

# ANNEX-B

## Technical Specifications

RFQ/SC/2022/050

### 1. Technical Specifications

#### Specifications of All-in-one Solar streetlight

An all-in-one integrated LED solar streetlight consists of solar photovoltaic module, battery, battery management system, control electronics, LED driver, Microwave sensor, inter-connecting cables and pole mounting piece integrated into the luminaire as a single unit.

#### A. Lighting Luminaires

The luminaire shall have highly efficient mid power white dimmable LEDs with lumen output ranges from 5000 Lumens up to 18,000 Lumens, and a typical correlated color temperature of 5700K (+/-510K) with CRI>70 and lenses with efficient bat wing optics designed for efficient light distribution for secondary roads. The Lumens Output of the Fitting shall be of Minimum 5000 Lumens. The Efficacy of Luminaire shall be of Minimum 185 Lumens / Watts. With 50000 Burning hours life class. The Luminaire shall meet the relevant IEC codes mentioned in Table 1.

#### B. INTEGRATED CONTROLLER

The luminaire shall have a highly efficient, integrated microprocessor based MPPT charge controller with driver mounted on the same board to minimize power loss. This intelligent power management system shall maximize the overall system efficacy to minimum 185 lumens/watt. A built in Microwave sensor shall be provided that can detect presence of people and override the dimming to ensure full visibility. This dimming profile shall be configured as follows

- i. first 2 hours from dusk Luminaire output is at 30% and Microwave sensor enabled, on motion detection the Luminaire shall go to 100%
- ii. Next 3 hours Luminaire output is at 20% and Microwave sensor enabled, on motion detection the Luminaire shall go to 60%
- iii. Next 6 hours Luminaire output is at 10% and Microwave sensor enabled, on motion detection the Luminaire shall go to 30%
- iv. It shall be possible to modify the dimming profile on site using an IR Remote Control.
- v. Next till dawn Luminaire output is at 30% and Microwave sensor enabled, on motion detection the Luminaire shall go to 50%
- vi. Dusk and dawn detection shall be through voltage generated from the solar panel, and it should be configurable.

The Controller Efficiency shall be > than 90%. and shall have the following inbuilt protection features:

1. protection against battery overcharge and deep discharge condition.
2. protection should be provided against battery and Panel reverse polarity.

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3. over current protection.
4. Protection for reverse flow of current through the PV module(s) should be provided.

### C. SOLAR MODULE

The Solar Cell shall be made of Premium grade mono crystalline silicon Cell. The Solar Module Power shall 35Wp. The Solar Module Construction shall be of Low iron tempered glass with low reflection characteristics and with rated IP 65. The Life Cycle shall be > than 25 Years.

### D. BATTERY

The Battery shall be minimum 60Ah 3.2V Rechargeable Lithium Ferro Phosphate (LiFePo<sub>4</sub>) Battery Pack. The Battery Pack should have Inbuilt Battery management system Module with following safety features

- a. accidental short circuit
- b. over discharge
- c. over charge
- d. over temperature.
- e. Low Temperature

The battery shall be Capable of Providing Power to the LED Fitting for 12 Hrs per night for 2 nights as per the default dimming profile mentioned above. The Life Cycle shall be Minimum 2000 Cycles for 90% daily depth Discharge.

### E. HOUSING

- i. The luminaire shall have excellent heat dissipation with IP 65 protection and IK08 impact resistance (IK05 for PV Panel). The front cover is composed of weather resistant, UV stabilized polycarbonate. The luminaire shall have a smart self-diagnosis feature with LED indicators for battery charging, deep discharge and Load cut off indication visible from ground.

### F. Mounting Bracket

The luminaire shall have a specially designed pole mounting piece that enables as post top mounting and installation at varying tilts from 0 to 15 degrees for optimal light distribution. It shall be suitable for mounting on pole of diameter 48 – 60mm.

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**Table 1**

Please refer attached certificate.

Safety of Luminaire for Road and Street Lighting	EN60598-2-3 EN60598-1
EMC immunity requirements	EN 61547
Assessment of lighting equipment related to human exposure to electromagnetic field	EN62493
Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields	EN62479
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	EN55015
Electro Magnetic Compatibility (EMC) standard for radio equipment and services	ETSI EN 301 489-1 & 3
Radio equipment to be used in the 1 GHz to 40 GHz frequency range	ETSI EN 300 440

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### **2. Specifications of All-in-one Solar Floodlight**

An all-in-one integrated LED solar floodlight consists of solar photovoltaic module, battery, battery management system, control electronics, LED driver, Microwave sensor, inter-connecting cables and pole mounting piece integrated into the luminaire as a single unit.

#### **G. Lighting Luminaires**

The luminaire shall have highly efficient mid power white dimmable LEDs with typical correlated color temperature of 5500-7000K with CRI>70 and lens with reflector. The Lumens Output of the Fitting shall be of Minimum 8000 Lumens. The Efficacy of Luminaire shall be of Minimum 100 Lumens / Watts. With 50000 Burning hours life class. The Luminaire shall meet the relevant IEC codes mentioned in Table 1.

#### **H. INTEGRATED CONTROLLER**

The luminaire shall have a highly efficient, integrated microprocessor based MPPT charge controller with driver mounted on the same board to minimize power loss. This intelligent power management system shall maximize the overall system efficacy to minimum 100 lumens/watt. A built in Microwave sensor shall be provided that can detect presence of people and override the dimming to ensure full visibility. This dimming profile shall be configurable through a remote and shall provide at least three levels (low, medium, high). Photocell

The Controller Efficiency shall be > than 90%. and shall have the following inbuilt protection features:

1. protection against battery overcharge and deep discharge condition.
2. protection should be provided against battery and Panel reverse polarity.
3. over current protection.
4. Protection for reverse flow of current through the PV module(s) should be provided.

#### **I. SOLAR MODULE**

The Solar Cell shall be made of Premium grade mono crystalline silicon Cell. The Solar Module Power shall 35Wp. The Solar Module Construction shall be of Low iron tempered glass with low reflection characteristics and with rated IP 65. The Life Cycle shall be > than 25 Years.

#### **J. BATTERY**

The Battery shall be minimum 60Ah Rechargeable Lithium Ferro Phosphate (LiFePo4) Battery Pack. The Battery Pack should have Inbuilt Battery management system Module with following safety features

- f. accidental short circuit
- g. over discharge
- h. over charge

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i. over temperature.

j. Low Temperature

The battery shall be Capable of Providing Power to the LED Fitting for 12 Hrs per night for 2 nights at “low level” of dimming profile mentioned above. The Life Cycle shall be Minimum 2000 Cycles for 90% daily depth Discharge.

### **K. HOUSING**

The luminaire shall have excellent heat dissipation with IP 65 protection and IK07 impact resistance (IK05 for PV Panel). The front cover is composed of weather resistant, UV stabilized polycarbonate/ pressure die cast aluminum.

### **L. Mounting Bracket**

The luminaire shall have a specially designed pole mounting piece that enables as post top mounting and installation at varying tilts for optimal light distribution. It shall be suitable for mounting on pole of diameter 48 – 60mm.

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**Table 1**

Requirements for Floodlighting	EN60598-2-5 EN60598-1
EMC immunity requirements	EN61547
Assessment of lighting equipment related to human exposure to electromagnetic field	EN62493
Assessment of the compliance of low-power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields	EN62479
Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	EN55015
Electro Magnetic Compatibility (EMC) standard for radio equipment and services	ETSI EN 301 489-1 & 3
Radio equipment to be used in the 1 GHz to 40 GHz frequency range	ETSI EN 300 440

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### 3. Specifications of All-in-one Solar Streetlight and Pole

An all-in-one integrated LED solar streetlight shall consist of solar photovoltaic module, battery, battery management system, control electronics, LED driver, microwave sensor, inter-connecting cables and pole mounting piece integrated into the luminaire as a single unit.

#### M. Lighting Luminaires

The luminaire shall have highly efficient mid power dimmable LEDs with lumen output of minimum 5000 lumens and a typical correlated color temperature of 5000-7000K with CRI>70 and lenses with efficient bat wing optics designed for efficient light distribution. The efficacy of luminaire shall be of minimum 150 lumens / watts, with 50000 burning hours life class. The luminaire shall meet the relevant IEC codes mentioned in Table 1.

#### N. Integrated Controller

The luminaire shall have a highly efficient, integrated microprocessor based MPPT charge controller with driver mounted on the same board to minimize power loss. This intelligent power management system shall maximize the overall system efficacy to minimum 150 lumens/watt. A built-in microwave sensor shall be provided that can detect presence of people and override the dimming to ensure full visibility. This dimming profile shall be configured as follows:

Time Step No.	Duration	Luminaire Output	
		No Motion Detected	Motion Detected
1	First 2 hours from dusk	30%	100%
2	Next 3 hours	20%	60%
3	Next 6 hours	10%	30%
4	Next Till dawn	30%	50%

It shall be possible to modify the dimming profile on site using an infrared remote control. Dusk and dawn detection shall be through voltage generated from the solar panel, and it should be configurable.

The controller efficiency shall be > than 90%. and shall have the following inbuilt protection features:

1. protection against battery overcharge and deep discharge condition.

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2. protection should be provided against battery and Panel reverse polarity.
3. over current protection.
4. protection for reverse flow of current through the PV module(s) should be provided.

### **O. Solar Panel**

The Solar panel shall be made of premium grade mono crystalline silicon cell. Rated power of solar panel shall be at least 35Wp. Panel construction shall be of low iron tempered glass with low reflection characteristics and with rated IP 65. The life cycle shall be at least 25 Years.

### **P. Battery**

The battery pack shall be rechargeable Lithium Iron Phosphate (LiFePO<sub>4</sub>) with minimum rating of 60Ah 3.2V. The battery pack should have inbuilt battery management system module with following safety features:

- k. accidental short circuit
- l. over discharge
- m. over charge
- n. over temperature.
- o. low temperature

The battery shall be capable of providing power to the LED fitting for 12 hours per night for 2 nights as per the dimming profile mentioned above. The life cycle shall be minimum 2000 cycles for 90% daily depth discharge.

### **Q. Housing**

The luminaire shall have excellent heat dissipation with IP 65 protection and IK08 impact resistance (IK05 for PV Panel). The front cover is composed of weather resistant, UV stabilized polycarbonate. The luminaire shall have a smart self-diagnosis feature with LED indicators for battery charging, deep discharge and load cut off indications.

### **R. Mounting Bracket**

The luminaire shall have a specially designed pole mounting piece that enables pole top/side mounting and installation at varying tilts from 0 to 15 degrees for optimal light distribution. It shall be suitable for mounting on pole of diameter 50 – 60mm.

### **S. Poles**

Smooth round conical hot dipped galvanised steel pole for pole top/side mounted luminaries (with one side arm), complete with base plate, fixing nuts, bolts & washers etc. shall be provided. All bolts, nuts and screw shall be stainless steel material. Poles shall be fixed to a concrete base by means of anchor bolts and shall have following characteristics:



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**Pole type: conical pole suitable for concrete anchor base**

**Arm length (for side mounted luminaries): ≥300 mm**

**Pole height: 6.0 m**

**Base dia: ≥120 mm**

**Top dia: 50-60 mm (corresponding to offered luminaire)**

**Shaft thickness: ≥3mm**

**Shaft length: 6.0 m**

Finish: Commercial grade, super durable powder coat finish

Anchor bolts: A set of 4 galvanized steel anchor bolts shall be provided with each pole assembly. Each anchor bolt shall include 1 Hex Nut, 1 Lock Washer and 1 Flat Washer. Top portion of the anchor bolt shall be threaded for securing and levelling the pole with the provided nuts and washers.

**Table 1**

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