



SUNMASTER

# *Solar Street Light Handbook*



*A simple, practical guide to solar street light-designing  
and installing solar street lighting system.*

*Jinhua SunMaster Solar Lighting Co.,Ltd. is a Zhejiang based enterprise, which is specialized in supplying solar street lights, solar garden lights, wind & solar hybrid lights, small & medium solar generating systems and solar pump system etc.*

*SunMaster currently owns manufacturing plants with a total area of 8,000 square meters, with multiple workshops for the production of solar panels, LED lights, controller and the relative parts. The company has an annual manufacturing capacity of 15,000-20,000 lights and solar systems. The company is ISO9001 certified .The products are CE, RoHs, SGS SonCap certified*

*SunMaster has gathered a group of excellent personnel who have been worked in the semiconductor industry or related fields for many years, including physical, thermology, photology, mechanics, electronics and other majors. We cooperate with Semiconductor Institute of Beijing University and LED Research Center of Zhejiang University.*

*With the company spirit of “devotion, teamwork and innovation”, SunMater staff will work hard to provide optimum solar lighting solutions, best quality products and quick after-sale-service for our customers.*

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## 1. How Solar Street Light Works?

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*The solar street lights work on the principle of the photovoltaic cell or solar cell. The solar cell converts solar energy to the electrical energy which is stored in the battery. The solar lamp draws the current from this battery and it requires no other wiring.*

### **Working of Solar Street Lights**

*The solar street lights use solar energy, a form of the renewable energy. These days it is common to see the solar street lamps along the sides of roads. The solar street lights comprise of the which absorb the solar energy during daytime. The photovoltaic cells convert solar energy into electrical energy, which is stored in the battery. At the nighttime the lamp starts automatically and it consumes the electricity already stored in the battery. During the day time the battery gets recharged and the process keeps on repeating every day.*

### **Models of Solar Street Lights**

1) **Sodium Vapor Lights:** *The sodium street lights use sodium in excited state to discharge the light. These lights comprise of the solar panels that absorb the solar energy during daytime, which is converted into electricity and stored in the batteries. At nighttime the sodium lamps consume electricity from*

rechargeable battery. There is no wiring required for these lamps, there are no electricity bills to be paid, they are very safe and can light the streets from 4 to 12 hours depending on the size of the solar panels and battery. The sodium solar street lights can be used for lighting streets, public places, residential areas, parks, plaza etc.

2) **Solar LED lights:** LED stands for light emitting diode. LED comprises of the chemical compound that gives off the light when direct current (DC) from the battery passes through it. Solar LEDs are available from number of companies in different sizes, shapes and styles. The life of LED is usually very high extending up to 50,000 hours. The LEDs require very little current hence the solar panels of smaller sizes are required for the solar lights with LED lamps.

3) **Solar lights using induction technology:** In this technique the lamps used in the solar lights do not contain the filament or the electrodes that tend to get damaged faster, thus ensuring very high life of the lamp. The life of the lamp in solar street lights based on induction technology can be more than 10, 0000 hours, which is almost 100 times the life of the incandescent lamps. These results in lower maintenance and electrical costs and fewer disturbances caused to the traffic on the road. Since these lights are based in induction technology, they generate lesser heat, thus permitting the use of aluminum reflectors that increases the intensity of the light produced by the lamp.

## 2. The Advantage of Solar Street Light

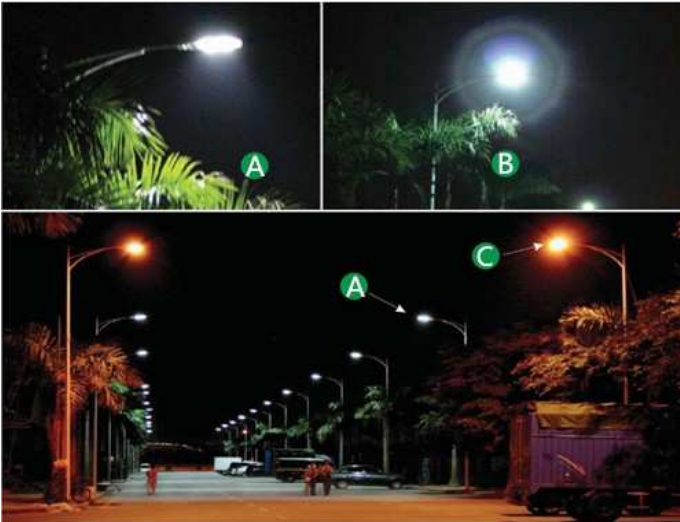
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*Each system is built for the type and wattage lamp that will be utilized for the specific application. Lighting a multilane roadway will take much more power than lighting a small pathway. That makes the commercially manufactured solar lights more versatile to adapt from one job to the next. They range from small one LED fixture that runs along a home's driveway to powerful street lights that can illuminate a 150' area.*

*Solar lighting also has many excellent qualities. It is a green alternative to traditional lighting, it is low cost and practically maintenance free, and there is no power bill associated with utilizing solar since the power is not coming from the grid. Solar is also low voltage which makes it much safer to install and operate. Finally, solar lighting is **renewable** and **promotes sustainability**; its only requirement is the sun for operation.*

**Glare, Color Temperature and Color Index for SUNMASTER High Power LED Street Lamps and the Conventional Street Lamps**

### A. SUNMASTER High Power LED Lamp



*No glare, the color temperature is comfortable, the objects are irradiated are colorful and are true, and people feel more comfortable;*

### B. Metal Halide Lamp

*Strong glare, the color temperature is too high (close to cyan), the objects were irradiated and are untrue, people feel irritable, and depressed;*

### C. Sodium Lamp

*Strong glare, the color temperature is too low (very yellow or orange). the objects were irradiated and are untrue, people feel boring and hypnoses.*

### 3. Comparison between SunMaster Solar Street Light and Conventional Solar Street Light

Item	High Pressure Sodium Lamp	SunMaster LED Streetlight
<b>Photometric Performance</b>	Bad	Excellent
<b>Radiator Performance</b>	Bad	Excellent
<b>Electrical Performance</b>	Electrical Shock Easy (High Voltage)	Safe (Low Voltage)
<b>Working Life</b>	Short (5,000 Hours)	Very Long (>50,000 Hours)
<b>Working Voltage Range</b>	Narrow ( $\pm 7\%$ )	Wide ( $\pm 20\%$ )
<b>Power Consumption</b>	Quite High	Quite Low
<b>Startup Speed</b>	Quite Slow (Over 10 Minutes)	Rapid (2 seconds)
<b>Strobe</b>	Yes (Alternating Current Drive)	No (Direct Current Drive)
<b>Optical Efficiency</b>	Low (< 60%)	High (> 90%)
<b>Color Index/Distinguish Feature</b>	Bad, Ra < 50 (The color of the object is not fresh, Boring, Hypnosis)	Bad, Ra > 75 (The color of the object)
<b>Color Temperature</b>	Quite Low (Yellow or Amber, Uncomfortable)	Ideal Color Temperature (Comfortable)
<b>Bad Glare</b>	Strong Glare	No Glare
<b>Light Pollution</b>	Serious	No
<b>Heat Generation</b>	Serious (>300°C)	Serious (<60°C)
<b>Lampshade Turn Dark</b>	Easy (Dust Absorption)	No (Static Proof)
<b>Lampshade Aging Turn</b>	Very Fast	Not
<b>Shockproof Performance</b>	Bad (Frangibility)	Good (No Filament Nor Glass)
<b>Environment Pollution</b>	Lead Pollution, etc.	None
<b>Maintenance Cost</b>	High	Quite Low
<b>Product Cubage</b>	Very Large	Small (Slim Appearance)
<b>Product Weight</b>	Heavy	Light
<b>Cost-Effective</b>	Bad	High
<b>Integrated</b>	Bad	Excellent



## **4. How to Choose the Solar Light?**

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*Before this, we have a discussion about how to decide whether or not you need solar. This time I want to tell you some about how to choose solar lighting. It's both for home owner and public illumination. Installing solar lighting can pose many challenges to the homeowner. In addition to the basic cost of the lights themselves, it's also necessary to hire a licensed electrician to do the solar lighting installation.*

*Solar lights are an increasingly popular alternative for both home lighting and public lighting. They are affordably priced, simple and safe to install yourself, can be relocated easily, and, of course, you also save on electrical costs.*

*Until recently, most solar lights emitted only a dim light and were not all that reliable. This has changed, as super-bright LEDs have replaced more conventional filament bulbs. Light-emitting diodes (LEDs) create light without generating the waste heat of normal bulbs, so they are very bright, yet require far less electricity to operate. The result is a dependable, long-term "bulb" that will usually shine for the life of the product. And now, most solar lighting are using LED lighting bulb their lighting resources.*

*Other recent advances in solar lighting technology include the development of more efficient, affordably-priced photovoltaic cells, improved circuitry, and more efficient batteries. These new solar lights are able to perform year-round*

*—even through the cold, short days of winter—with little variation in performance.*

*When shopping for solar lights, it's important to match the light to the function you want it to perform. There are three primary categories of solar lights for use in the landscape: accent, path, and task lights (spotlights).*

### **Solar Pathway Lighting**

*The SunMaster Solar garden light can be used to illuminate steps or a garden path.*

*As the name implies, path lights are meant to light paths, walkways, driveway perimeters or other small areas around your home and in your landscape. They are often used in multiples to guide the way along a set of stairs or a dark walk. Path lights typically come with a choice of ground stakes, flange mounts and hanging hooks, to give the user a wide choice of positioning options. Most are designed to focus their light downward.*

*Path lights may also have on-off switches, a feature that allows the homeowner to "store" the electrical charge for a special event and ensure the longest possible run time. Some models may offer options such as high-low power, colored lenses, or timers. Solar path lights are a mid-range choice in terms of price and light output.*

## **Solar Street Lights**

*Solar Street light is the most common public lighting resources; I am willing to introduce some knowledge about solar street light.*

*Solar street lights are the brightest class of solar lights and usually carry high price tag. They are designed to cast a bright beam of light on streets. That is to say, it is important to realize a solar street light will not perform like a standard 100-watt outdoor floodlight.*

*Most solar street lights are designed so they can be mounted in a number of ways and can be adjusted to shine in any direction. Often the solar panel can be mounted separately from the light, which allows you to put the panel in a place where it will get the sunshine.*

*Solar Street lighting that use LEDs have another little-known benefit that makes them especially well suited for landscape use. As temperatures drop, LEDs generate an even brighter light, due to their solid state design. In this respect, solar lights are superior to low-voltage outdoor lights and compact fluorescent lights, which operate less efficiently in very cold conditions. LEDs also have a lifespan in excess of 100,000 hours compared to 2,000 to 3,000 hours for the average incandescent.*

*The application of solar lighting is very important to our environment. And solar lighting is also getting more and more popular nowadays. So I think it is very useful getting to know some basic information about solar lighting*

### **3 Steps to See if Solar Lighting is Right for You.**

*Solar lighting provides a great alternative to traditional electrical lights. They can be installed anywhere as long as the solar panel has direct access to sunlight. Here are three easy steps to see if solar lighting is your best alternative for lighting just about anything.*

#### **1. Is there electric already available?**

*There may or may not be electric already available in the area needing to be lit up. If there is electrical, great, then you have two options; however, if there is no electric available, then the cost of trenching and adding the needed electric should be considered. Solar lights, because of their nature, can be installed anywhere, even in shaded areas. The cost of trenching and bringing electric out to some sites can be very costly and solar is a great alternative than adding those unnecessary expense.*

#### **2. What are the required lighting levels?**

*In today's industry, lighting can be a faint glow just for mood, or bright enough to read under, and all types of lighting can range from one end of the spectra, to the other. Personally, I have solar LED strand lights on my back porch for mood lighting which are powered by solar that provide just a warm glow for atmosphere. Other applications can be for street or parking lot lighting. Solar lights can be great alternative on replacing already installed lights for a lower overall electric bill or installed in a new application where a green alternative is high on the list.*

### **3. Are you looking for a green alternative?**

*Solar lights provide a green alternative to traditional lighting applications. Solar lights are separate from the grid, produce no greenhouse gases, and provide lighting even if the electric fails for an reason. They are completely self-sufficient and require little to no maintenance.*

### **4. Conclusion**

*While the high upfront cost of solar lighting can be daunting at first glance, the reality is that in the long run, solar lighting is far more economical than standard AC power lighting when all things are taken into consideration (i.e. Parts, installation, electricity and maintenance). Better yet, solar lighting is good for the environment and will eliminate thousands of pounds of CO2*

*over their lifetime. So next time you are in the market looking for lighting options, look at solar lighting. From commercial applications such as parking lots, roadways, and signs; to smaller applications like gardens, driveways, and atmospheric lighting, solar provides a great alternative.*

## **4. Solar Street Light Free customized Design Service**

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### **What Information does SunMaster Need to Offer You the Best Customized Solar Lamps?**

Generally, SunMaster needs those questions answered.

- 1) The sunshine hours per day or the exact city the street lights will be installed*
- 2) How many continuous rainy days in the raining season there? (It matters because we have to make sure the light can still work in 3 or 4 raining days with little sunshine)*
- 3) The brightness of LED lamp(50Watt, for example)*
- 4) Working time of solar light every day(10 hours, for example)*
- 5) The height of the poles, or the width of road*
- 6) It is best to offer the pictures on the locations where the solar lamps going to be installed.*

### **What is a Sun Hour?**

*A sun hour is a unit of measurement of the intensity of sunlight on the earth at a given time that can be used for generation of solar power, recognizing factors such as climate and weather. A full sun hour is measured as the intensity of sunlight at noon, whereas less than a full sun hour will result during the hours before and after noon.*

### **How does the Light Know When to Turn On and Turn Off?**

*SunMaster's solar controller uses a photocell and/or timer to control when the light will turn on, when the sun goes down, and to turn off when the sun comes up. The photocell detects when the sun comes down and when the sun comes up again. SunMaster can make the lamp last anywhere from 8-14 hours, and this varies on the customer's needs.*

*The solar controller utilizes an internal timer that is pre-set for a specific number of hours to determine when to switch the light off. If the solar controller is set to leave the light on until dawn, it determines when the sun rise (and when to switch the light off) by means of voltage readings from the solar panel array.*

### **What Happens If There are Cloudy Days?**

*Electrical energy is stored in the battery each day, and some of that energy is used to operate the light at night. Generally, we design your system so that the battery will operate the light for five nights without charging. This means that, even after a series of cloudy days, there will be plenty energy in the battery to power the light each night. Also, the solar panel will continue to charge the battery (although at a reduced rate) even when it is cloudy.*

### **What is The Typical Maintenance Schedule for a Solar Lighting System?**



*There is no regular maintenance required for a solar lighting system. However, it is helpful to keep the solar panels clean, especially in a dusty climate.*

***Do I have to charge the batteries?***

*Batteries are shipped 85% charged. The batteries will be at 100% charged within two weeks of proper operation.*

## 5. More About SunMaster

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### *The SunMaster Difference*

#### **Experience** - Manufacturing since 2010

*As a commercial solar lighting enterprise, SunMaster has already many years experience with more than 500's of successful solar lighting projects around the world, We SunMaster is the ideal partner for your solar lighting project.*

#### **High Performance Fixtures** - No dim lights here

*SunMaster mainly uses USA Bridgelux LED chip that means our LED luminaire is absolute highest quality and best performing LED light fixtures on the market. These fixtures are the same style architects offer allowing aesthetics to be the same in solar applications.*

#### **Protective Panel Pans** - Helping keep your investment safe

*SunMaster solar arrays feature full marine grade aluminum panel pans, power riveted to the backside of the solar array, to protect highly vulnerable back-side of solar array from wind-blown debris and vandalism.*

**Wind Load Rating** - *Standing tall even after a storm*

*Thanks to SunMaster's strength welded bracket and light pole .Each project designed by accurate wind-resistant count. SunMaster solar power assemblies are structurally certified to meet wind force requirements.*

**Best Warranty in the Biz** - *We stand by our work*

*Using only top of the line components and materials, SunMaster solar lighting systems are backed by the best warranty in the industry.*

**Customer Service** - *How can SunMaster help you today?*

*Customers can rely on SunMaster's outstanding customer service throughout the entire sales, installation and regularly scheduled maintenance process.*

**Contact Us If You Have Any Requirement.**

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