



Guide to Solar Lighting Systems

Solar power assemblies from
Hubbell Lighting and SEPCO



Hubbell Lighting, Inc.



A Brilliant Solution

Solar energy and 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. Hubbell Lighting offers you solar how-to, along with a broad spectrum of solar-ready 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. Nellis Air Force Base is receiving photoelectric power for 2.2 ¢/kWh and grid power for 9 ¢/kWh. Since photovoltaic modules typically last 25 to 40 years, the International Conference on Solar Photovoltaic Investments, organized by EPIA, has estimated that PV systems will pay back their investors in 8 to 12 years. Reducing maintenance costs by improving lamp life and fixture reliability is a key component of outdoor lighting. In fact, for some outdoor applications, such as roadways, lighting maintenance savings can far exceed energy savings. Solar LED luminaires 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, are dimmable and provide significant energy savings over traditional lamps.

Secure

Mandates currently set forth by the U.S. Federal government pertaining to Federal facilities make our solar-powered LED lighting an ideal solution. Federally owned property and buildings are mandated to materially reduce current energy use. A second requirement is to improve energy security, by employing renewable power that operates independent of electrical utility grids. Give regulations the one-two punch with Hubbell Lighting solar-ready products. (Federal Energy Policy Act of 2005, Executive Orders 13423 and 13514)

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. The payoff continues to add up when you consider that solar lighting eliminates ongoing payments for electricity and any hassle from brownouts or blackouts.

How solar panels convert sunlight into electricity

Solar lighting is as old as our planet. The sun's rays provide life. Hubbell Lighting and SEPCO, our partner and manufacturer of solar power assemblies, 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:



1
Photovoltaic solar panels harvest the sun and convert sunlight into energy.



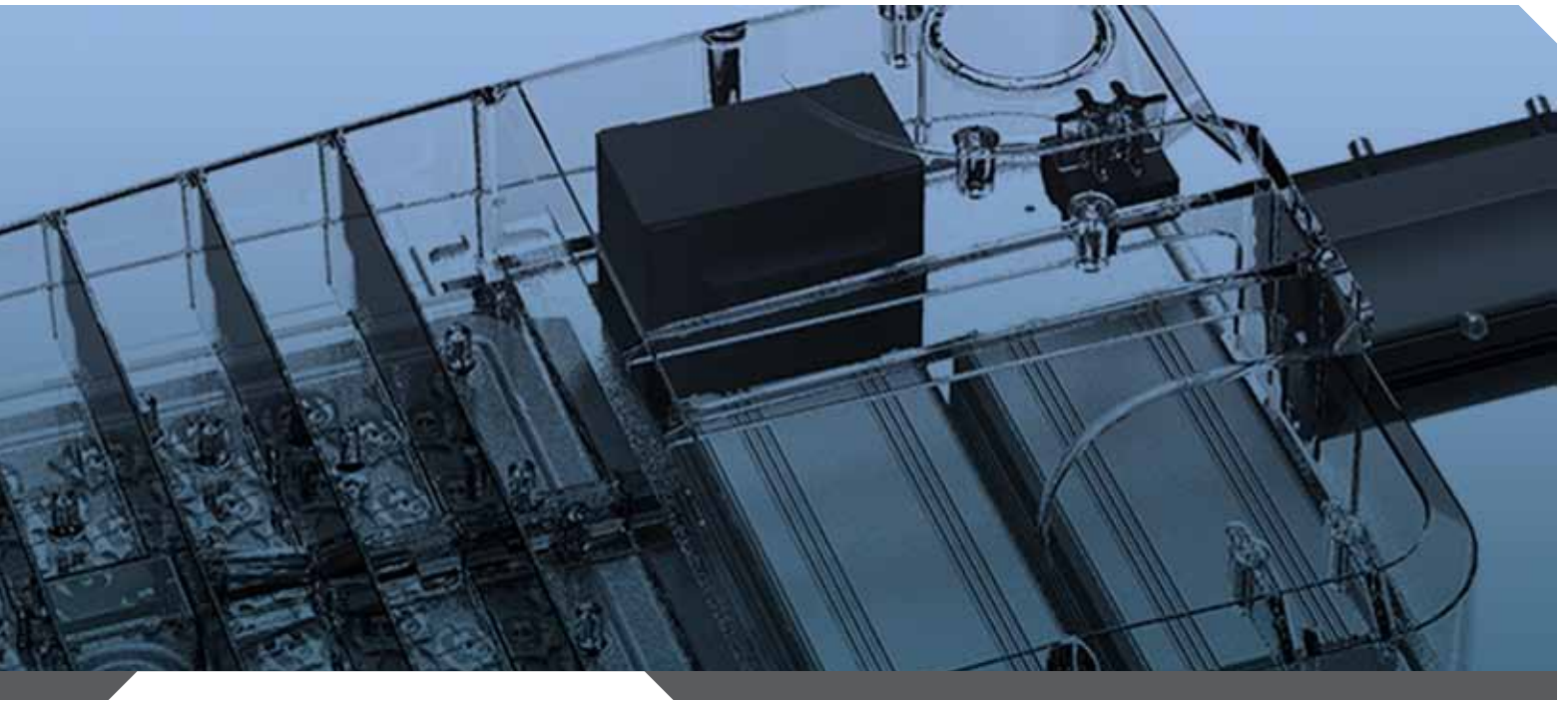
2
Power generated from this process is fed through a patented charge controller which regulates battery storage capacity and ensures long system life.



3
At night, the charge controller circuitry distributes stored energy to one of the many Hubbell Lighting energy efficient LED luminaires.



4
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.



Follow the Leader

Hubbell Lighting is 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 energy cost. In fact, we have 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 designs and exceed legacy lighting performance and aesthetics. And we go the distance when it comes to walking the talk.

We're Here to Help.

From lighting design to warranty, Hubbell Lighting is rooted and grounded in serving our customers needs. We understand that there is no perfect lighting solution, no one size fits all, especially for unique applications like the military. We are your turnkey solution for ballasts, fixtures and controls that span the full spectrum of lighting technologies. Our agents and ESCO partners can also provide a comprehensive audit and upgrade program to help customers choose the best lighting systems and controls, including measurable energy cost reduction.

Hubbell Lighting provides lighting 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're with you every step of the way, meeting stringent regulations and saving dollars.

YOUR SOLUTION OUR PASSION

Plainly stated, Hubbell Lighting gets it.

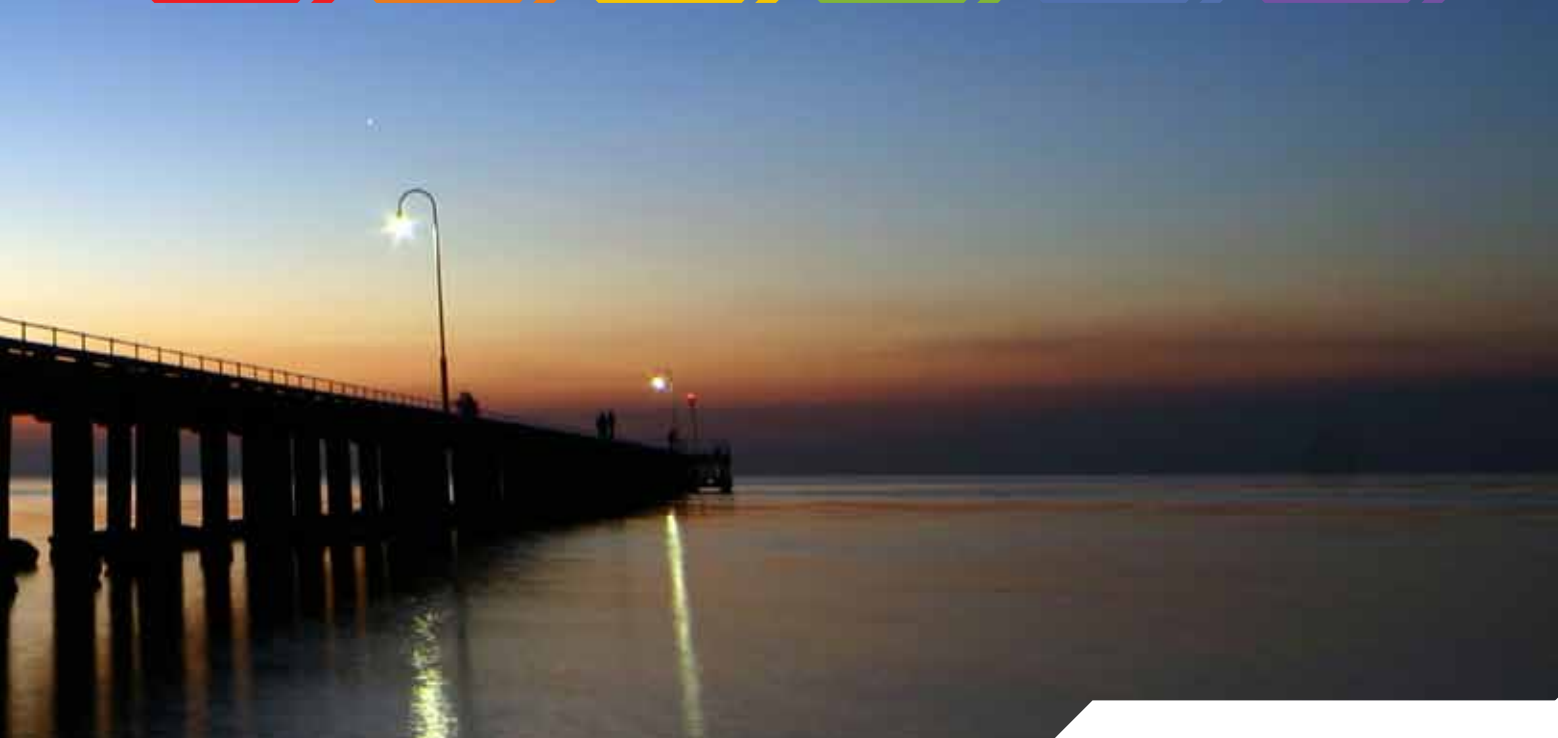
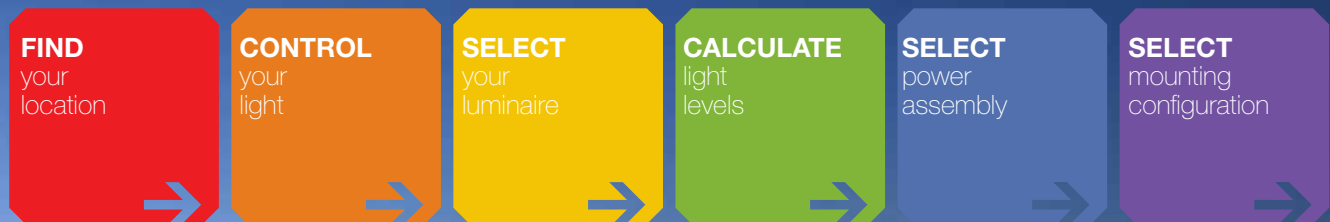
We know what solar lighting solution best suits your application, no matter the industry or geographic location. The availability and cost of energy, new infrastructure and many government financial incentives make solar the bright choice. We offer a broad array of solar-ready, energy efficient luminaires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

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



ON.

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.



LOCATION

FIND
your
location



SOLAR AVAILABILITY

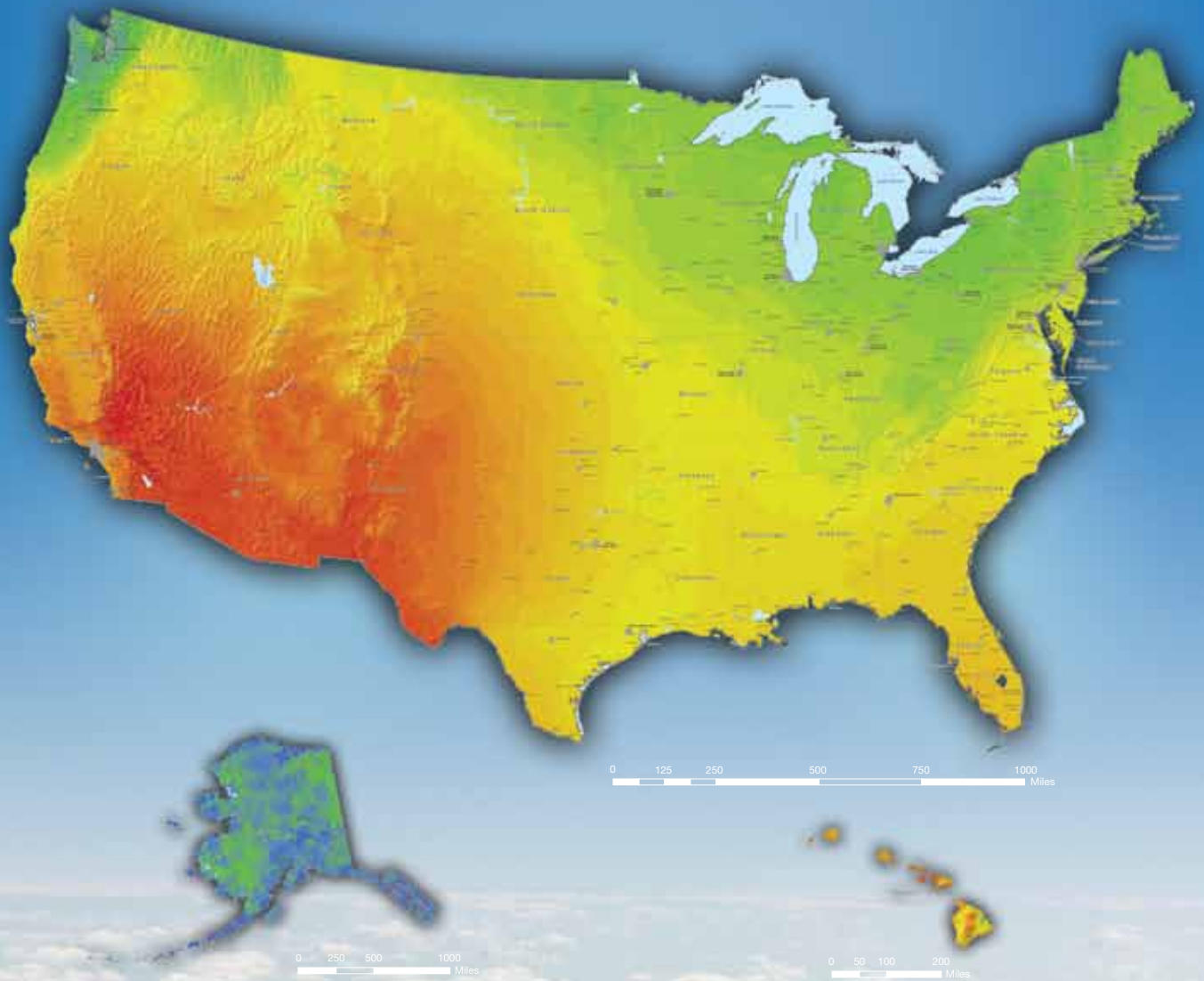
Location, location, location. You're heard it before. Locations are not all created equal when it comes to sunlight, either. Hubbell Lighting LED solar luminaires take that into account by offering advanced features for areas that aren't as sunny. Find your nearest location below to see how many hours of sun are available for energy conversion.

STATE	CITY	SUN HOURS
Alabama	Mobile	3.64
Alaska	Anchorage	0.50
Arizona	Tucson	5.31
Arkansas	Little Rock	3.45
California	San Diego	4.73
Colorado	Boulder	3.95
Connecticut	Hartford	2.65
Delaware	Wilmington	2.87
Florida	Daytona Beach	4.27
Georgia	Athens	3.79
Hawaii	Hilo	3.50
Idaho	Boise	2.60
Illinois	Springfield	2.89
Indiana	Indianapolis	2.63
Iowa	Des Moines	3.12
Kansas	Wichita	3.83
Kentucky	Louisville	2.70
Louisiana	New Orleans	3.77
Maine	Caribou	2.53
Maryland	Baltimore	3.20
Massachusetts	Boston	2.71
Michigan	Detroit	2.19
Minnesota	Minneapolis	2.81
Mississippi	Jackson	3.61
Missouri	St. Louis	3.00

STATE	CITY	SUN HOURS
Montana	Helena	2.48
Nebraska	Omaha	3.10
New Hampshire	Concord	2.80
Nevada	Reno	3.86
New Jersey	Atlantic City	3.09
New Mexico	Albuquerque	5.11
New York	Buffalo	2.25
North Carolina	Asheville	3.53
North Dakota	Bismark	3.16
Ohio	Columbus	2.42
Oklahoma	Tulsa	3.63
Oregon	Portland	1.75
Pennsylvania	Pittsburgh	2.23
Rhode Island	Providence	2.89
South Carolina	Greenville	3.69
South Dakota	Sioux Falls	2.89
Tennessee	Chattanooga	3.26
Texas	Fort Worth	4.31
Utah	Salt Lake City	3.02
Vermont	Burlington	2.17
Virginia	Roanoke	3.30
Washington	Olympia	1.63
West Virginia	Charleston	2.27
Wisconsin	Milwaukee	2.52
Wyoming	Cheyenne	3.60

kWh/m²/Day

United States Photovoltaic Resource: **Flat Plate Tilted at Latitude**



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



CONTROL
your
light



You're in Control.

Hubbell Lighting offers control circuitry to allow any geographic location to benefit from the cost savings of LED solar lighting solutions. Limited solar input is no worry. We can help you harness the sun for years of reliable, grid-free lighting. Our control points allow reduced power consumption and variable illumination intensity. Solutions with grid backup are also available.



SUNSET

As night sets in and sufficient sunlight is no longer present for energy production, the patented solar charge controller enables energy stored in batteries to be delivered to connected luminaire(s).



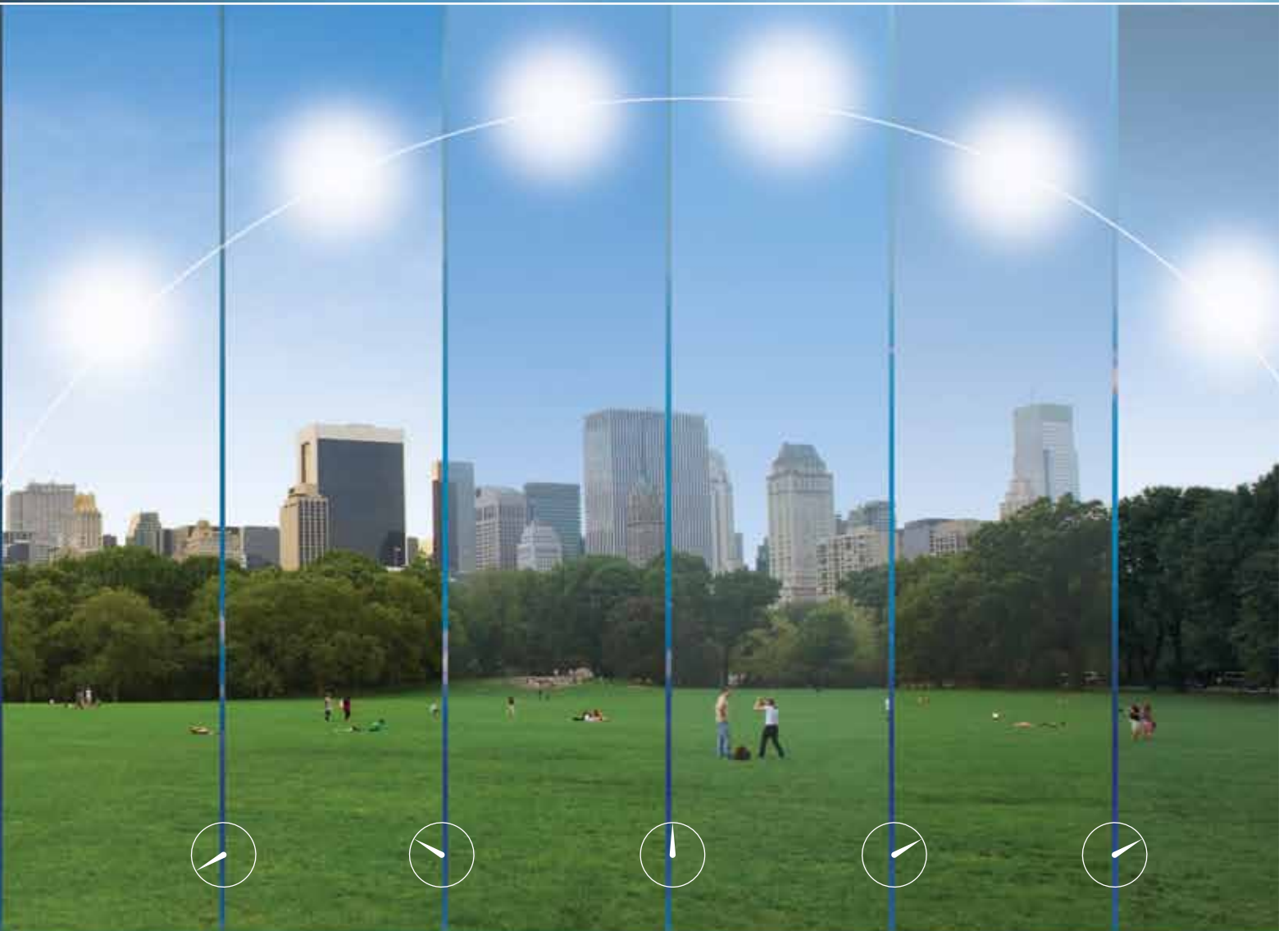
CONTROL POINT 1

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



CONTROL POINT 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.



DAYTIME

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



SUMMER

The sun's position varies by season. In the Northern Hemisphere, calculate your solar input using the location-specific values for December.



RELATIVE TILT

Areas closer to the equator may benefit from a lower panel tilt (15 degrees) to maximize solar collection with their SEPCO photovoltaic solar panels.



SELECT
your
luminaire





architectural area lighting

PROVIDENCE® SMALL (PROS)

The Providence® family are transitional style fixtures that combine modern lighting performance with aesthetics in traditional forms. The Small Providence utilizes efficient lamp sources including LED, and is available with direct full cutoff and indirect asymmetric and symmetric cutoff optical systems. Also available in matching wall sconse, bollard and medium and large luminaires.

WATTAGE: 16.4W- 32.7W
 DISTRIBUTIONS: Type II, III, IV and V
 COLORS: arctic white, black, matte black, dark green, dark bronze, weathered bronze, aluminum, medium gray, antique green, RAL/ premium and custom color



Universe® SMALL (UCS)

The Universe Collection® is a complete family of customizable decorative luminaires that transcend architectural styles past and present. The Universe small scale features five luminous element options, and five hood styles. Available with IES Type 5 opal acrylic lens. Full cutoff options available. Pole, wall and pendant mounting available. Coordinates with Universe bollard, medium and large luminaires.

WATTAGE: 32W
 DISTRIBUTIONS: Type II, III, IV and V
 COLORS: arctic white, black, matte black, dark green, dark bronze, weathered bronze, aluminum, medium gray, antique green, RAL/ premium and custom color



Flex™ (FH)

Flex™, part of AAL's Designer SSL Series, features AAL's exclusive [MicroEmitter](#) technology which provides ample, smooth, even illumination of the environment. The precision aiming system of AAL's [MicroEmitter](#) technology ensures that even when looking directly at the luminaire, only one-half of the LEDs can be viewed at any given time. This results in 50% less glare when compared to other exposed, unshielded LED systems. Multiple arm designs and mounting options, including single, twin, tri shape and quad, form a versatile "create it yourself" look.

WATTAGE: 62W
 DISTRIBUTIONS: Type II, III, IV and IV
 COLORS: arctic white, black, matte black, dark green, dark bronze, weathered bronze, aluminum, medium gray, antique green, RAL/ premium and custom color





VIPER-S

The Viper luminaire is available in two sizes with a wide choice of different LED wattage configurations and optical distributions designed to replace HID lighting up to 175W MH and with 5 different mounting options for application in a wide variety of new and existing installations. The Viper is the Cutting Edge in LED style, performance and technology.

WATTAGE: 15W - 60W
 DISTRIBUTIONS: Type II, III, IV, V
 COLORS: black, bronze, white, green, gray, metallic bronze, metallic titanium



CRUZER

The Cruzer is an LED Pole Top luminaire that introduces the concept of unifying the tasks of area, roadway and site lighting with complimentary building mounted (wall-pack styled) fixtures. The LED Cruzer is designed to meet strict lighting codes with environment-friendly, full cutoff and is available in four different lighting distributions.

WATTAGE: 15W - 60W
 DISTRIBUTIONS: Type II, III, IV, V
 COLORS: black, bronze, white, green, gray, metallic bronze, metallic titanium



URBAN

In applications where a decorative LED luminaire is desired for roadway or area lighting, the Urban is your ultimate solution. Its 4 styles, 2 different shades, 4 LED wattages, and four full cutoff lighting distributions, make the Urban an ideal solution for energy efficient, environmentally friendly lighting for both street and parking lot lighting applications.

WATTAGE: 15W - 60W
 DISTRIBUTIONS: Type II, III, IV, V
 COLORS: black, bronze, white, green, gray, metallic bronze, metallic titanium



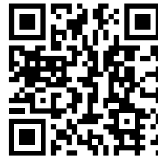
BEACON

PRODUCTS

ALPHA

Alpha is a revolutionary design that provides more than just architectural lighting. For safety, security, outdoor storage, car lots, and recreational sports activities, the Alpha Flood is the energy and maintenance efficient LED powered flood light to specify. Whether pole mounted, wall mounted or base plate mounted, the Alpha eliminates spill light and light trespass making it an ideal instrument for lighting commercial facilities in residential and urban settings.

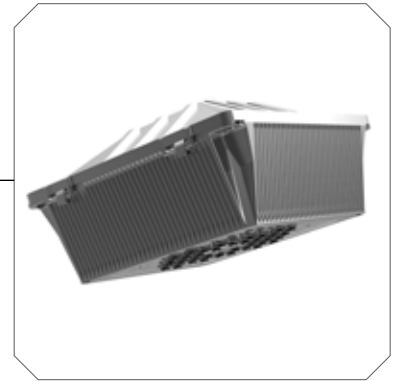
WATTAGE: 15W - 60W
DISTRIBUTIONS: NEMA 2x2, 4x4, 5x5, 6x6
COLORS: black, bronze, white, green, gray, metallic bronze, metallic titanium



ENDURA

The Endura LED Parking Garage luminaire offers a precise optical distribution, called "Drive Lane Optics" (T5R), that minimizes glare to the driver while lighting the spaces between the cars. This unique design also incorporates On-Board occupancy sensors, a bird nesting deterrent, an integral thermal management system to ensure maximum life, a replaceable LED light engine, and is the easiest to install in both existing and new installations.

WATTAGE: 15W - 60W
DISTRIBUTIONS: T5R, T5W
COLORS: black, bronze, white, green, gray, metallic bronze, metallic titanium



SLIDE

The versatile transitional designed lighting fixture was created to yield the ultimate in flexibility in LED Post Top Lighting, this classic geometric form of a cylinder offers 3 different top shades, 3 LED wattages, and four different full cutoff lighting distributions making it an ideal solution for the urban setting and the educational or medical campus.

WATTAGE: 15W - 60W
DISTRIBUTIONS: Type II, III, IV, V
COLORS: black, bronze, white, green, gray, metallic bronze, metallic titanium





SELECT
your
luminaire



WARP 9

Typical site lighting attempts to embellish, decorate, or adorn, often beyond the original architectural intent. WARP9 was designed to disappear from the site, camouflage itself within its surroundings, and avoid detection from daytime visual perception.

WATTAGE: 35W- 70W
DISTRIBUTIONS: Type II, III, IV and V
COLORS: dark bronze, black, stealth gray,
light gray, white, platinum silver



ALTITUDE

The ultimate in luminaire design innovation with a unique balance of form, engineering and unique PicoPrism™ optics. ALTITUDE's aesthetic housing is proportional and scalable, with six sizes to cover more pedestrian/site/roadway environments than ever before.

WATTAGE: 35W- 70W
DISTRIBUTIONS: Type II, III, IV and V
COLORS: dark bronze, black, stealth gray,
light gray, white, platinum silver



ERA

Era® is a transitionally styled luminaire that complements both traditional and contemporary architecture. Available with Kim's exclusive MicroEmitter® LED technology. Era LED Type 3 and Type 5 (5100K) are DLC approved.

WATTAGE: 35W- 70W
DISTRIBUTIONS: Type II, III, IV and V
COLORS: dark bronze, black, stealth gray,
light gray, white, platinum silver





KIM LIGHTING

BOUNCE LED, CFL LED

Bounce features a subtle indirect component that addresses the growing concern for control of glare and light trespass, with a unique visual presence both day and night.

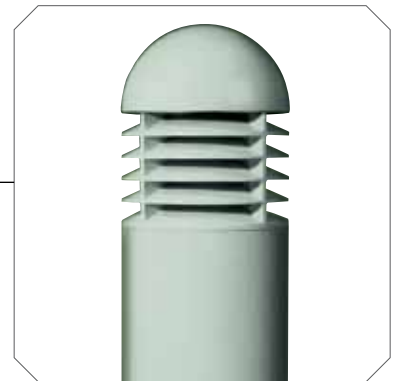
WATTAGE: 35W- 70W
DISTRIBUTIONS: Type II, III, IV and V
COLORS: dark bronze, black, stealth gray,
light gray, white, platinum silver



VRB LED

Low level luminaires can be subject to vandalism in unsecured areas. The Vandal Resistant Bollards have been engineered to provide superior strength through rugged components and base-to-grade connections that withstand considerable force.

WATTAGE: 12W- 18W- 24W
DISTRIBUTIONS: Type I, III and V
COLORS: dark bronze, black, stealth gray,
light gray, white, platinum silver



ARCHETYPE

Modern architecture often integrates curvilinear, rectilinear, classical, and neoclassical styles into a single structure. The eclectic shape of The Archetype readily adapts to and universally complements contemporary architectural design.

WATTAGE: 35W- 70W
DISTRIBUTIONS: Type II, III, IV and V
COLORS: dark bronze, black, stealth gray,
light gray, white, platinum silver





SELECT
your
luminaire



CR1 LED 12V DC

Spaulding Lighting's CR1 12V DC area/site lighter is a perfect fit for parking area and site applications in areas with abundant solar energy and remote applications. The CR1 utilizes the off the grid lighting solution with low maintenance and energy savings. State-of-the art LEDs provide better uniformity and eliminate hot spots.

WATTAGE: 35W-50W-69W
DISTRIBUTIONS: Type II,III,IV,V
COLORS: bronze, grey



RM LED 12V DC

The Hubbell Outdoor LED Roadway 12V DC meets RP-8 2007 guidelines for local applications while utilizing LED advantages of better uniformity and eliminating hot spots. This off the grid lighting solution provides low maintenance and energy savings with long life LEDs.

WATTAGE: 35W-50W-69W
DISTRIBUTIONS: Type II,III,IV,V
COLORS: grey



Laramie LFS 12V DC

The Hubbell Outdoor Laramie LFS LED 12V DC available in narrow, medium or wide flood lighting applications.

WATTAGE: 13.5W
DISTRIBUTIONS: NEMA 1x1,4x4,6x6
COLORS: bronze, black, grey, white, platinum silver



SPAULDING LIGHTING



Outdoor Lighting



LAREDO LCC 12V DC

The Hubbell Outdoor Laredo LCC 12V DC wallpack fixture utilizes lensed LEDs for maximum performance and spacing.

WATTAGE: 12.8W
DISTRIBUTIONS: symmetric
COLORS: bronze, black, grey,
white, platinum silver



EUROLUXE® 12V DC

The Hubbell Outdoor Euroluxe® 12V DC wall/ceiling mount fixture utilizes energy saving LEDs and improved uniformity.

WATTAGE: 15 W
DISTRIBUTIONS: symmetric
COLORS: bronze & white



TEMPE LED BOLLARDS

The stylish Spaulding Lighting Tempe LED Bollards available in round or square styles, featuring distinct cast aluminum ribbed design tops.

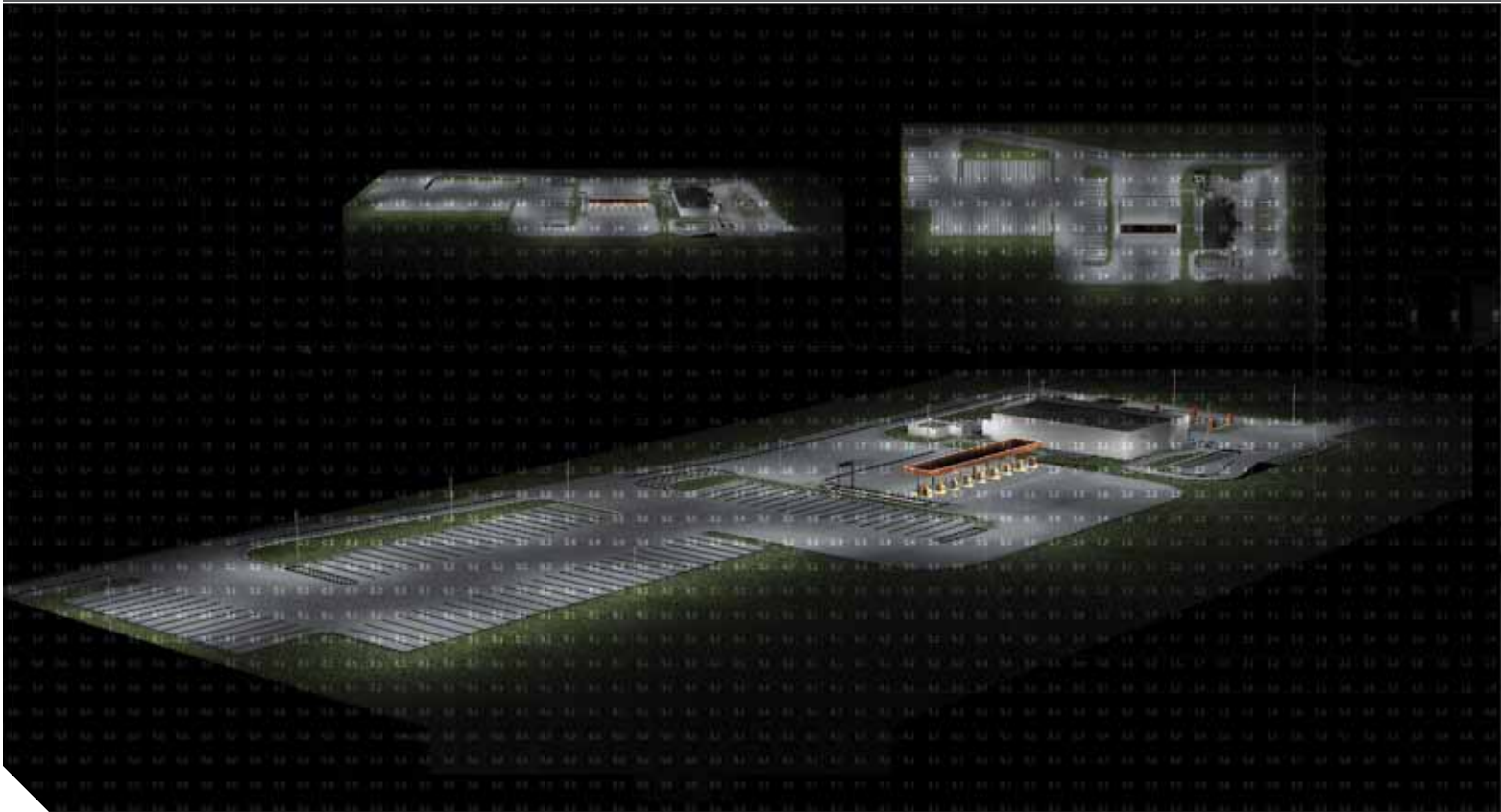
WATTAGE: 31W-62W
DISTRIBUTIONS: symmetric & asymmetric
COLORS: bronze, black, grey,
white, platinum silver



CALCULATE
light
levels



CALCULATE




Calculate the Right Light.

You can't know how much solar energy your Hubbell Lighting LED luminaires will require until you calculate how much light you actually need for visibility and security. When you're ready to take this step, Hubbell Lighting and our partners will help you conduct a point-by-point photometric calculation to determine the number of luminaires and their relative wattage.



Power Up.

After your light requirements are determined, calculating the power necessary is the next step. Hubbell Lighting and SEPCO offer one of the most comprehensive selections of solar electric power assemblies (SEPA) to meet the needs your unique site conditions present. Battery storage and power production are modifications easily made per application.



SELECT
power
assembly



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 industry. While our roots date back to 1979, we have been exclusively manufacturing commercial solar lighting and off-grid solar power systems under the SEPCO name since 1994. Our products offer the perfect solution for applications where the power grid is either unobtainable or cost prohibitive. We provide experience with quality, stand behind our products, and take pride in our work. Our team makes it possible to take a project from concept to reality.

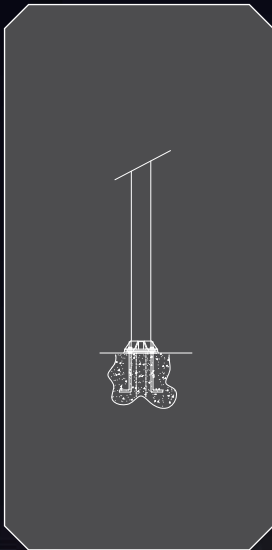
Recognized as the leading industrial solar lighting company in the world, our specialized products are uniquely tailored to meet the needs of today's industry. SEPCO provides unmatched industry experience, technology, and customer service. Our number one priority is to understand the unique goals and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

Power Assembly	System Wattage	Number of Panels	Panel Wattage	Full Sun Charge Current	No. of Batteries	Battery Storage	Daily Production (Winter/5 hours)
SEPA10	10W	1	10W	0.6 Amps	1	36 A.H.	3 A.H.
SEPA20	20W	1	20W	1.2 Amps	1	36 A.H.	6 A.H.
SEPA30	30W	1	30W	1.8 Amps	1	36 A.H.	9 A.H.
SEPA50	50W	1	50W	2.9 Amps	1	82 A.H.	14.5 A.H.
SEPA85	85W	1	85W	4.8 Amps	1	82 A.H.	24 A.H.
SEPA125	125W	1	125W	7.3 Amps	1	112 A.H.	36.5 A.H.
SEPA170	170W	1	170W	9.6 Amps	2	164 A.H.	48 A.H.
SEPA225	225W	1	225W	13.2 Amps	2	224 A.H.	66 A.H.
SEPA255	255w	1	255W	14.4 Amps	2	224 A.H.	72 A.H.
SEPA300	300W	1	300W	17.6 Amps	2	224 A.H.	88 A.H.
SEPA340	340W	1	340W	19.2 Amps	2	224 A.H.	96 A.H.

SELECT
mounting
configuration

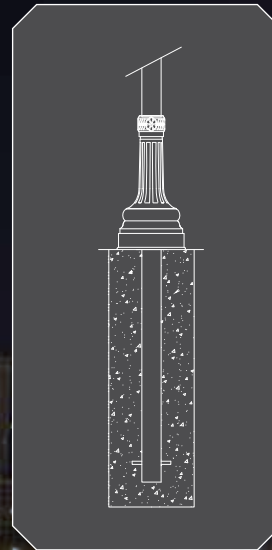


INSTALL



ANCHOR BASE

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



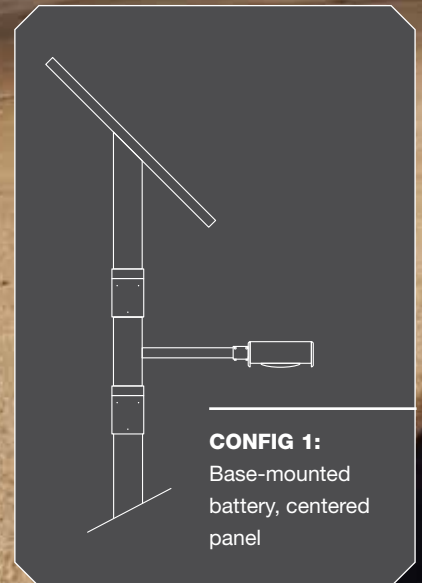
DIRECT BURIAL

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.

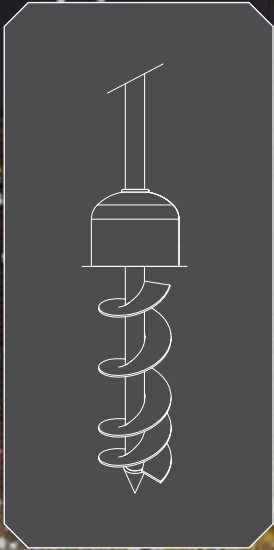
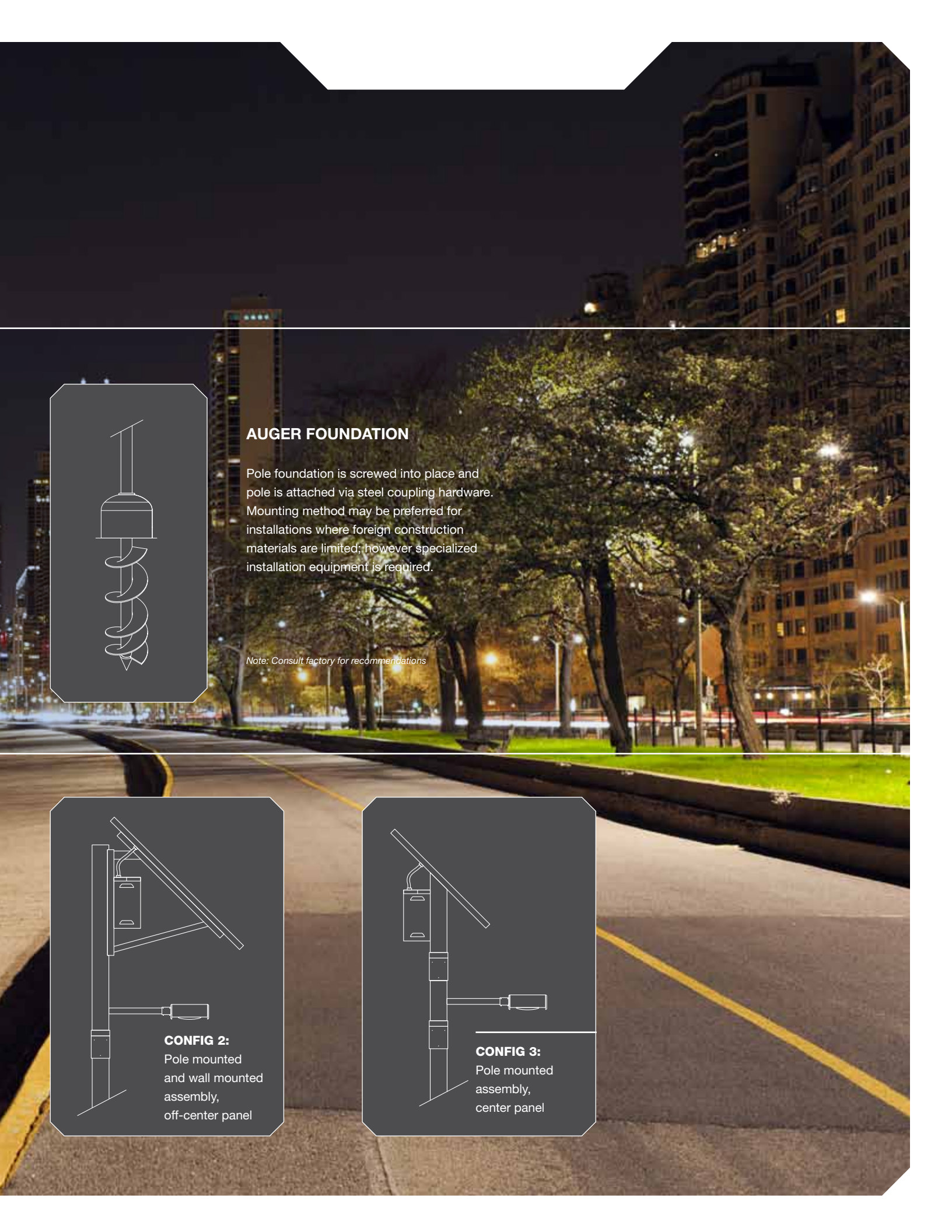
SOLAR POWER ASSEMBLY

Several Solar Electric Power Assembly (SEPA) mounting methods are available. The adjacent illustrations represent the most common arrangements, other configurations are available to meet on-site performance and aesthetic requirements.

Note: Location and tilt of battery/control box and panel is for illustration purposes only. Actual site conditions will determine tilt, rotation and battery/control box location. Consult factory for recommendations



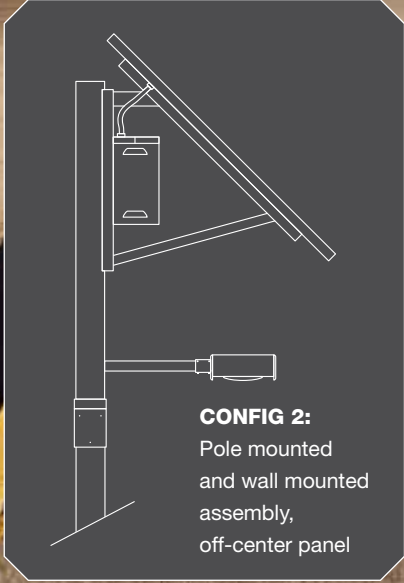
CONFIG 1:
Base-mounted
battery, centered
panel



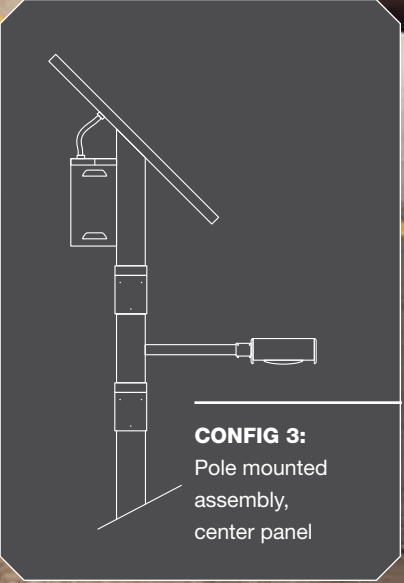
AUGER FOUNDATION

Pole foundation is screwed into place and pole is attached via steel coupling hardware. Mounting method may be preferred for installations where foreign construction materials are limited; however specialized installation equipment is required.

Note: Consult factory for recommendations



CONFIG 2:
Pole mounted and wall mounted assembly, off-center panel



CONFIG 3:
Pole mounted assembly, center panel

The Choice is Yours: Security, Savings and Sustainability.

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



Security

Protecting property, people and assets is the job of exterior lighting. Solar LED lighting from Hubbell Lighting not only offers better visibility and wards 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 a 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.



Sustainability

There is no 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 lighting to fragile environments a lot less hassle and harm. Hubbell Lighting and SEPCO encourage good stewardship and feel privileged to offer solutions to help.

Economical

Hubbell Lighting wants 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.



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Greenville, SC 29607
Telephone (864) 678-1000

www.hubbellighting.com

GSA Schedule: GS-07F-0072Y
• FSC 56 Building Materials

NAICS Codes:

- 335122
- 335110
- 335129

Duns #: 804538817
Cage Code: 67xG9
Federal Tax ID: 06-1123319
CCR Registered
ORCA Registered



1521 SE Palm Court
Stuart, FL 34994
Telephone (772) 220-6615

<http://www.sepco-solarlighting.com>

GSA Schedule: GS-07F-0288M
• FSC 62II

NAICS Codes:

- 335122 • 221114 • 335121 • 423690
- 335129 • 423610 • 334413 • 335999
- 221119 • 238210 • 237130

Duns #: 01-967-5672
Cage Code: 1vyp0
Federal Tax ID: 65-0472624
CCR Registered
ORCA Registered