SOLAR ELECTRIC POWER COMPANY

STREET LIGHTING DESIGN GUIDE

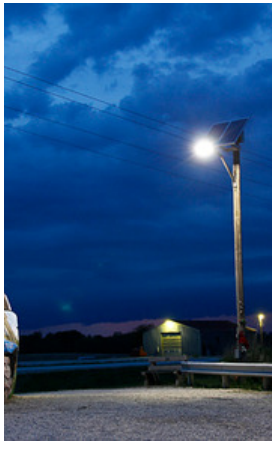
Navigating how to design a reliable solar street lighting solution

When you think of street lighting, you may only think of one type or another. Streets can be in major areas such as freeways and highways. Others are local roads, alleyways, sidewalks, intersections, bikeways, and medians. All types of street areas need proper lighting to ensure the safety of the people using them.

This eBook will explain the why's, where's and how's of street lighting. By the end of this eBook you will have a better understanding of lighting of different types of streets and their requirements, and how solar lighting can fit street lighting requirements with ease.

Street lighting produces quick, accurate and comfortable visibility at night. Street lighting also safeguards, facilitates and encourages vehicle and pedestrian traffic. By providing good visibility also provides social and economic benefits such as:

- *Reduction in night accidents*
- *Aid security and police protection*
- *Improve the flow of traffic*
- *Promote business and use of public facilities at night*



Freeways / Expressways

Roadways with greater visual complexity and higher traffic volumes require brighter lighting than rural roads. Since these are usually found in metropolitan areas, there is typically more light pollution from surrounding areas.

Local Roadways

Local roadways provide access to residential, commercial, industrial and other types of property in a city or town. The lighting needs are lower than freeways, but still need adequate lighting for safety of vehicles and pedestrians. These roads typically cater to bike lanes and sidewalks as well as vehicles.

Residential Roadways

Residential roadway lighting provides safety and security to residences. These light levels have the lowest requirement of all roadway lighting projects. Residential roadways do not necessarily need to be evenly illuminated; however, the final design uses the recommendations of the HOA and residences to determine the requirements.

Ever drive down a road and there is a whole stretch of lights, but all you see are small circles of light on the ground every hundred feet or so and nothing in between? This doesn't really help with visibility. However, when you go down a road that has uniform lighting, with no dark areas between the lights, visibility is increased tenfold. Uniformity provides better visual assistance and does not put as much strain on the eyes. When designing a solar street light project, uniformity still needs to be taken into consideration.

IES standards are different between roadways. Large freeways and highways have much different light level requirements than urban roads. Even different cities and municipalities have their own set of standards that go above what IES standards are. Gathering this information and completing a lighting layout to match the standards will be the first step in making sure that the new solar street lights are uniform and meet minimum standards.

The implementation of LEDs allows for uniform lighting levels between various fixture sets. A bell style fixture which used to only produce a round area of light directly below the fixture can now provide different distribution patterns and allow for lighting of roadways with uniformity. SEPCO works with Hubbell Outdoor Lighting to provide different distribution patters for every project maximizing the light output of each fixture.

LED lights also provide much better lighting with much less light loss from wasted light. Older style fixtures such as metal halide and high pressure sodium had a lot of wasted light. The lumens of the lamp get thrown in all directions and the fixtures were designed to push the light out everywhere with no real task lighting.

LEDs provide task specific lighting and are pushing the light in only in the area that requires lighting. This additional efficiency allows for the use of much less power, fewer lumens, and better overall lighting and uniformity.

KNOW WHAT GOES INTO DESIGNING A STREET LIGHT SYSTEM

Street light vary from one application to the next. Understanding some of the keypoints used to design a project will help you navigate the process efficiently.

Step 1 – Find area in need of street lights

The first thing to figure out is the length of road in need of street lights. This can be a small entrance road only a couple hundred of feet long to miles of streets through an area. Does the area currently have any type of lighting available? What is the reason for needing street lights in this area?

Step 2 – Find out if electric is available

Is the electrical grid already nearby or would you need to call the power company to bring in electrical lines? If the electric needs to be brought to the area, how much is this going to cost? Depending on how far the grid electric is from the location of the needed lighting, this can be quite expensive.

Step 3 – Determine the lighting requirements

How much lighting is needed on the street? Do the lights need to be dark sky compliant? Do the street lights need to run from dusk to dawn or for only a specified number of hours at night? Are the street lights able to dim in the middle of the night and still provide enough lighting? These questions need to be answered before you can decide on how many lights you will need to complete the project.

Step 4 – Find all alternatives

Solar power street lights are an option to traditional electrical lights. Solar street lights do not need the electrical grid to be brought in as they are self-contained units that provide their own electric. LED street light fixtures provide the best lighting solution by using lower amounts of power, better optics, dimming features where needed, and cost less in an overall solution.

Step 5 – Contact companies for quotes

The last step after gathering the above information is to contact companies for quotes. Just like with anything else, get multiple quotes and weigh the pros and cons of every company and situation. The lowest quote is not always the best, so make sure to do your research on companies and products before you submit a purchase order.

Make sure your quotes come with an explanation of:

Battery Backup: *How much battery backup you are offering based on days? Some solar street lights manufactures offer 2-day battery backup which is actually a bad solar system assembly design. SEPCO provides a battery backup which has a minimum of 5 days storage. This lengthens the backup times while prolonging the life of the battery.*

Photometric Study: *A photometric layout allows you to see the foot-candle and light distribution for every project. Without the photometric study, there is no representation of the light the systems will produce.*

USING SOLAR LED LIGHTING SYSTEMS FOR YOUR PROJECT

Since solar powered street lights are self-contained, the installation will be a snap. Setting the poles, installing the solar power assembly and light fixture with bracket will take less time and will not require additional trenching. This saves on costs and allows for the lighting to be implemented more quickly.

Solar lights that are in production for commercial applications such as streets, roadways, pedestrian walkways, etc. have a higher upfront cost, but they will pay for themselves immediately when looking at the total costs on installation for new construction. These systems provide lighting for specific applications with different runtime settings. They also provide many days of stored power to provide continuous reliability, even during times of inclement weather.

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.

THANK YOU FOR YOUR TIME!

Kindly get in touch to let us know if you have any questions.

One of our solar specialists would be happy to help you choose the best option for your Solar Lighting project and provide clean, renewable solar energy!

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