Guide to Solar Lighting Systems

Solar Power Assemblies from SEPCO

A BRILLIANT SOLUTION

Solar lighting solutions are just plain smart. Harnessed by humans since ancient times using a range of ever-evolving technologies, solar energy is economical, secure and good for our environment. SEPCO offers you solar how-to, along with a broad spectrum of solar LED luminaires and controls for energy efficient exterior applications.

ECONOMICAL

The cost of solar power has fallen well below that of nuclear power and is set to fall further. Reducing maintenance costs by using solar power assemblies lasting 30+ years and by improving lamp life with LEDs, solar can have a quick ROI and even beats out the cost of traditional grid lighting systems in many cases. In fact, for some outdoor applications, such as roadways, lower installation costs and maintenance savings can far exceed energy savings. LED solar lights require very little maintenance and are easier to install than their wired counterparts. Underground wiring, on-site transformers and electrical enclosures are typically more costly than installing new solar lights. LED technology means that the lamps require fewer replacements, can be controlled and provide significant energy savings over traditional lamps. Solar means there is no electric bill...ever. Even better, installing solar lights helps earn LEED points and provides a NET Zero installation.

SECURITY

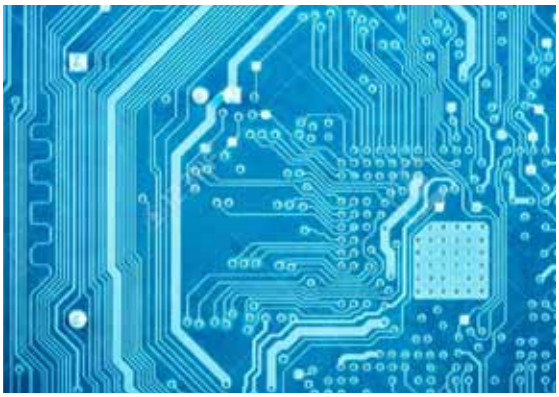
Protecting property, people and assets is one of the key jobs of exterior lighting. Security through lighting has been instrumental to deter crime and improve security to the public, business and residential spaces. Solar LED lighting not only offers better visibility, but also security from brownouts and blackouts. The lights are always there when you need them and can adapt to almost any application.

SUSTAINABLE

The sun comes up every day. That's the definition of renewable energy. Another sustainability plus is solar lighting's low environmental impact. For sensitive environments like wetlands, the seashore, or other sensitive ecosystems, solar lighting minimizes the impact on nature by avoiding below-grade services and unsightly enclosures. Solar lights can also utilize turtle friendly and dark sky compliant fixtures to lessen their impact on nature.

HOW SOLAR PANELS CONVERT SUNLIGHT INTO ELECTRICITY

Photovoltaic solar panels harvest the sun and convert sunlight into energy. The energy is stored in the battery assemblies to be utilized at night.



Power generated from this process is fed through a charge controller which regulates battery storage capacity and ensures long system life.

FOLLOW THE LEADER

SEPCO is the leader in solar lighting technology, along with Hubbell Lighting as a leader in lighting technology, perfecting LED solar solutions for exterior use. We've proven the efficacy and efficiency of these technologies in countless military and civilian installations, saving thousands on the energy cost. In fact, Hubbell has more LED luminaires recognized by the Illuminating Engineering Society of America (IESNA) Progress Report than any other manufacturer. Our lighting solutions offer immediate economic benefits, sustainable design and exceed legacy lighting performance and aesthetics; and we go the distance when it comes to walking the talk.

Solar lighting is as old as our planet. The sun's rays provide life. SEPCO and Hubbell Lighting help you harness that same energy to provide grid free lighting. The chart below explains the steps involved in changing sunlight to a solar LED lighted parking lot, military base or roadway.

At night, the charge controller circuitry distributes the stored energy to one of the many energy efficient LED luminaires.

Additional control circuitry is available to enable specific geographic locations with limited solar input to harness the sun and provide reliable grid free lighting for years to come.

WE'RE HERE TO HELP

From lighting design to warranty, SEPCO is here to serve our customer's needs. We understand there is no perfect lighting solution, no one size fits all, especially for unique applications like the military. We are your turnkey solution for complete solar lighting systems to meet the requirements of a project.

Together, SEPCO and Hubbell Lighting provide lighting solutions for perimeters, parking lots, public spaces, streets, residential areas, sports arenas and other areas where lighting security is critical. Our lighting solutions meet and exceed the lighting requirements associated with the operation of military bases in the United States and around the world. Bottom line? We know LED solar applications and we are with you every step of the way, meeting stringent regulations and saving dollars.

YOUR SOLUTION,

PLAINLY STATED: SEPCO GETS IT!

We know what solar lighting solution best suits your application, no matter the industry or geographic location. The availability and cost of energy, new infrastructure and many government financial incentives make solar the bright choice. We offer a broad array of solar powered LED luminaires that provide reliable performance and maintenance free operation, coupled with the long life of a solar power assembly.

We understand the unique needs of government and offer a GSA schedule to back that up. Stringent guidelines don't scare us. Security and stainability keep people, property and the planet safe. Our lighting technology leadership is evident in every solution.

OUR PASSION.

The next few pages are a primer for designing a solar powered lighting system for your next project. The availability of energy, its cost, and the financial incentives available for installing a solar lighting system make sense.

FIND

SOLAR AVAILABILITY

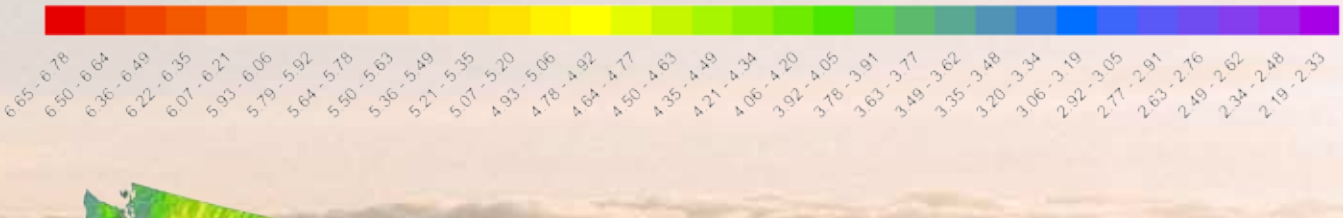
Location, location, location. You've heard it before. Locations are not all created equal when it comes to available solar insolation either. SEPCO takes into consideration the location of the installation and offers advanced features for areas that aren't sunny. Each system is built to specification of the location of installation, longest night of the year, and operation profile for the specific project.

State	City	Sun Hours	State	City	Sun Hours
Alabama	Montgomery	3.88	Montana	Helena	2.75
Alaska	Juneau	0.71	Nebraska	Lincoln	3.00
Arizona	Phoenix	5.08	Nevada	Carson City	3.94
Arkansas	Little Rock	3.06	New Hampshire	Concord	2.93
California	Sacramento	2.93	New Jersey	Trenton	2.81
Colorado	Denver	4.21	New Mexico	Santa Fe	5.22
Connecticut	Harford	2.81	New York	Albany	2.54
Delaware	Dover	2.98	North Carolina	Raleigh	3.68
Florida	Tallahassee	4.15	North Dakota	Bismarck	3.19
Georgia	Atlanta	3.42	Ohio	Columbus	2.43
Hawaii	Honolulu	4.99	Oklahoma	Oklahoma City	4.20
Idaho	Boise	2.71	Oregon	Salem	1.84
Illinois	Springfield	3.01	Pennsylvania	Harrisburg	2.88
Indiana	Indianapolis	2.78	Rhode Island	Providence	2.91
Iowa	Des Moines	3.25	South Carolina	Columbia	3.87
Kansas	Topeka	3.49	South Dakota	Pierre	3.19
Kentucky	Frankfort	2.89	Tennessee	Nashville	3.25
Louisiana	Baton Rouge	3.70	Texas	Austin	4.22
Maine	Augusta	2.29	Utah	Salt Lake City	3.12
Maryland	Annapolis	3.09	Vermont	Montpelier	2.05
Massachusetts	Boston	2.78	Virginia	Richmond	3.43
Michigan	Lansing	2.29	Washington	Olympia	1.57
Minnesota	Saint Paul	2.20	West Virginia	Charleston	2.76
Mississippi	Jackson	3.73	Wisconsin	Madison	2.82
Missouri	Jefferson City	2.84	Wyoming	Cheyenne	4.00

Note: Above is states and capitals only, there are thousands of other locations with variations on solar insolation available. The sun hours are calculated for each project with the panel facing South and at a 45° angle and winter sun hours.

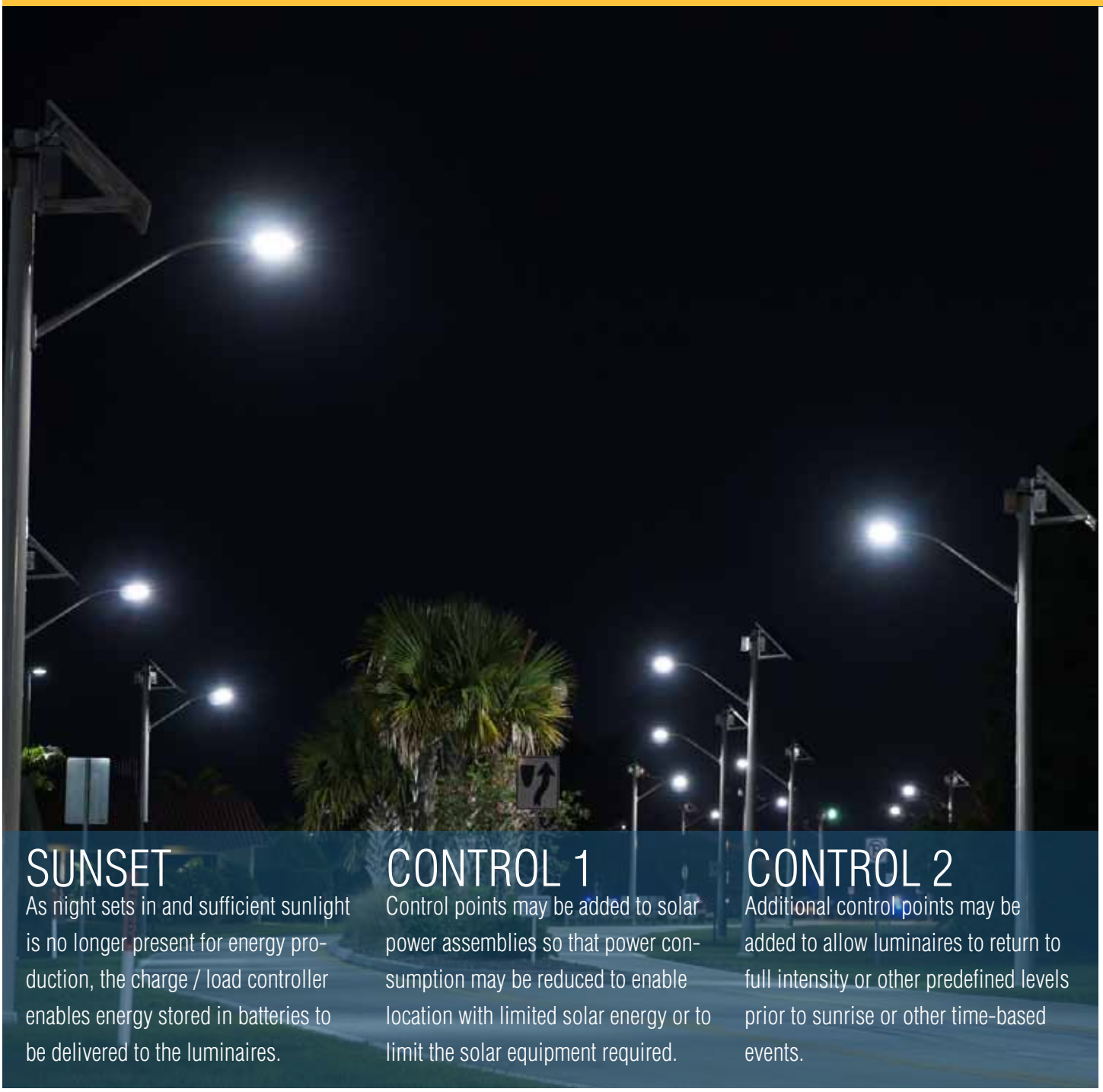
YOUR LOCATION

kWh/m^2/day - US Photovoltaic



Annual average solar resource data is shown for a tilt-latitude collector. The data for Hawaii and the 48 contiguous states is a 10km, satellite model dataset (SUNY/NREL, 2007) representing data from 1998-2005. THe data for Alaska is a 40km dataset produced by the Climatological Solar Radiation Model (NREL, 2003).

CONTROL



SUNSET

As night sets in and sufficient sunlight is no longer present for energy production, the charge / load controller enables energy stored in batteries to be delivered to the luminaires.

CONTROL 1

Control points may be added to solar power assemblies so that power consumption may be reduced to enable location with limited solar energy or to limit the solar equipment required.

CONTROL 2

Additional control points may be added to allow luminaires to return to full intensity or other predefined levels prior to sunrise or other time-based events.

YOUR LIGHT

DAYTIME

During the day, sunlight is converted to electrical energy and stored in gel-cell sealed batteries, which are 100% recyclable.

SUMMER/WINTER

The sun's position varies by season. In the Northern Hemisphere, the solar is calculated by using location-specific values for December (longest night, shortest day).

RELATIVE TILT

Areas closer to the equator may benefit from a lower panel tilt to maximize the solar collection, while further has a higher tilt.

CALCULATE

CALCULATE THE RIGHT LIGHT

You can't know how much solar energy your LED luminaires will require until you calculate how much light you will need for visibility and security. Standard IES guidelines are used for all applications. When you are ready to take this step, a point by point photometric calculation is used to determine the number of luminaires and their relative wattage to determine the requirements for a specific area / project.

ROADWAY LIGHTING

Solar street lighting can be used on highways, roadways, rural roads and neighborhood streets to provide additional security to travelers. Dark streets can be a hazard to pedestrians and vehicle travelers alike. Solar powered street lighting systems will provide the needed light without additional trenching or added utility costs. These self contained systems provide the perfect solution to any roadway lighting application.

PARKING LOT LIGHTING

Solar parking lot lighting provides lighting to any size parking lot, and for existing parking lots, does not tear up the existing parking lot structures for installation. Dark sky compliant fixtures can also provide great lighting without additional light pollution. Since each light is self-contained with its own power system installation is a snap. Just set the pole and mount the solar and fixtures.

LIGHT LEVELS

AREA LIGHTING

Area security lighting is the perfect solution to perimeters, parks, pathways, boat ramps, storage yards and many other applications. The need for security lighting has increased and solar is a way to provide lighting in areas where existing utility lines do not exist or would cause damage to the surrounding area to trench in. Solar powered security light systems are self contained and are easy to install.

SIGN LIGHTING

Solar sign light systems provide lighting to a sign no matter the location without additional trenching tearing up the surrounding area or landscaping. Solar sign lights can even be installed in medians. The solar can mount nearby to show a green initiative, in the landscape nearby or on the top of the sign structure. The systems work perfectly with internally illuminated and front lit signs as well as billboards and banner signs.

POWER UP

After the light requirements are determined, calculating the power assembly is the next step. This is completed by SEPCO with information on operation schedules for the project and take into consideration geographical locations and available insolation in the winter months. All this information is put together to complete a turn-key solution for the solar lighting project.

SELECT

SOLAR POWER ASSEMBLY

Solar Electric Power Company - SEPCO is the leading manufacturer of commercial solar lighting and remote solar power systems. With over 30 years of experience, SEPCO is known as the pioneer in the solar lighting industry. While roots date back to 1979, SEPCO has been exclusively manufacturing commercial solar lighting and off-grid solar power systems under the SEPCO name since 1994. SEPCO products offer the perfect solution for applications where the power grid is either unobtainable or cost prohibitive. SEPCO provides experience with quality, stands behind their products and takes pride in their work. The highly trained team makes it possible to take any project from concept to reality.

Recognized as the leading industrial solar lighting company in the world, SEPCO's specialized products are uniquely tailored to meet the needs of today's industry. SEPCO provides unmatched industry experience, technology and customer service. The number one priority is to understand the unique goals and meet the needs of each client.

POWER ASSEMBLY

SOLAR POWER ASSEMBLY

System Part	Description
SEPA30	Solar Electric Power Assembly 30 Watt
SEPA50	Solar Electric Power Assembly 50 Watt
SEPA75	Solar Electric Power Assembly 75 Watt
SEPA100	Solar Electric Power Assembly 100 Watt
SEPA150	Solar Electric Power Assembly 150 Watt
SEPA200	Solar Electric Power Assembly 200 Watt
SEPA275	Solar Electric Power Assembly 275 Watt
SEPA300	Solar Electric Power Assembly 300 Watt
SEPA550	Solar Electric Power Assembly 550 Watt

*System subject to change, contact SEPCO for updates

BATTERY ASSEMBLY

System Part	Description
XS	36 Amp Hour Battery Assembly
S	82 Amp Hour Battery Assembly
M	112 Amp Hour Battery Assembly
DS	164 Amp Hour Battery Assembly
DM	224 Amp Hour Battery Assembly
QS	328 Amp Hour Battery Assembly
QM	448 Amp Hour Battery Assembly
HS	492 Amp Hour Battery Assembly
HM	672 Amp Hour Battery Assembly

*System subject to change, contact SEPCO for updates

INSTALL

FIXTURE MOUNTING

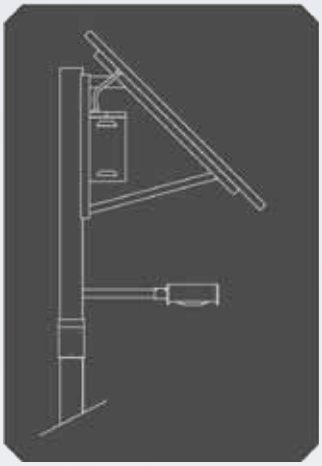
There are many fixture mounting brackets used with commercial lighting, poles, or other items relating to the project specified equipment. If the fixture you are ordering does not use an accessory bracket, like a pole top luminaire, or if you are providing the pole and or bracket, additional fixture mounting brackets are not required.

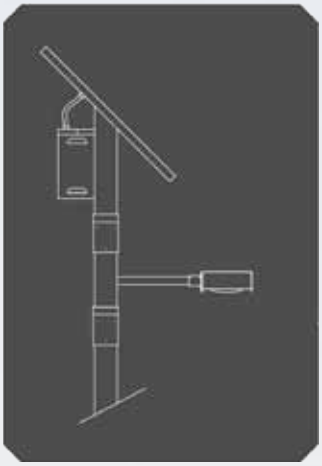
Brackets range from long upsweep brackets to shorter straight brackets. There are also brackets specific for signs and flood lights. Finally, decorative brackets are used with our decorative fixture selection.

System Part	Description
RB	Railroad Bracket
LB	London Bracket
PW	Pierwalk Bracket
FB	Fixture Bracket
SH	Side of Pole Horn Bracket
SP4/6/8	Side of Pole Bracket 4', 6', 8'
ST5/24	Side of Tenon Bracket 5"/24"
TA	Tenon Adapter

SOLAR POWER CONFIGURATIONS

Several solar electric power assembly mounting methods are available. The illustrations represent the most common arrangements, other configurations are available to meet on-site performance and aesthetic requirements.





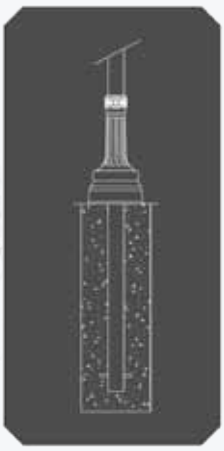
MOUNTING CONFIGURATION

POLE CONFIGURATIONS

Poles used for solar lighting applications are built to meet the local AASHTO wind load requirements understanding the weight and EPA requirements. Every pole is custom ordered for the specific project with little variances. Poles can either be Aluminum, Stainless Steel, Fiberglass Composite or Concrete and come with Anchor Bases, Direct Burial configurations, or Transformer Bases. Pole heights range from 10' to 35' and provide a minimum of 3' at the top of the pole for mounting of the solar power assembly. Consult your designer for additional options and recommendations.

Anchor Base

Pole is installed via cast-in-place steel anchor bolts which are sized according to the pole loading and AASHTO wind zone. This is the most popular installation method.



Direct Burial

Pole includes an integral shaft extension which is installed below grade and reinforced with compacted aggregate or concrete. This mounting method may be preferred for installations where foreign construction materials are limited.

Auger Foundation

Pole foundation is screwed into place and pole is attached via steel coupling hardware. Special installation equipment is required.

THE CHOICE IS YOURS:

SOLAR LED LIGHTING SOLUTIONS

Solar LED lighting solutions from SEPCO and Hubbell Lighting offer civilian and military applications added security, huge energy savings and undeniable stainability. SEPCO recognizes that there is no one size fits all solution for exterior lighting and that each customer requires unique considerations. As the pioneers in the solar lighting industry, we are uniquely equipped to meet needs from lighting design, education, engineering, installation assistance and ongoing customer service.

SECURITY

Protecting property, people and assets is the job of exterior lighting. Solar LED lighting not only offers better visibility and ward off potential threats, but it also offers security from brownouts and blackouts. In military settings, solar powered lighting keeps troops from relying on grid power, protecting against enemy sabotage.

SAVINGS

Energy savings are natural with solar LED lighting systems. Sunlight is plentiful and photovoltaic panels can harvest energy where grids don't reach. Low maintenance and ease of installation are the cherries on top of the energy savings, meaning years of reliable performance and lower overhead.

SECURITY. SAVINGS & SUSTAINABILITY

SUSTAINABILITY

There is not a more renewable resource than the sun. Capturing its energy to light up dark buildings and roadways is a great way to honor our resources. Ease of installation makes adding light to fragile environments a lot less hassle and harm. Hubbell Lighting and SEPCO encourages good stewardship and feel privileged to offer solutions to help.

ECONOMICAL

SEPCO and Hubbell Lighting want to help you save energy costs and go greener with your next exterior lighting project. Our lighting designers will assist you in choosing the right illumination levels and luminaires from our broad selection of solar-ready LED fixtures. Give us a call today to learn how to get started or visit our website for more details about our products.

SEPCO - Solar Electric Power Company

1521 SE Palm Court
Stuart, FL 34994
772-220-6615
info@sepconet.com

www.sepco-solarlighting.com

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In Partnership with

Hubbell Lighting, Inc.

701 Millennium Boulevard
Greenville, SC 29607
864-678-1000

www.hubbelllighting.com