

# Technical Specification

## Solar Street Lighting Devices (All-in-Two)

The solar street lighting device is divided into two separate parts (All-in-Two):

- 1.The Solar Panel.
- 2.The Lighting Device that comprises all the remaining parts within one unit (i.e., Battery, LED arrays, and Controller).
- 3.Panel, LED and supporting structure designed to withstand site climatic, environmental, and meteorological conditions: yearly average and seasonal extremes, particularly solar radiance, availability of sunlight, relative humidity up to 95%, wind speeds up to 120 km/h, ambient temperature from -20°C to +65°C, high levels of dust, ultraviolet radiation, insects, etc.

### A. The Solar Panel

#### I. Minimum Technical Specifications:

- 1.The Solar Panel is completed with brackets for the proposed panel and corresponding supporting structures:
- 2.Cell: Mono-crystalline or Poly-crystalline silicon cells with a junction box including protection diodes cable and MC4 connection terminals for external use, the bidder must submit a 10-year manufacture warranty, a 12-year 90% performance guarantee, and an 80% performance guarantee in the 25 year and cover materials and manufacturing faults for 10 years.
- 3.Panel capacity must be 60 Watt at least
- 4.All structures to be made of corrosion-resistant materials. The same applies to all bolts, nuts, and fasteners.
- 5.The panel's frame must be made of weatherproof galvanized aluminium.
- 6.Minimum IP rating of product: IP65
- 7.The solar panel must be installed on an adjustable base separated from the LED arrays direction (brackets for the proposed solar panel); Bracket's design and specification must be provided.
- 8.The solar panel life span must be no less than 25 years.

#### II. Minimum requirement:

The catalogues required for solar panel as below at least:

- Cell type
- Solar Panel dimensions
- Solar Panel weight
- Operating temperature range
- Fill Factor

-(I, V) and (P,V) curve

-Module efficiency

-Parameters must be for STC (standard test conditions):  $V_{max}$ ,  $I_{max}$ ,  $I_{sc}$ ,  $V_{oc}$ ,  $V_{mp}$ ,  $I_{mp}$  and  $P_{max}$ .

-Load max

-Temperature coefficient

### III. Technical Data Sheet and Manuals:

1. Each module must have a technical data sheet including the following:

- Name, monogram or manufacturer's mark, module reference number, serial number and lifespan
- Module dimensions and weight.
- Operating Temperature.
- Module's efficiency.
- Fill Factor.
- The following parameters must be for STC (standard test conditions):  $V_{max}$ ,  $I_{max}$ ,  $I_{sc}$ ,  $V_{oc}$  and  $P_{max}$ .
- (I,V) curve.
- (P,V) curve.
- $V_{mp}$ .

2. The bidder must provide the specifications and catalogues of the installed panels in English and Arabic,

3. Detailed and clear installation, operations and maintenance manuals Arabic and English must be provided with each delivered product

## B. The Lighting Device - LED arrays, Battery, Controller and Accessories:

### General:

1. Weight of the Lighting Device should not exceed 25 KG

### B\1 LED Arrays

#### I. Minimum Technical Specifications:

1. Must be manufactured according to international standards.
2. LED Technology - multichip technology
3. Minimum capacity **30W**.
4. Minimum luminous flux **4,500 lumens** at least.

5. Daylight color temperature: (2700 to 6500)K.
6. Min. LED life 50,000 hrs.
7. Min. lighting efficiency 160 lumens/watt at least.
8. Aluminum heat exchanger (aluminium cooling plates).
9. The device must be subject to dismounting and reinstallation.
10. IP: 65.
11. CRI >70
12. Optical sensitization should be either by a sensor or controller.
13. Operation time: All nights even in rainy, cloudy, foggy, high-humidity days.

## **II. Minimum requirement:**

1. The bidder must provide technical specifications and catalogues:
2. The catalogues of the LED arrays must include the following information at least:
  - LED Technology
  - The LED arrays power
  - Inlet's volt
  - Lighting efficiency
  - Luminous flux
  - CRI
  - Color temperature
  - LED lifespan
  - IP rate
  - Operating temperature range
  - Aluminium heat exchanger (aluminium cooling plates).

## **B/2 - Battery:**

### **I. Minimum Technical Specifications:**

1. Battery type: **LiFePo4 Lithium-Iron Phosphate.**
2. Battery capacity: **290 Wh** at least operate the required load for the operation period.
3. Life cycle at 50% discharge min. 5000 cycles at 25°C
4. The battery's voltage and capacity must be stable during night operation time.
5. Battery operating temperature (charging/discharging, not storage temp.) from -20°C to +65°C
6. All parameters should be clear on the battery's body

7.Charging and discharging curves are required

8.The battery life should be not less than 8 years, and it is warranty must be at least 5 years

## **II. Minimum requirement :**

The catalogues of the battery must include the following information at least:

-Battery type

-Charging current

-Discharge current

-The battery capacity

-Operation temperature range

-Charge and discharge curve

-DoD @ 50%

-Battery volt

## **B/3 Controller (Regulator- Charger):**

### **I. Minimum Technical Specifications:**

1.Minimum lifespan of the charge controller should be 10 years and the warranty period should be at least 5 years.

2.Programmable inverted charger: the charge controller shall enable the hourly power consumption of lighting to be controlled and programmed, so that it can be regulated during the night-time (e.g. from dusk: 3h at 100 per cent, 2h at 50 per cent etc.) and with automated intelligence to cope with reduced sunlight capture or low battery charge.

3.Controller to be MPPT according to the conditions at the site

4.The following minimum protection functions should be available; overcharge, over-discharge, overcurrent and overvoltage, short circuit, polarity inversion and short circuit of the LED lamp. The risk of reverse polarity connections must also be precluded mechanically through the choice of plug technology and size.

5.Controller must stop discharging when the power level reaches 15% of the battery capacity.

6.Operating temperature: -20°C to +65°C.

### **II. Technical Data Sheet and Manuals:**

Each Charge controller must be delivered with a technical data sheet including the following information:

- name,
- monogram or manufacturer's name and mark,
- module reference number,

- serial number,
- rated capacity,
- self-consumption data,
- weight, charging strategy,
- warranty,
- maximum power current and maximum system voltage.

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Name of Signatory:.....

Title of Signatory:.....

Name of Bidder:.....

Signature & stamp:

Date of Signing:.....