E. TECHNICAL SPECIFICATIONS

Detail Description Including Supply, Scope of Job (Earth Pits construction) Technical Specs & Drawings:

SCOPE includes:

- Design, Supply, installation & commissioning of White LED based solar Light system along with Fittings / SPV module / Electric Pole / battery / foundations & accessories required for commissioning as per attached specifications.
- Submission of completion certificate of fitting for Installed location along with Test report and photographs in illuminating conditions.

1.2 **Vendor Deliverables:**

Upon completion of work, the Contractor shall submit the following:

a. Photographs of each lighting system installed and commissioned in illuminating condition with mark location with pole numbers

b. One set of Manual in Hindi/English along with warranty/guaranty certificate and do's and don'ts for the system to be handed over to the location.

c. Do's and don'ts and preventive maintenance training to be given small group of people at the location.

d. Two complete set of all manuals/warranty/guarantee cards/ certificate/ tracings / reproducible along with the soft form in AutoCAD/PDF and hard copy of the of the same in original size to be handed over to HPCL.

1.3.1 Technical Specification for Stand-alone LED based Solar Street Lighting System:

1. SUPPLY- 2x18W SOLAR STREET LIGHT ALONG WITH 6MTS POLE
   Each Light Polar Shall consist of 2 no's 18 Watt LED Non FLP Light Fittings with adjustable Brackets along with the required Solar Modules and Accessories. Supply includes 6 Mts GI Pole

   Tech specs are as follows:

A standalone solar photovoltaic street lighting system is an outdoor lighting unit used for illuminating a street or an open area. The Solar Street Lighting System (SSLS) consists of solar photovoltaic (SPV) module, a luminaire, storage battery and battery charge controller, control electronics, inter-connecting wires/cables, module mounting pole including fixture along with the mounting arrangement and the solar panel and integrated solar street light installed.

S. No	ITEM	Description
1	Solar LED street light wattage	18 W X 2 No's per Pole
2	Lumens Output	*LED Life>50000hrs. *Each LED output must be 130-140Lumen per Watt. (Brands:- CREE/ Bridgelux/Seoul/ Osram).
3	Type of operation	Automatic Dusk to Dawn
4	Hours of Usage per day	Bright Mode 100% - 6hrs (After Dusk) Dim Mode 50% - 4 hrs (Mid Night), Bright Mode 100% -2 hrs (Before Dawn)
5	Solar Panel	**100 WP Poly/Mono**
6	Charge Controller	Micro controller based High efficiency 5Amp charge controller.
7	Battery	**2 X 19.8Ah** Lithium ion battery with "Two Years of Warranty"
8	Autonomy	Minimum 2 days
9	Pole	Hot Dip Galvanized Pole of Height 6 meters, OD 76.1 mm and 3 mm thick as per IS 1161 latest. The pole should have the provision to hold the luminaire. Corrosion resistant metallic frame structure/GI structure shall also be fixed on the pole to hold the SPV Module

10	Cables	ISI mark of reputed manufacturer Havells /Polycab /finolex /equivalent.
11	Nut Bolt & other accessories	Only Galvanized/Stainless steel nut bolt and other accessories shall be used which is corrosion resistance. Name Plate board with 14" X 7".
12	Foundation	M-25 Grade of material shall be used for foundation.
13	Warranty	5 Years Comprehensive On-Site

(i) The light source will be of white LED type.
(ii) The color temperature of W-LEDs used in the system should be in the range of 5500oK 6500oK.
(iii) LEDs should not emit ultraviolet light.
(iv) The light output from the W-LED light source should be constant throughout the duty cycle.
(v) The lamps should be housed in an assembly suitable for outdoor use.

Note: Any equivalent makes of items shall have to be preapproved before tender due date. No change in makes other than those specified in the tender shall be accepted post due date of the tender

Sample Pic for considering Fixation of 2 no's of Light Fittings: Specification shall be Strictly adhere as per this Tender Documents

1.3.2 Solar panel (Solar Photo Voltaic Module):

1. MNRE approved indigenously manufactured PV modules with polycrystalline silicon solar cells should be used. Output wattage of solar panel should not be less than 90% for first 10 years and should not be less 80% at end of 25 years of rated wattage.

2. The power output of the module under STC should be a minimum of 60 Wp.

3. The PV module should be made up of polycrystalline silicon solar cells and must have a certificate of testing conforming to Latest edition IEC 61215 / BIS 14286 from an NABL or IECQ accredited Laboratory. PV modules must quality to IEC 61730 Part 1- requirements for construction & Part 2 –requirements for testing, for safety qualification

IEC standards	All IEC Type test should be submitted. IEC 62124 – Solar standalone system performance IEC 61347-2-13: LED driver safety IEC 62384: LED driver performance CISPR 15 : Radio disturbance characteristics IEC 61547 : EMC immunity requirements IEC 60598 : General requirements and tests

4. **The module efficiency should not be less than 12 %.**
5. The terminal box on the module should have a provision for opening, for replacing the cable, if required.
6. **A distinctive serial number will be engraved on the frame of the module or screen printed on the tedlar sheet of the module.**

PV module shall contain the following information:

a) Name of the manufacturer of PV Module
b) Model or Type Number
c) Serial Number
d) Month and year of manufacture
e) I-V Curve for the module
f) Unique Serial No. and Model No. of the module.

Battery location shall be mounted at least 3m above the ground or at suitable height as per design and shall be enclosed in a cabin that has pilfer proof Lock & Key arrangement. The battery cabin shall be of a vented, acid proof and corrosion resistant metallic box or polymer make, designed for outdoor application.

1.3.3 SYSTEM REQUIREMENTS/ELECTRONICS/ ELECTRONIC PROTECTIONS

Following requirements to be met:

1. The total electronic efficiency should be at least 85 %.
2. The idle current should be less than 20 mA
3. The voltage drop from module terminals to the battery terminals should not exceed 0.8 volts including the drop across the diode and the cable when measured at maximum charging current.
4. The PCB containing the electronics should be capable of solder free installation and replacement.
5. The system should have protection against battery overcharge, Deep-discharge protection@75% deep discharge condition.
6. Adequate protection should be provided against battery reverse polarity.
7. Temperature compensated charging for battery.
8. Fuses should be provided to protect against short circuit conditions. Fuse is not mandatory, in case, over current protection is provided in the driver circuit.
9. Protection for reverse flow of current through the PV module(s) should be provided.
10. Duty cycle Automatic switch on/off and Dusk to Dawn 6 hours full light, rest of time lower light level with/without motion sensor.
11. Standalone Street Lighting System shall operate efficiently even under extreme temperatures/ climatic conditions.
12. The system shall be designed for unmanned operation and be automatically operated by sensing the day light at dawn to dusk with a minimum autonomy of three days.

1.3.4 INDICATORS:

1. The system should have two indicators, green and red.
2. 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.
3. Discharge indication RED LED

1.3.5 POLE/ MECHANICAL COMPONENTS:

1. Galvanized Iron Tubular Pole (Corrosion Resistance)
2. The pole shall be suitable for rural application.
3. Total length 6 m which includes 5 m above the ground level, after grouting and final installation. Pole should be GI pole OD 76.1 mm and 3 mm thick as per IS 1161 latest. The pole should have the provision to hold the luminaire. Corrosion resistant metallic frame structure/GI structure shall also be fixed on the pole to hold the SPV Module.
4. Pole shall withstand Wind speed resistance 170 kmph with all its mountings.
5. The frame structure shall have provision to adjust its angle of inclination to the horizontal between 00 and 450 so that the module can be oriented at the specified tile angle.
6. HPCL Logo/ branding in clamp and vinyl pasting to be fixed on pole at visible location as per company requirement. The specification & design will be provided by HPCL, however the supply installation of the same in vendor scope.

1.3.6 POLE FOUNDATION STRUCTURE:

1. Pole shall be properly concreted with M20 grade RCC and PCC mix of 1:3:6.
2. Pole foundation shall be laid inside the ground. Foundation have min dimension 0.3m x 0.3m x 1.0 m and min 0.15 m foundation shall be extended above the ground. Two 12 mm dia 0.3 m long steel rod shall be fix in hole of pole at height of 0.3 m and 0.6 m from pole end at 90 degrees apart.
3. Pole structure should withstand complete solar street lighting system load including all its accessories and wind speed of 170 Km/hour.

Note to Bidder: All these provided specification are minimum requirement and any superior specification required as designed shall be provided.

1.3.7 Brief Description of Work:

1. The Scope of Work of a bidder shall include Design, Manufacture, Supply, Erection, Testing and Commissioning of stand-alone LED based Solar street lighting system including complete system warranty and its maintenance for 5 years.

2. Bidder has to submit the operation, instruction and maintenance manual, in English and Hindi should be provided with each Solar Street lights. An Operation, Instruction and Maintenance Manual, in English and the Hindi language, should

be provided with the Solar Lighting System. The following minimum details must be provided in the Manual:

a Basic principles of Photovoltaic.

b A small write-up (with a block diagram) on Solar Street Lighting System Its components, PV Module, Battery, Electronics and luminaire and expected performance

c About charging significance of indicators.

d Type, Model number, voltage & capacity of the battery, used in the system.

e The make, model number, country of origin and technical characteristics (including IESNA LM-80 report) of W-LEDs used in the lighting system must be indicated in the manual.

f Clear instructions about erection of pole and mounting of PV module(s)and lamp housing assembly on the pole

g Clear instructions on regular maintenance and troubleshooting of the Solar Street Lighting System.

h DO's and DONT's.

i Name and address of the contact person for repair and maintenance, in case of nonfunctionality of the solar street lighting system.

1.3.8 Quality and Warranty:

1. **The complete Solar Street Lighting System will be warranted for a period of Five years from the date of supply.**
2. **The PV module(s) will be warranted for a minimum period of 15 years from the date of supply.**
3. The Warranty Card to be supplied with the system must contain the details of the system. The manufacturers can also provide additional information about the system and conditions of warranty as necessary.
4. Bidder has to maintain the infrastructure created under the project in good condition for Five years to cover warranty period.
5. It is an essential part of the contract that the tenderer shall provide warranty of the system for 05 years. During the warranty following maintenance will be required to be carried out by the contractor:
   a) Quarterly checking up keeping and replacement of the any component or subcomponents of the system for proper operation of the system.
   b) Repairing/replacement of all defective components and sub-components including battery of the system as per the requirement to ensure proper operation of the system.

c) The scope of work includes repairing/replacement of parts to make the system functional within warranty period whenever a complaint is lodged by the user. The contractor shall attend the same within a reasonable period of time and in any case of breakdown shall be corrected within a period not exceeding 7 days.

6. In case of any damage or breakage of the component due to negligence or fault of beneficiary or theft etc. the same shall be replaced at users cost.
7. In case of Solar PV module damaged due to natural calamity, contractor shall replace the same free of cost, once if required during warranty period. Thus it is in the interest of the contractor to insured the Solar PV modules for such calamities and the cost of the insurance should be included in the price bid.
8. The safety and security of the system shall be sole responsibility of the user.
9. Goods bearing ISI Mark will be given preference and any tax liability arising to HPCL due to issuance of Road permit to the Party will be recovered from Party"
10. Inspection by HPCL or HPCL authorized Third Party Inspection Agency will be carried out.

1.3.9 Maintenance:

1. After the expiring of the warranty period, it will be mandatory on the part of the contractor to enter into a Comprehensive maintenance contract with end user, **if the end user so desires.** The acts under maintenance shall be same as those of covered under the warranty clause.

Other Terms:

1. The contractor has to all safety regulation like Use of safety belts at elevation; helmets and shoes are compulsory of all contract personnel. Use of masks, hand gloves, ear plugs are to be used positively depending upon safety requirements w.r.t particular jobs proper scaffolding and other safety measures as applicable for work. Contractor has to bear the cost of providing good quality PPE's to his workmen. Corporation will not be responsible for economical loss to the contractor for non-compliance of above.

2. The contractor has to abide by all statutory rules being followed at depot and has to ensure compliance of Minimum Wages/EPF/ESIC. Payment to contractor's workers will be done in stipulated time and records of the same to be produced either to HPCL or from statutory bodies as required.

3. Inspection by HPCL or HPCL authorised Third Party Inspection Agency will be carried out.