase more than 30 degree C above ambient temperature even after 48 hrs. of continuous operation. This condition should be complied for the dusk to dawn operation of the lamps while battery operating at any voltage between the loads disconnect and charge regulation set point.

4- High power LED of minimum 1 watt each capacity capable to withstand maximum 1 amp driving current having lens angle greater than 120 degree shall be used. The LED of reputed make having LM 80 and LM 79 test report shall only be used.

5- The LED efficacy should be more than 150 lumen / watt @ 350 mA, the total luminaire efficacy should not be less than 135 lumens per watt. (Including all loses) i.e the lumens output of each luminaire should not be less than 3000 lumens.

6- All LED in circuit must be connected in series only. It must incorporate fail short

mechanism in all LEDs. The LEDs used in the luminaire should have life time more than 50,000 hrs.

7- The lumen depreciation of LED shall not be more than 30% even after 50,000 burning hours.

8- Power consumption (input and output) of the each LED Luminaire/Lighting unit shall not be more than 22 W (including LED Driver power loss).

9- The lux level over a 16 meter of radius should not be less than 5% at the point mentioned below in the lux level distribution chart.

The chart is plotted for 6.5 meter high, with lamp bracket arm of 1 meter with 5 degree. Grid spacing 1×1 meter. Maintenance factor 0.8. The average Lux should be min 8 lux and average/min = min 0.25.

10- Other Parameters :

- LED DC current regulation - better than 3 %
- Input - 12 VDC
- Driver Type- DC-DC (as per IEC 62384)
- CRI - 70 % Typical
- Lighting quality- Free from glare and flickering and UV
- Ambient temp- up to 50deg
- DC to DC convertor efficiency > =90%

11- The connecting wires used inside the luminaries, shall be low smoke halogen free, fire retardant e-beam cable and fuse protection shall be provided at input side.

12- Auto resettable reverse polarity protection shall be provided.

13- LED lighting unit shall comply with LM -79-08 Standards and copy of test certificate should be submitted.

14- The make, model number, country of origin and technical characteristics of white LEDs used in the lighting system must be furnished.

15- The luminaries must have light distribution polar curve. The bidder should submit the polar curve of luminaries in LM 79 report.

16- The luminaire should be tested for all type tests as per IS 10322 Part 5 Sect 3 or IEC 60598-2-3 standards. *ELECTRONICS*

MPPT charge controller to maximize energy drawn from the Solar PV array. The MPPT charger shall be microcontroller based. The PV charging efficiency shall not be less than 90% and shall be suitably designed to meet array capacity. The charge controller shall confirm to IEC 62093, IEC 60068 as per specifications.

MPPT Charge controller to maximize energy drawn from the solar PV array. The MPPT Charger should be microcontroller based. The charge controller should have:

SOLAR CHARGE CONTROLLER

Sr No.	Description	Specification
1	Charge controller Type	MPPT type -Maximum Power point Tracking.
2	Charge controller Rating @ Related Voltage	10 Amps
3	Module Rating	110 Wp @ 16.4 volt ± 0.2 V, if MPPT is not used with positive tolerance
		36 Cell configuration
		Voc- > 21 Volts
		Vmp-16.4 volt ± 0.2 at STC without MPPT

(i) Protection against polarity reversal of PV array and battery, Over Current, Short Circuit, Deep Discharge, Input Surge Voltage; Blocking Diode protection against battery night time leakage through PV Module.
(ii) Electronics should operate 21volt and 11.2 volt and its efficiency should be at least 90 %.
(iii) The system should have protection against battery overcharge and deep discharge conditions. The numerical values of the cut off limits of lower voltage should not be less than 11.2 Volt and over voltage cutoff should be 14.6V.
(iv) Full protection against open circuit, accidental short circuit and reverse polarity should be provided
(v) Charge controller shall have automatic dusk-dawn circuit based on SPV module as sensor for switching on/off the high mast light without manual intervention. The sensor must not get triggered by impulse lighting like lightning flashes and fire crackers.
(vi) The self-consumption of the charge controller shall not be more than 20 mA at rated voltage and rated current.
(vii) Adequate protection shall also be incorporated under no-load conditions (i.e. when the system is ON & the load (LED Lamp is removed).
(viii) The system should be provided with 2 LED indicators: a green light to indicate charging in progress and a red LED to indicate deep discharge condition of the battery. The green LED should glow only when the battery is actually being charged.
(ix) All capacitors shall be rated for max. temp of 105°C.
(x) Resistances shall preferably be made of metal film of adequate rating.
(xi) Device shall have adequate thermal margin should be at least 25 degree below the allowable junction temperature while operating at an ambient temperature of 55 degree C and full load.
(xii) Fibre glass epoxy of grade FR 4 or superior shall be used for PCB boards.

Preferably the electronics (both charge controller and driver) should be housed in a box and installed on pole suitably in order to perform the repairing of electronics quickly without removing the whole luminaire.

TECHNICAL REQUIREMENT/STANDARDS

Item / System	Applicable BIS /Equivalent IEC Standard Or MNRE Specifications	
	Standard Description	Standard Number
Solar PV Systems	Crystalline Silicon Terrestrial PV Modules	IEC 61215 edition II / BIS 14286 and IEC 61730 part-1 and part-2 Test Certificates / Reports from IECQ / NABL/ MNRE accredited laboratory for relevant IEC / equivalent BIS standard.
Charge Controller/MPPT Units and Protections		IEC 62093 Equivalent BIS Std.
Storage Batteries	LiFePo4	Tested as per IS 16046 (Part 2):2018
Cables	2.00 mm DC Cable	EN 50618 DC Cable
Luminaries and Charge Controller housing		IP65
LED	LED performance Luminary performance	LM -80-08 LM 79-08

MECHANICAL HARDWARE

1. A galvanized metallic frame structure to be fixed on the pole to hold the SPV module(s). The frame structure should be fixed at 30 degree from horizontal facing true south.

2. The pole should be hot deep Galvanized Iron Octagonal pole in single length for 7.0 mtr. height as per specification as under:

   (i) The Octagonal poles shall be hot deep galvanized. The material of pole shall be as per specification of BS EN 100025, ISO 1461.

   (ii) The size of the pole shall be min 75 mm at Top side, 150 mm at bottom side with thickness of 4 mm minimum.
   (iii) The base plate of pole shall be of size 260 X 260 X 18 mm duly welded to pole.
   (iv) Pole should have the arrangement at top for mounting of Solar panel of design capacity with mounting structure at an angle of latitude $\pm 2^{o}$ degree.

   (v) The four LED luminaire shall be mounted on this pole at height of 6.5 meter from pole bottom.
   (vi) The pole shall be mounted on suitable RCC foundation at least 1.25 meter deep and 0.5 meter above ground with 4/6/8 bolt of min 20 mm size.
   (vii) The Nut -Bolts in battery box and panel structures should be proper riveted to ensure the theft.

BATTERY BOX:

The battery box should be corrosion resistant, hot dip galvanized metallic box (IP65) with anti- theft locking arrangement. The size of box should be as per battery pack size. The battery box is to be properly rest/mounted on pole approx. 6.5 meters of height from ground level. The edges of box should be turned properly to give smooth edge and good strength. Components and hardware shall be vandal and theft resistant. All parts shall be corrosion-resistant.

ELECTRIC CABLE

The electric cable used shall be twin core PVC insulated water and UV resistance copper cable of minimum size 2.00 mm thickness. Cable shall meet EN 50618 standard for DC cables.

INSTALLATION OF SYSTEM:

The system should be properly installed at site. The SPV module mounting structure along with telescopic octagonal pole should be properly grouted depending upon the location and requirement of the site. The grouting should be such that it should withstand the maximum wind speed /storm of 180 kmph. The pole should be rest on a suitable foundation. (RCC Foundation with iron rings size 600 mm x600 mm x 1250 mm deep and 500 mm above the ground level. must have 4/6/8 nos. foundation bolts of 1200 mm & 20mm dia.) Adequate space should be provided behind the PV module/array for allowing un-obstructed air flow for passive cooling. Cables of appropriate size should be used to keep electrical losses to a bare

minimum. Care should be taken to ensure that the battery is placed with appropriate leveling on a structurally sound surface. The control electronics should not be installed directly above the battery. All wiring should be in a proper conduit or capping case. Wire should not be hanging loose. Any minor items which are not specifically included in the scope of supply but required for proper installation and efficient operation of the SPV systems is to be provided by the manufacturer as per standards.

WARRANTY

The mechanical structures, electrical works including power conditioners/inverters/charge controllers/ maximum power point tracker units/distribution boards/digital meters/ switchgear/ storage batteries, etc. and overall workmanship of the systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 7 years. The warranty & maintenance is elaborated as under:-

- The PV modules will be warranted for a minimum period of 25 years from the date of supply. (Output wattage should not be less than 90% at the end of 20 years and 80% at the end of 25 years).

- The mechanical structures, electrical components including battery and overall workmanship of the Solar PV White- LED High Mast LightSystems must be warranted for a minimum of 7 years from the date of commissioning and handing over of the system..

- The Comprehensive Maintenance (within warranty period) shall be executed by the firm themselves or through the authorized dealer/ service center of the firm in the concerned district.

- Necessary maintenance spares for seven years trouble free operation shall also be supplied with the system.

- The contractor/ bidder shall be responsible to replace free of cost (including transportation and insurance expenses) to the purchaser whole or any part of supply which under normal and proper use become dysfunctional within one month of issue of any such complaint by the purchaser.
- The service personnel of the Successful Bidder will make routine quarterly maintenance visits. The maintenance shall include thorough testing & replacement of any damaged parts Apart from this any complaint registered/ service calls received / faults notified in the report generated by the IVRS should be attended to and the system should be repaired/ restored/ replaced within 3 days.

- A separate Service & Maintenance passbook shall be maintained of the supplied systems as per the format provided by HAREDA. The deputed personnel shall be in a position to check and test all the components regularly, so that preventive actions, if any, could be taken well in advance to save any equipment from damage. Any abnormal behavior of any component shall be brought to the notice of HAREDA for appropriate action.

- Normal and preventive maintenance of the Solar PV White- LED High Mast Light systems such as cleaning of module surface, topping up of batteries, tightening of all electrical connections, cleaning & greasing of battery terminals, also the

duties of the deputed personnel during quarterly maintenance visits.

- During operation and maintenance period of the Solar PV White- LED High Mast Light systems, if there is any loss or damage of any component due to miss management/miss handling or due to any other reasons pertaining to the deputed personnel, what-so-ever, the supplier shall be responsible for immediate replacement/rectification. The damaged component may be repaired or replaced by new component.

TRACEABILITY OF THE PRODUCT TO BE SUPPLIED

In order to prevent the misuse of the product such as unauthorized sale or diversion to the open market, the following incorporation shall be made in the product.

(a) Engraving (or) Screen printing of HAREDA with logo at a suitable place on the main components viz., SPV Panel, Battery, LED Lighting Units to be used in the installation of the solar high mast lighting systems.

(b) The unique system ID number as provided by HAREDA shall be embossed or punch or permanently riveted on each pole and battery box of the system. The UID number painting or marking will not be allowed.

(Details specifications as per DNIT & sample submitted by you and approved by the Technical Committee)

TERMS & CONDITION

1- **F.O.R.:-** The above rates are for destination anywhere in Haryana at supplier's risk.

2- **G.S.T. :-** Inclusive in above rates.

3- **Delivery period (includes supply, installation & commissioning):-** Three months from the date of placement of work order.

4- **Payment :-**

i. 60% payment will be released within one month time on submission of material receipt of physical delivery of inspected/ accepted goods in physically good condition at consignee go down on submission of bill of material supported by material receipt duly signed by PO/APO of the department/ office.

ii. 30% will be released within one month time after satisfactory installation / working of the items on submission of joint commissioning report (JCR) along with photograph of the system in the attached format duly signed by the user & PO/APO of the consignee department/ office with countersignature of head of the office (ADC-cum-CPO).

iii. 10%payment will be released on completion of 07years from the date of commissioning of the systems on submission of satisfactory performance report of the systems duly certified by the concerned PO/APOOR said amount may be released against submission of bank guarantee of equal amount valid for seven years from the date of commissioning of the system.

The Indenting Departments would have option to release payments in RTGS/ Electronics mode also.

Delay in payments to the suppliers beyond the stipulated credit period indicated in the supply order, unless supported by cogent reasons and approved by a higher authority, will attract penal interest on the defaulting amount @ Rs.25/- per rupees one lakh per

day of delay beyond the stipulated credit period. Non provision of adequate budget will be no ground for delay in payments to the supplier.

5. **Warranty :-** Seven years from the date of commissioning (including batteries) and PV module(s) will be warranted for a minimum period of 25 years from the date of supply. PV modules used in Solar Lighting system must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Ten (10) years and 80% at the end of Twenty five (25) years.

6. **INSPECTION**:- The inspection of the material will be carried out by the committee constituted by Indenting Department or their authorized representatives at the premises of the supplier before dispatch.

In case, the material offered for inspection by the firm fails to meet the specifications stipulated in NIT/Order/Contract and the samples are rejected by the Inspecting Committee, the Indenting Department will have the right to levy a penalty at 0.1% of the total order value. In case, the material offered for inspection fails during the 2nd inspection also, the Indenting Department will have the right to increase the penalty to 0.25% of the total order value. In case, the material offered fails during the 3rd and final inspection also, the firm will be liable for penal action including forfeiture of EMD, risk purchase, debarring/ blacklisting in future, and no further opportunity for inspection would be provided to the supplier firm.

(OTHER TERMS & CONDITIONS WILL BE AS PER DNIT AND SCHEDULE-B ATTACHED).

Encls.a/a

Executive Engineer,
Director General Supplies & Disposals, Haryana,
For & On behalf of Governor of Haryana.