02 FIRMS CONTRACTED IN UPNEDA FOR 30 Watt Street Lighting System				
S.N.	Name Of Firm	Address	Name and Mobile Number of Representative	E-Mail-ID
1	M/s Starline Communication	D-96, Sector-7, Noida, Gautam Buddha Nagar, Uttar Pradesh	Haseeb Uddin 9711222218	info@starlinedirect.com
2	M/s Sunrover Private Limited	GF-1, Shree Mahakali Apartment, Stanley Road, Prayagraj	Ravindra Pratap Singh 7572020834	info@sunrover.in

संख्याः 3270 /यूपीनेडा–एसईपीवी–एसएसएल (30वाट)–टेण्डर/2023–24

उत्तर प्रदेश नवीन एवं नवीकरणीय ऊर्जा विकास अभिकरण,
विभूति खण्ड, गोमती नगर, लखनऊ।
दिनांकः 10 सितम्बर, 2024

समस्त जनपदीय वरि0परि0अधि0–।।/परि0अधि0/प्रभारी परियोजना,
यूपीनेडा,
जनपद–

जेम पोर्टल के माध्यम से आमंत्रित बिड जेम/2024/बी/4570709 दिनांक 02 फरवरी, 2024 के क्रम में 30 वाट क्षमता की सोलर स्ट्रीट लाइट संयंत्र की आपूर्ति, स्थापना, कमिशनिंग एवं 05 वर्ष की कम्प्रीहेन्सिव वारण्टी सहित प्रति संयत्र दर रू.24240/– (रूपये चौबीस हजार दो चालीस मात्र) जीएसटी सहित निर्धारित हुई है। लीथियम–फेरो–फॉस्फेट बैटरी के साथ 30वाट क्षमता की एलईडी सोलर स्ट्रीट लाइट संयत्र के मुख्य अवयवों के विशिष्टीकरण निम्नवत् हैंः–

PV Module	**Only indigenous modules shall be used in the project.** SPV module of 36 cells 180 Wp, Voltage at Maximum Power (Vmpp) 19.0 V±0.3%. Module Voc should be minimum of 23 V. Module efficiency should be >18%
Battery	Lithium Ferro Phosphate (LifePO4/ LFP) 12.8 Volt, 75 Ah, at STC
Light Source	• White Light Emitting Diode (W-LED) 30 Watt(LED +Driver) • Using LEDs which emits ultraviolet light will not be permitted
Light Out put	White colour (colour temperature 5500-6500 K). The Lumen efficacy of LED-minimum 135 lumens/Watt and the lumens output (luminous flux) of luminaries should be >3750 lumen. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred.
Mounting of light, Controller and Battery pack	The pole should be hot dip galvanized pipe as per IS 1161 & IS 4736 i.e. Class B. with 76 mm outer diameter and minimum 3 mm thickness of 6-meter length Approx., 4.5 meter above the ground, mounted at pole below the module mounting structure.
Average duty cycle	Dusk to dawn
Remote monitoring facility	Inbuilt remote monitoring facility should be available in MPPT Charge Controller and it should record System Parameters at a fixed time interval for system health analysis (time interval should be changeable from 15 minutes to 4 hours and will be intimated at the time of award of work as per the requirement). The remote monitoring can be done using any available communication mode like GSM/GPRS/SMS. The cost for the same should be borne by the successful bidder.

क्रमशः---2

उपरोक्त मानक व विशिष्यिों के साथ 30वाट क्षमता की एलईडी सोलर स्ट्रीट लाइट संयत्र की **निर्धारित दर** निम्नवत् हैंः–

1– बेसिक मूल्य रू.21300.53 (बिना जीएसटी)
(70 प्रतिशत मूल्य पर 12 प्रतिशत जीएसटी रू.1789.24 एवं शेष 30 प्रतिशत मूल्य पर 18 प्रतिशत जीएसटी रू.1150.23 इस प्रकार रू.2939.47)
2– दर प्रति संयत्र मूल्य (21300.53+2939.47) = रू.24240.00
(जीएसटी सहित)
3– अभिकरण का प्रति संयत्र अनुषॉगिक व्यय रू.1000.00
4– आनुषॉगिक व्यय की धनराशि पर 18 प्रतिशत जीएसटी रू.180.00
5– आनुषॉगिक व्यय के साथ प्रति संयत्र निर्धारित मूल्य–(**24240.00+1180.00**)
= रू.25420.00)

उपरोक्त के कम में निर्देशित किया जाता है कि आपके अधीनस्थ जनपद में 30वाट क्षमता की एलईडी सोलर स्ट्रीट लाइट के पूर्ण कीमत पर धनराशि (आनुषांगिक व्यय जहॉ देय हो) के साथ मांग प्रस्ताव प्रेषित करना सुनिश्चित करें।

(अनुपम शुक्ला)
निदेशक, यूपीनेडा।

संख्याः /यूपीनेडा–एसईपीवी–एसएसएल (30वाट)–टेण्डर/2023–24 तद् दिनांकः

प्रतिलिपिः– निम्नांकित सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।
1. समस्त मण्डलायुक्त उ0प्र0।
2. समस्त जिलाधिकारी, उ0प्र0।
3. समस्त मुख्य विकास अधिकारी/परि0नियं0अधि0, यूपीनेडा।
4. समस्त नगर आयुक्त, उ0प्र0।
5. समस्त कार्यक्रम प्रभारी, यूपीनेडा।

(अनुपम शुक्ला)
निदेशक, यूपीनेडा।

SCOPE OF WORK AND TECHNICAL SPECIFICATIONS

Scope of Work:-

The scope of work includes design, supply, installation, commissioning of Solar Street Lighting Systems (LED based) including 05 years comprehensive warranty and maintenance in various villages/ hamlets, institutions, individuals etc. at various districts of Uttar Pradesh as directed by UPNEDA at sites identified by UPNEDA as per the terms and conditions in this document and following specifications.
The scope of work also include mandatory opening of Service Center in their name in concerned district through which servicing and maintenance should be provided as stipulated quarterly in a year and within 72 hours.

GENERAL TECHNICAL SPECIFICATION:

A Solar Street Light (LED based) consist of white LED luminary of maximum **30 Watt** (LED + Driver) as per configuration along with solar PV modules and Li-Fe-PO_4 battery of given capacity, necessary control electronics-inter connecting wires / cables, module mounting structures etc. to operate theload for dusk to dawn. 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 of 36 cells 180 Wp, Voltage at Maximum Power (Vmpp) 19.0 V$\pm$0.3%. Module Voc should be minimum of 23 V. Module efficiency should be >18%
Battery	Lithium Ferro Phosphate (LifePO4/ LFP) 12.8 Volt, 75 Ah, at STC
Light Source	• White Light Emitting Diode (W-LED) 30 Watt(LED +Driver) • Using LEDs which emits ultraviolet light will not be permitted
Light Out put	White colour (colour temperature 5500-6500 K). The Lumen efficacy of LED-minimum 135 lumens/Watt and the lumens output (luminous flux) of luminaries should be >3750 lumen. The illumination should be uniform without dark bands or abrupt variations, and soothing to the eye. Higher light output will be preferred.
Mounting of light, Controller and Battery pack	Approx., 4.5 meter above the ground, mountedat pole below the module mounting structure.
Average duty cycle	Dusk to dawn

Make of Items must be as per the BIS/ MNRE Technical specification and equivalent make offered by the Bidders in the Bid. The Bidders may change the make of items with the permission of competent authority of UPNEDA as and when required on valid circumstantial conditions. The bidder shall provide Test Certificate of the proposed make of items issued from MNRE authorized testing center or NABL accredited test lab.

MINIMUM TECHNICAL REQUIREMENTS / STANDARDS

1. DUTY CYCLE

   i. The LED solar street lighting system should be designed to operate for dusk to dawn

2. SPV MODULES:

i. Only indigenous modules of IEC Tested shall only be used in the project. Crystalline high power/efficiency 36 cells should be used in the solar photovoltaic module. The power output of the module shall not be less than 180 Wp at 19.0 V + 0.3%, Module efficiency should be > 18 % at STC.

ii. The open circuit voltage of the PV modules under STC should be at least 23 Volts.

iii. PV module must be warranted for output wattage, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

iv. The terminal box on the module shall be designed for long life out door operation in harsh environment should have a provision for opening for replacing the cable, if required.

v. The offered module shall be in accordance with the requirements of MNRE standards and tested as per:

   a) As per IEC 61215 / IS 14286 for Crystalline Silicon Terrestrial Photovoltaic (PV module - Design Qualification and Type Approval

   b) As per IEC 61730 Part 1- requirements for construction & Part 2 – requirements for testing, for safety qualification.

vi. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided and if required, blocking diode(s) may also be provided.

vi. IDENTIFICATION AND TRACEABILITY

Each PV module must use a identification tag which must contain the following information:

(i) Name of the manufacturer with logo
(ii) Month and year of the manufacture
(iii) Unique Serial No

(iv) Model No of the module with voltage and rated wattage
(viii) Made in India

2. <u>Lithium-Ferro-Phosphate (Li-Fe-Po4) Battery:</u>

The Battery pack as per IS /IEC 62133-2012. The minimum cell capacity should be 3.2volt, 5 AH.

The Lithium iron phosphate battery needs a very good "Battery Management System" BMS to ensure the proper charging and discharging of each cell of battery with proper protection of battery when temperature is reaching beyond battery permissible limits. This battery also needs constant current and constants voltage charging methodology related to upper voltage limit of battery. BMS primary focus are therefore on the safety and the protection of the battery,to Minimize the risk of sudden failure and to maximize the life cycle of the battery.

a. Capacity of the battery shall not be less than 12.8 V (nominal), 75 Ah atSTC, 960Watt Hour.
b. The battery cycle life should be 2000 cycle at 95% discharge.
c. 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/luminaries. The height of battery pack will be approximate, 4.5 meters above the ground. The system must withstand wind velocity of 150 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 66) with anti-theft locking arrangement.

d.

e. 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, 75AH; Li-fe-PO4
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 @ 25 deg C before capacity of battery falls below 75%	more than 2000 Cycles
5	Battery Warranty	5 years
6	Capacity of Individual Cells (Minimum)	3.2V cell of 5 AH
7	Type of Cell	Prismatic/Cylindrical

8	Nominal Capacity	12.8 volt - 75AH
9	Nominal Voltage	12.8V
10	Operating Voltage Range	11.2 V - 14.6V
11	Total Energy	960WHr
12	Rated Charging current	20 Amps
13	Maximum Charging current	20 Amps
14	Maximum Discharging Current	10 Amps
15	Discharge Cut off Voltage	>11.2V
16	Over Charge Cut off Voltage	15.5V+/- 0.2V
17	Charging Time	Around 5 - 5.5 Hours

3. ELECTRONICS/CHARGE CONTROLLER :

i. 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	180 Wp @ 19.0 V + 0.3%,
		36 Cell configuration
		Voc> 23 Volts
4	Load current Max @rated Voltage	2 Amps
5	Ideal current consumption (self-consumption)	< 20 mAmps
6	Minimum Efficiency	>90%
7	Battery Voltage Setting	Charging 14.4v ± 0.2 Volts
		Battery Low Volt disconnect >10.5 Volts
		Load Reconnects 12.8V± 0.2Volts
		Low Battery Cut off11.2 V± 2%
8	LED indication with LCD display	GREEN LED for charging under Process and red for battery low
9	Protection	Over Charge / Deep Discharge
		Solar & Battery reverse protection
		Reverse current from battery at night

- Electronics should operate at 12.8V and the efficiency of DC-DC converter should be at least 90 %.

- Full Protection against polarity reversal of PV array and battery, Over Voltage, Short Circuit, Deep Discharge, Input Surge Voltage, open circuit, accidental short circuit and night time leakage of current from battery to Module.

Inbuilt remote monitoring facility should be available in MPPT Charge Controller and it should record following System Parameters at a fixed time interval for system health analysis (time interval should be changeable from 15 minutes to 4 hours and will be intimated at the time of award of work as per the requirement).
The detail regarding Remote Monitoring Systems are given below:-

1. Battery Parameters:

   a. Battery Voltage (BV).
   b. Battery Current (BI).
   c. Battery Power (BP)

2. Solar PV Parameters:

   a. Solar PV Voltage (SV)
   b. Solar PV Current (SI)
   c. Solar PV Power (SP)

3. Load Parameters

   a. Load Voltage (LV).
   b. Load Current (LI).
   c. Load Power (LP).
   d. Load ON/OFF condition

4. System shut down due to fault (event fault should be recorded)

5. Site coordinates (Latitude and Longitude)

The remote monitoring can be done using any available communication mode like GSM/GPRS/SMS. The cost for the same should be borne by the successful bidder.

LIGHT SOURCE:

i. 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.

ii. 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.

iii. The lamps, DC-DC driver should be housed in aluminum die-casted casing suitable for outdoor use and shall comply with IP 66.

iv. 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 load disconnect and charge regulation set point.

iv. High power LED of minimum 1 (one) watt each capacity capable to withstand maximum 1 amp driving current having optical lens angle greater than 120 degree shall be used.

v. LED Chip should be compliance to IES: LM-80 .

vi. The LED efficacy should be >135 lumen per watt and the lumens output (luminous flux) of luminaries should be >3750 lumen.

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

viii. Power consumption of the LED Luminaries / Lighting unit shall not be more than 30W (including LED and Driver power loss).

xi. The luminarie should have Suitable UV Stabilized polycarbonate Diffuser.

xii. Luminaries, reflectors and LED's should be engineered in such a way to give the specified lumens output distributed uniformly as per point xv.

xiii. The Luminarie should be designed, manufactured and tested as per LM-79-08 or latest standard by the MNRE/NABAL accredited lab.

xiv. The PCB used in luminaries should replaceable card type.

xv. The efficiency of the streetlights is maximized using a sensor and an intelligent controller which are programmed to regulate the light output depending on movement detection or time schedule.

Movement detection: The streetlight usually operates at 100% intensity and dims to 50% when no movement is detected.

Or

Time schedule model: The streetlight usually operates on 100% intensity for first 5 hours, 65% intensity for next 3 hours and for rest of the time at 30% intensity.

The above features are necessarily required. However, these are optional feature which may be enabled on site-to-site requirement.

xvi. **Lux for single light level:**

Minimum 55 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 55 Lux when measured at a point 4 meters belowthe light (at'' High'' illumination level). The illumination Should be uniform without dark bands or abrupt variations. Minimum 27 Lux at lower illumination level (Higher light output will be preferred) .

The luminaire should be test for all type tests as per IS 10322 Part 5 Sect 3 or IEC 60598-2-3 standards following performance parameters like:

1) Total luminous flux: >3750 lm.

2) Luminous efficacy (efficacy (i.e. system efficacy):>125lm/W.

3) Colour Temperature: Between 5500 K to 6500k.

4) CRI≥70

5) Luminous intensity distribution should follow the batwing patterns in polar curves.

xvi. Other Parameters:

- LED DC current regulation – better than 3 %
- Input V – 12.8 V DC
- Driver Type- DC-DC (as per IEC 62384)
- Lighting quality- Free from glare, flickering and UV
- Ambient temp 0 to– upto 55 deg
- Total electronics efficiency ≥90 %

xvii. The connecting wires used inside the luminaries, shall be low smoke halogen free, fire retardant e-beam cable.

xviii. Auto resettable reverse polarity protection shall be provided.

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

xx. Electronics

- Electronics should operate at 12.8V and the efficiency of DC-DC converter should be > 90%.
- Fuses should be provided to protect against short circuit conditions.
- A blocking diode should be provided as part of the electronics, to prevent reverse flow of current through the PV module, in case such a diode is not provided with the PV module.
- Full protection against open circuit, accidental short circuit and reverse polarity should be provided.
- Charge controller shall have automatic dusk-dawn circuit based on spv module as sensor for switching on/off the street light without manual intervention.
- The self-consumption of the charge controller shall not be more than 20 mA at rated voltage and rated current.

- Adequate protection shall also be incorporated under no-load conditions (i.e. when the system is ON & the load (LED Lamp is removed)
- 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.
- All capacitors shall be rated for max. temp of 105° C.
- Resistances shall preferably be made of metal film of adequate rating.
- Devices shall have adequate thermal margin at amb. temp. of 55° C
- Fiber glass epoxy of grade FR 4 or superior shall be used for PCB boards.

Technical Requirement/Standards

4. MECHANICAL HARDWARE

(i) A metallic frame structure (hot dip galvanized with 35*35*5 mm angle) 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.

(ii) The pole should be hot dip galvanized pipe as per IS 1161 & IS 4736 i.e. Class B. with 76 mm outer diameter and minimum 3 mm thickness of 6-meter length. The pole should have the provision to hold the weather proof lamp housing individually as per case. SPV panel shall be mounted on pole. The mounting structure shall be fixed in the center of GI tubular pole made flat at fixing end, square angle adjusting plate of 115 mm size 5 mm thick shall be provided. So that SPV panel can be fixed at inclination of 30 degree from horizontal.

(a) The metallic arm for holding the light assembly should be set at a suitable angle to maximize uniform illumination of desired level over the specified area (4-meter-wide road). The arm length of luminary holder from pole should be 0.6 meter for its easy approachability for repairing and replacement.

(b) Two 10 mm steal bar of 300 mm length should be inserted at the interval of 25 mm from bottom of the pole

iii) <u>ELECTRIC CABLE</u>

The electric cable used shall be twin core PVC insulated water and UV resistance copper cable of minimum size 1.5 mm. Cable shall meet IS 1554 / 694 Part 1:1988 & shall be of 650 V/ 1.1 kV

5. OTHER FEATURES

A toll-free number (i.e. 1800 180 0005) of IVRS of UPNEDA and 14 digit UID number of minimum thickness 5mm and height of letter should be at least 25mm (issued/provided by UPNEDA) is to be embossed / punch/ nut-bolted strip on pole between 1-1.5 meter above from ground level by contractor/ bidder, which in case of non-working/ operational problems etc of system will be dialed by the beneficiary etc to lodge a complaint in respect of system problems. The suitable sign board of 500 mm x 300 mm size powdercoated MS Sheet assigned by UPNEDA should be installed on pole under different schemes as per the requirement. The IVRS will divert the complaint to Contractor/ bidder through e-mail, SMS

etc. The contractor/ bidder will have to rectify the same to make/ restore the system to working position within 72 hours in the warrantee period of 5 years, failing which the system may be get rectified on contractor/ bidder cost and the cost will be recovered by contractor/ bidders pending claims what so ever and appropriate action as per non-compliance etc. of agreement will be considered / taken.

6. INSTALLATION OF SYSTEM:

The system should be properly installed at site. The SPV module mounting structure along with pole should be properly grouted depending upon the location and requirement of the site. The grouting should be such that it must withstand the maximum wind speed /storm. The pole should be grouted with CC mixture of 1:2:4 of dia 300 mm having depth of 1000 mm and 200 mm above ground level with 200 mm dia. The successful Bidder provides the foundation drawing. Adequate space should be provided behind the PV module/array for allowing unobstructed air flow for passive cooling. Cables of appropriate size should be used to keep electrical losses to a bare minimum. 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

7. AUTHORIZED TESTING LABORATORIES/ CENTERS

1.Test certificates of complete solar street lighting system as per specifications laid down in this tender should be from MNRE/NABL Accredited test Lab should be submitted. The test lab must have facilities for SPV module performance , Lithium Battery capacity, electronics and lumens testing.

8. WARRANTY

The mechanical structures, electrical works including charge controllers/ maximum power point tracker units/DC circuit drivers/Luminaire, storage batteries, etc. and overall workmanship of the SPV lighting systems must be warranted against any manufacturing/ design/ installation defects for a minimum period of 5 years. The SPV module should be warranted for 25 years.

9. 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 UPNEDA at a suitable place on the main components viz., SPV Panel, LED Lighting Units to be used in the installation of the solar street lighting systems.

b) The system unique ID number as provided by UPNEDA shall be permanently embossed / punch or a metallic strip nut-bolted / riveted to or directly embossed/punch on pole of the system. The UID number painting or marking will not be allowed.

C) Sign board as prescribed by UPNEDA should be fixed on pole.