

S O L A R

Application Guide

selux

History of Selux

Since 1983, Selux US has made its home in the Hudson Valley Region of New York State. Here we manufacture and distribute interior and exterior lighting fixtures for projects throughout North America. Like many of the Selux GmbH subsidiaries, Selux US is an independent profit center with local management accountable for all US operations. This management approach allows us the independence to focus on the unique demands of our specific markets with a competitive entrepreneurial spirit. While we work closely with our International colleagues, products are selected,



- Solar R&D began in 2003 at Highland, NY facility
- Partnered with the Lighting Research Center (performance review)

engineered and manufactured to meet the demands of North American lighting and building requirements. Our market philosophy enables the Architectural Designer to select from a catalog of standards as well as work with our team of local engineers and lighting application professionals to establish their own unique design solution. Selux is the place to find original designs, manufactured from quality materials, produced at a competitive price.



- Focused on the high end market with better aesthetics and quality luminaires
- Manufacturer of Solar Lighting now for more than 15 years
- 2022 added Hei solar products to the offering



Global attention to climate change and environmental disasters has intensified the spotlight on environmentally conscious design and renewable energies.

Solar power systems derive clean, pure energy from the sun. Installing solar helps combat greenhouse gas emissions and reduces our collective dependence on fossil fuels. Traditional electricity is sourced from fossil fuels such as coal and natural gas. Renewable energy also improves public health. Solar lighting is a green alternative to traditional lighting using no power at all from the grid. This means that they don't rely on the grid to ensure proper operation, ensuring plenty of light during brown or blackouts. They also use one of the world's leading renewable energy technologies.

Global attention to climate change and environmental disasters, such as "The Gulf Oil Spill," has intensified the spotlight on environmentally conscious design and the use of renewable energies. According to the US Department of Energy (DOE), residential and commercial buildings consume more than one third of the energy used in the United States each year. Lighting for commercial buildings accounts for 25 percent of this energy usage. LEED, ASHRAE/IESNA 90.1 and California Title 24 have helped drive design professionals to respond with innovative solutions to achieve their design intent. Manufacturers are challenged with providing energy-efficient and environmentally friend-

ly products to meet market demands while evaluating their own carbon footprint in the process.

Hurricanes like Hurricane Maria that devastated Puerto Rico and efforts to bring back the island to normalcy had been stalled. About five percent of the population was without power, a condition that is not only frustrating to those existing in the darkness, but also a potential danger. Lives depend upon having medical equipment working, food refrigeration systems need to be in place to avoid spoilage, and rescue teams need lighting, to name a few key power needs. And while food and water can be shipped in, power must be repaired, which can take days, weeks or—in the case of Puerto Rico—even months.

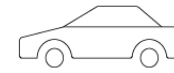
Most natural disasters knock out power for some period of time. And while rapid recovery of the grid is ideal, there's another solution to this problem: solar power.

Independent of the Power Grid

Simply put, solar luminaires generate their own energy in an environmentally friendly way - independent of existing power grids. They operate completely self-sufficient: electricity and trenching costs are eliminated and installation is quick and hassle-free for the surrounding area.



Possible Applications Include:



Roadway



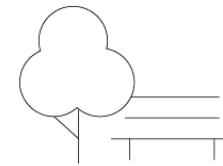
Bike paths



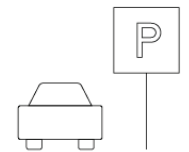
Hiking trails



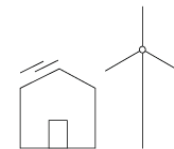
Ecological areas



Parks and gardens



Parking lots and stations



CO2 neutral communities

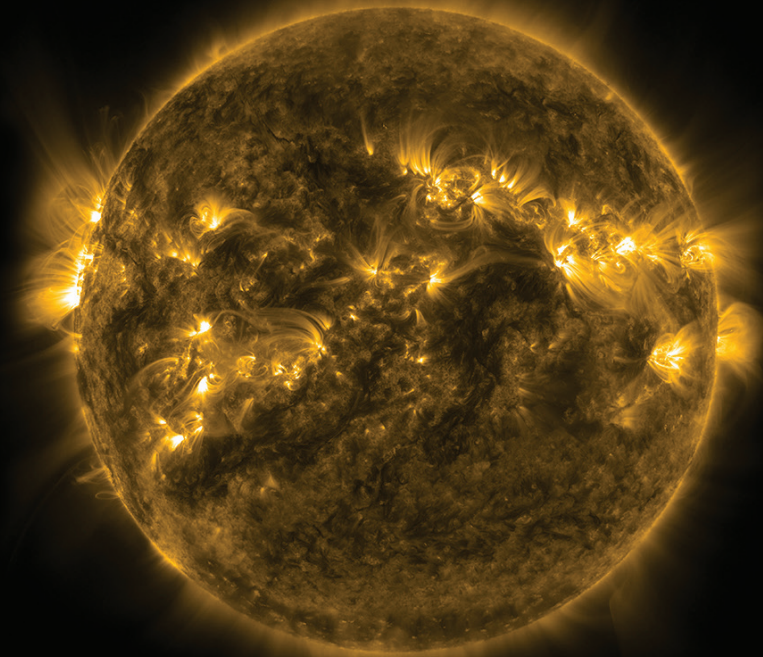


Temporary use

Energy source

The sun is the most important energy source for all life on earth

Sunlight heats up the atmosphere, it enables algae and plants to photosynthesize, it drives the water cycle, weather, and winds. In just a few minutes, the sun transfers as much energy to the earth as all humanity uses in a whole year.



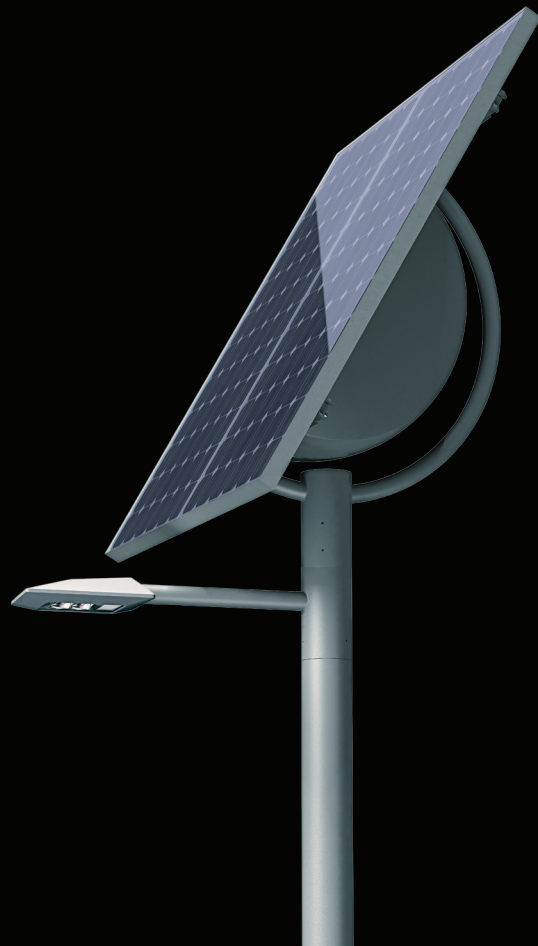
Emission-free electricity from sunlight

The conversion of sunlight into electrical energy through photovoltaics is becoming increasingly important. Solar electricity is not only sustainable from an ecological point of view, but is now also economical.

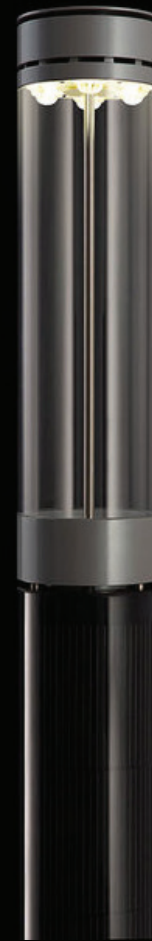


Various solar options to choose from

Flat Panel Fixed Output



Power Tube Variable Output



Determining the appropriate system type for your project may depend on many factors.



Flat Panel Fixed Output

- Fixed output systems provide consistent lumen output when light levels must be maintained at all times.
- Classic style flat photovoltaic panel maximizes power production when orientated and tilted toward the sun.
- Traditional AGM (Absorbed Glass Matte) Deep Cycle batteries with standard case sizes are easy to replace.
- All major components located on top of pole are hidden behind decorative ABS enclosure and provide protection from theft and flooding.



Power Tube Variable Output

- Variable output systems can be more efficient by trimming output during critical operating times.
- Patented by Hei Technology - The integrated photovoltaic power tube is direction independent and most visually pleasing.
- Lithium Ion LiFePO batteries mount inside pole and provide maximum service life.
- Major components integrated within pole for convenience and minimalistic appearance.

hei by Selux



A N A
T A R

L U K
I D A

Hei produces ecological, economical, and socially sustainable outdoor lighting solutions, to minimize environmental impact.

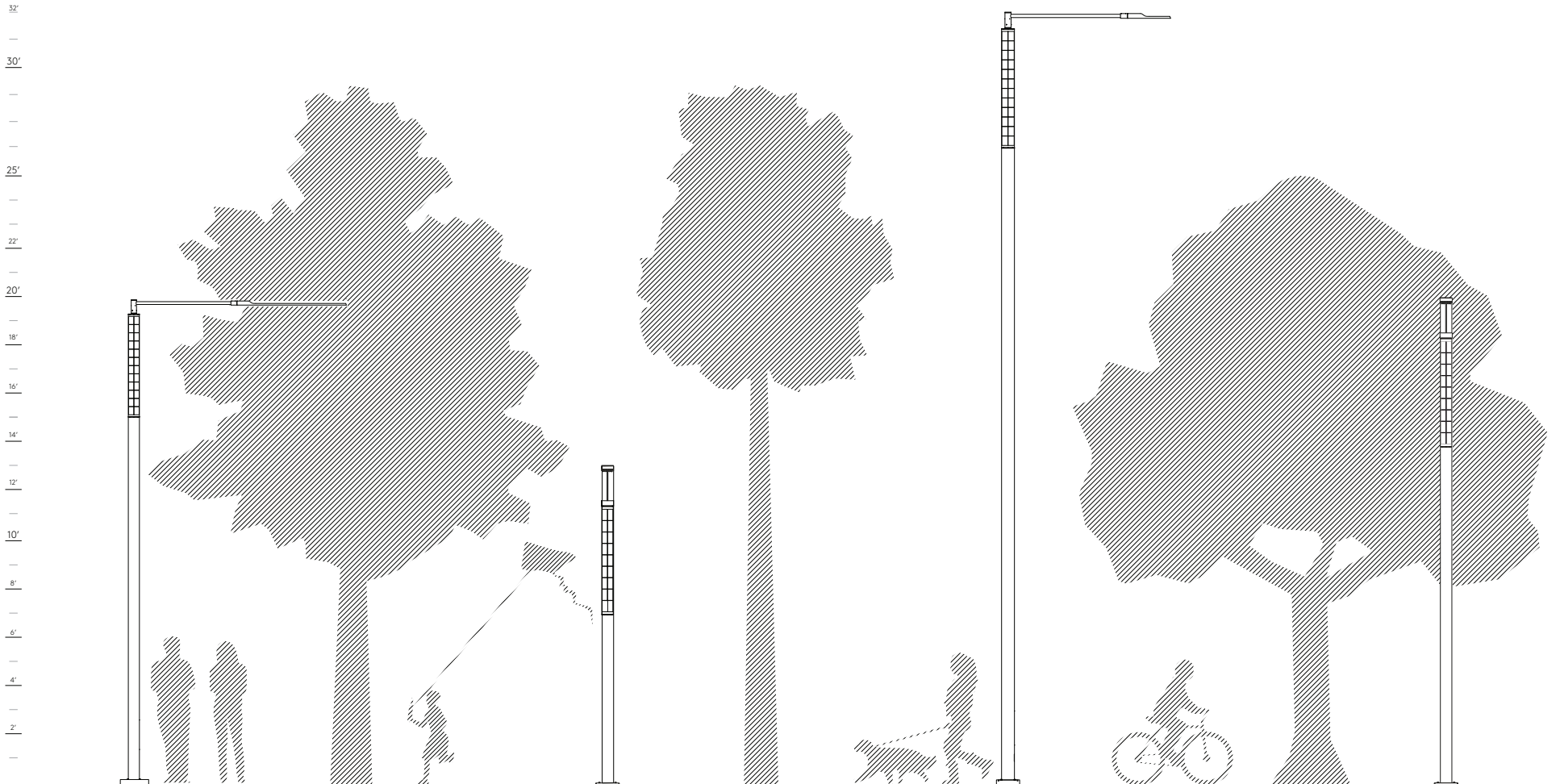
Hei by Selux is a highly efficient solar lighting option with a contemporary aesthetic. Hei produces ecological, economical and socially sustainable outdoor lighting solutions, to minimize environmental impact. Reliability of the energy-harvesting technology is key for any cable-free product. The unique and patented technology of vertical cylindrical photovoltaics - Hei power tube - has been field tested in numerous projects worldwide. The smooth glass ensures that sand or dirt particles cannot be deposited on the surface, removing the need of costly cleaning and

maintenance. All the essential parts of the Hei system are combined into a single unit. Through innovation, Hei brings you solar lighting in the sleekest way possible.

Hei power tube technology yields solar irradiance from all directions. The custom optics in combination with smart electronic controls ensure that the solar energy is used in an efficient way - while directing light only where required.

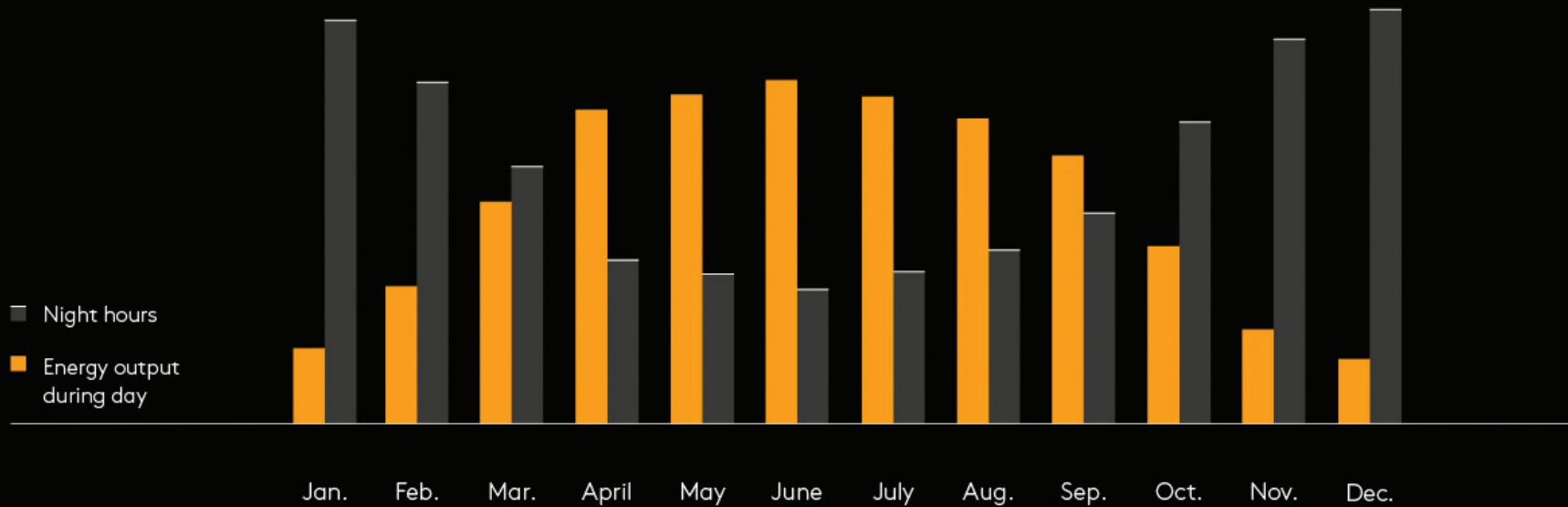
Advantages of using Hei solar lighting

- Solar solution without visual clutter
 - Lithium batteries extend service life
 - Not orientation specific
 - Monocrystalline solar cells
 - Taller mounting height options
 - Less EPA for high wind zone areas
 - Extended arms and column options
 - Hybrid (solar and line voltage) systems possible
- *consult factory



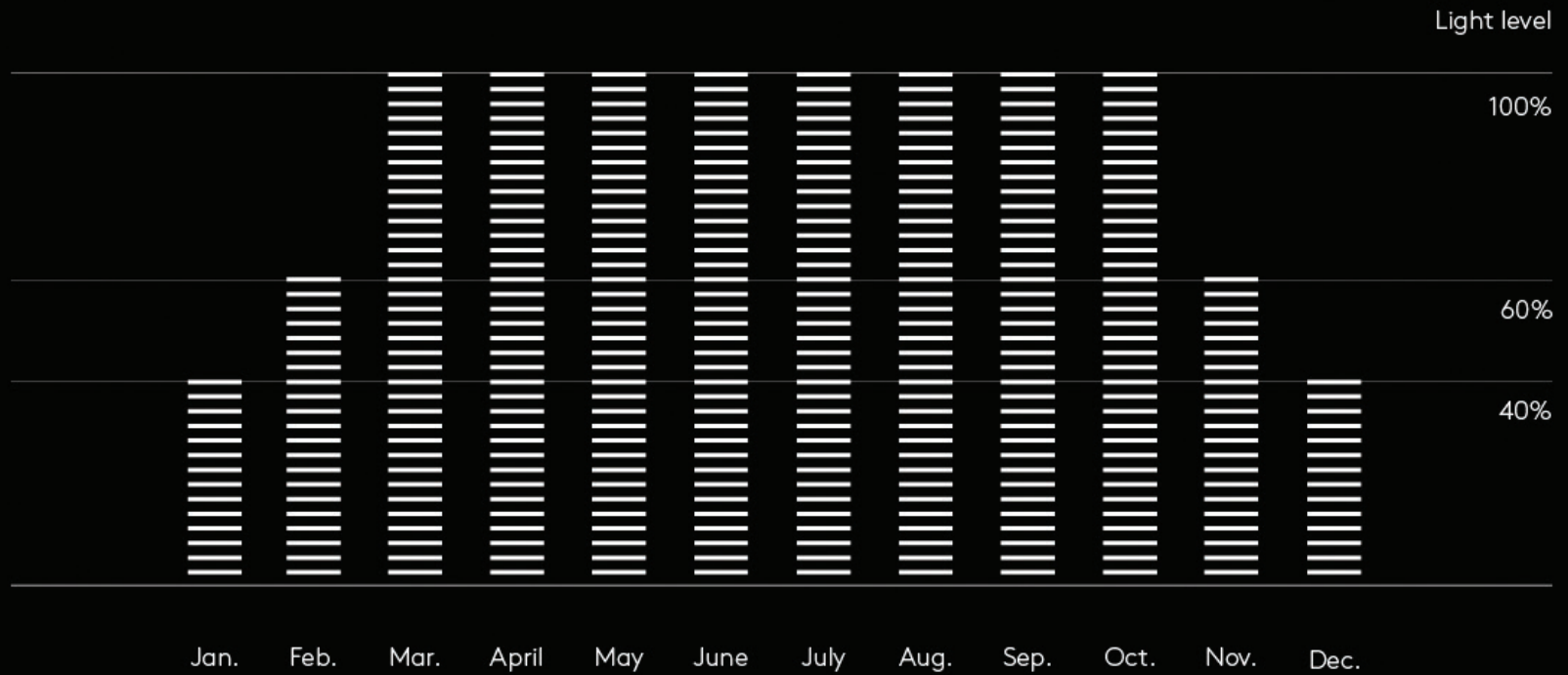
The Challenge: unevenly distributed solar energy output

The uneven distribution of the solar energy output over the course of the year is a challenge - with the maximum in summer and the minimum in winter.



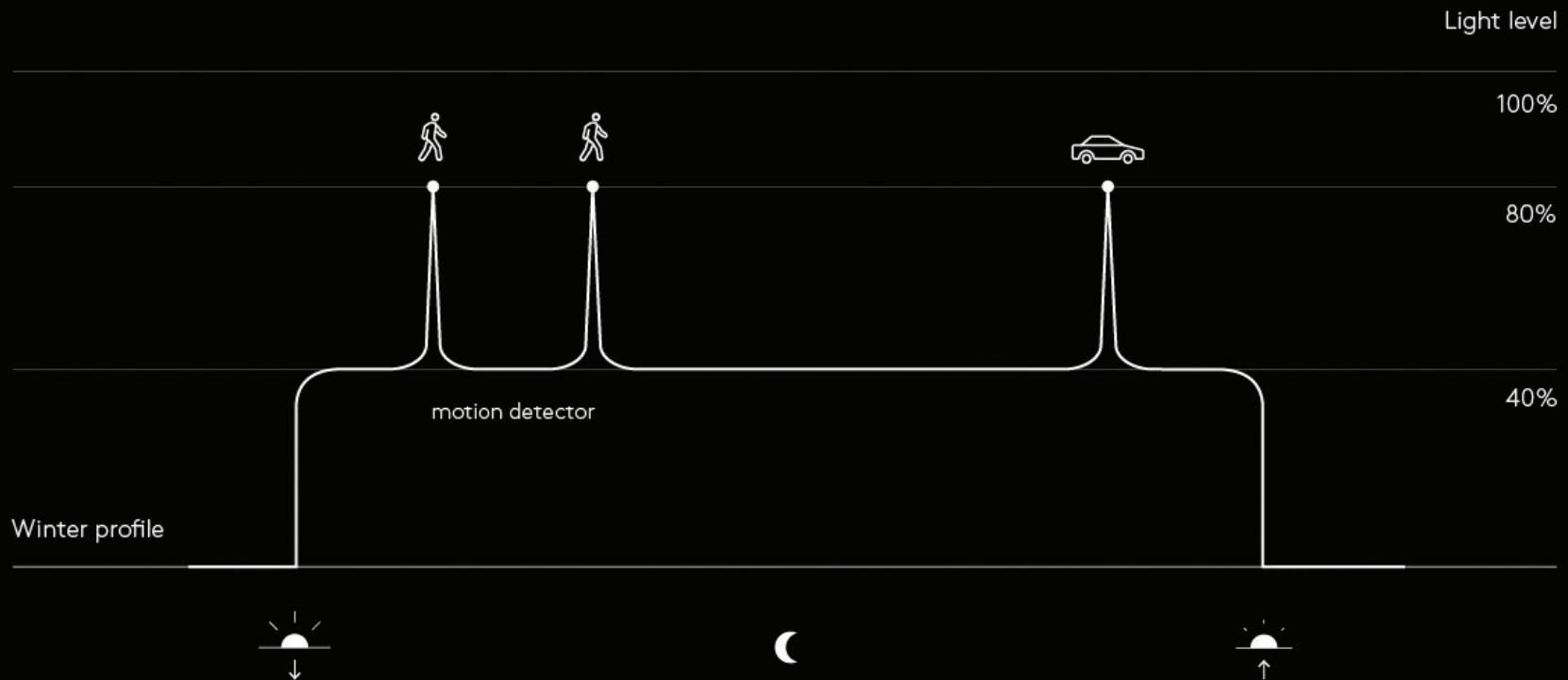
The Solution: variable output systems

Hei products have an intelligent control system for the lighting and the batteries. In the critical months, the microcontroller's algorithm ensures optimum energy management. The light level is dimmed, but never switched off.



The Solution: Advanced control

Optional motion sensors detect pedestrians, cyclists, cars, and other road users to ensure that light levels increase as required. Customizable operating profiles allow you to utilize stored energy as intelligently as possible.





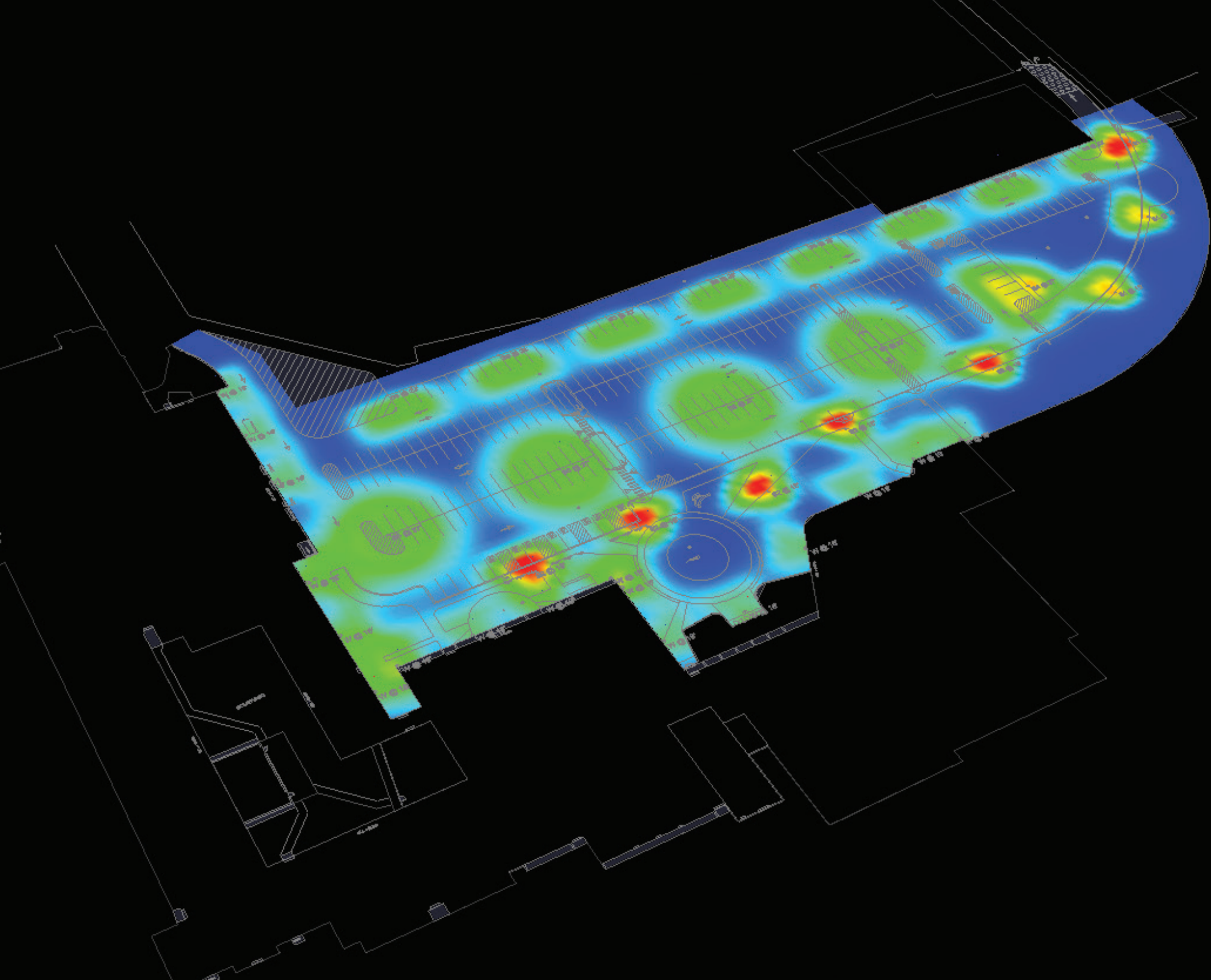
Lighting Calculations and Photometric Studies

supported by Selux

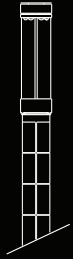
Get started working with Selux for a professional solar lighting design study. During the specification process for solar luminaires, the Selux Lighting Solution Team supports design professionals to come up with the most economical lighting layout while ensuring required light levels are met. The luminaire controls operation and the

projects physical location is all taken into consideration when evaluating each solar project.

Ask Selux for a conceptual design and specification for your unique requirement.



Lukida



Product Specifications

Series	Lukida 4000
Mounting:	Column
CCT:	3000K; 4000K
Distributions:	Asymmetric Street; Asymmetric Street with Pathway; Symmetric; Symmetric Long
Power Tube:	1016 (P100-160), 2016 (P200-160)
Batteries:	2P or 3P Lithium Batteries in pole
Pole Height:	4 meter; 5 meter; 6 meter; 8 meter; 10 meter



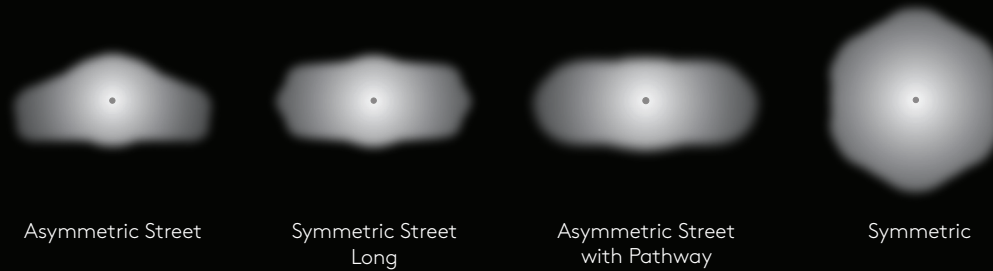
hei by Selux

Lukida is an aesthetically designed solar light column with integrated photovoltaics

With a choice of light distribution options, lumen packages, and heights, it is suitable for public and private lighting applications such as gardens, parks, promenades, and side streets. The cylindrical shape of the solar module enables installation regardless of orientation and

complements the organic look of the luminaire. With its precise optics, the Lukida does not emit disruptive scattered light, thus protecting the night sky from pollution.

Standard Distributions



Asymmetric Street

Symmetric Street
Long

Asymmetric Street
with Pathway

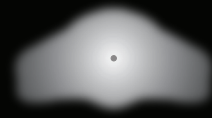
Symmetric

Anatar consists of two sizes of self-sufficient and maintenance free solar lights

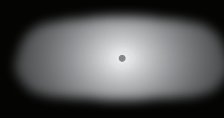
Anatar consists of two versions of self-sufficient and maintenance-free solar light poles that cover diverse applications in the technical exterior lighting of pathways or roadways. The luminaire is offered with multiple arm length versions. With an impressive efficacy and light

distribution, Anatar is the right choice for environmentally friendly street lighting - minimal environmental impact and maximum cost savings. Anatar precision optics protect the night sky and neighboring properties from light pollution.

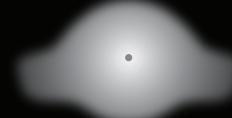
Standard Distributions



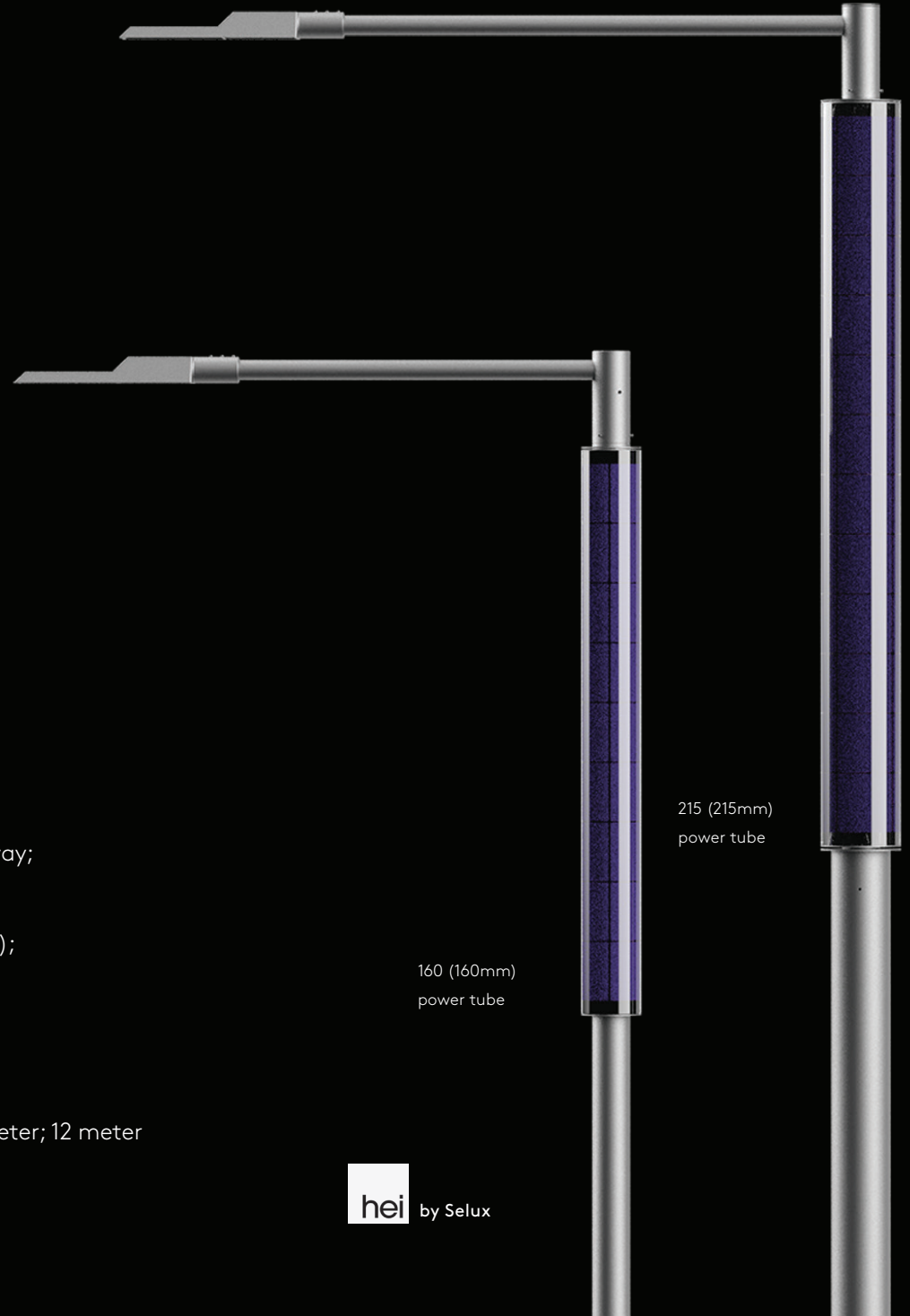
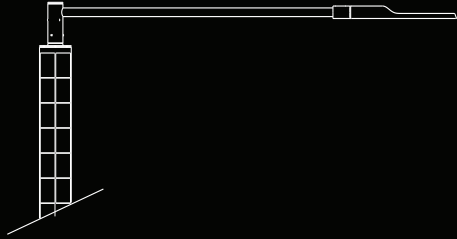
Asymmetric Street



Asymmetric Street
with Pathway



Asymmetric Street
Wide with Pathway



Product Specifications

Series	Anatar 4000 and 8000
Mounting:	Pole Top
CCT:	3000K; 4000K
Distributions:	Asymmetric Street; Asymmetric Street with Pathway; Asymmetric Wide with Pathway
Power Tube:	1016 (P100-160), 2016 (P200-160), 2021 (P200-215); 4021 (P400-215)
Batteries:	2P or 3P Lithium Batteries in pole
Arm Bracket:	0.5 meter; 1 meter; 1.5 meter
Pole Height:	4 meter; 5 meter; 6 meter; 7 meter; 8 meter; 10 meter; 12 meter
Options:	Motion Sensor

160 (160mm)
power tube

215 (215mm)
power tube



Solar Power Tube Construction

High efficiency silicone solar cells

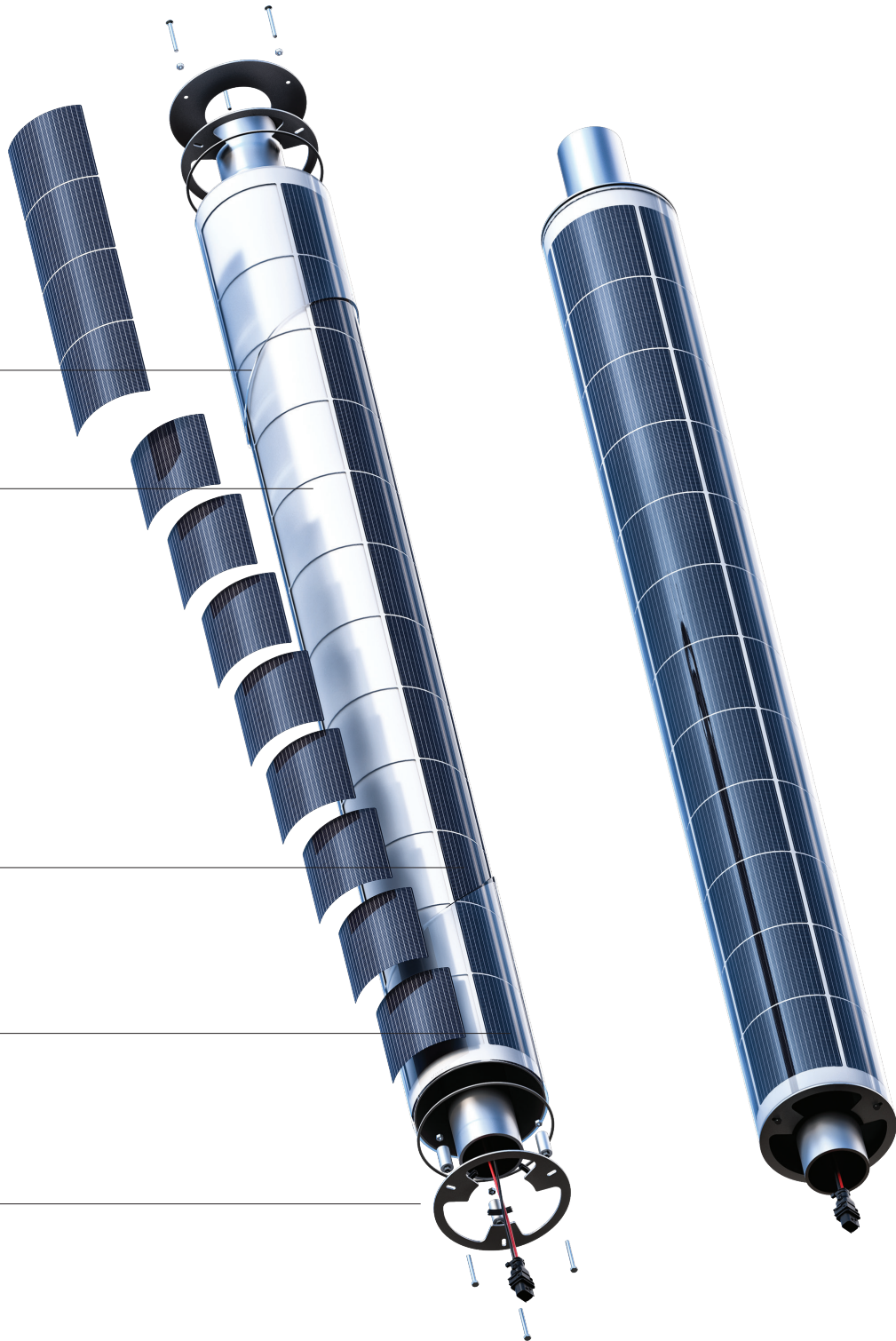
Borosilicate glass tube

Backsheet

Backlighting

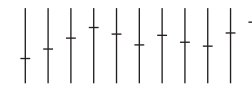
Low Maintenance

Plug & Play Technology



The Microcontroller

The microcontroller integrated in the pole is the centerpiece of the system. It connects the luminaire, solar module, and battery - controlling the battery's charging processes and optimizing the luminaire's energy consumption with intelligent dimming profiles. This ensures that the stored energy is used in the best possible way to enable reliable operation throughout the night.



Light Level Control



Motion Detection



Battery and loading management



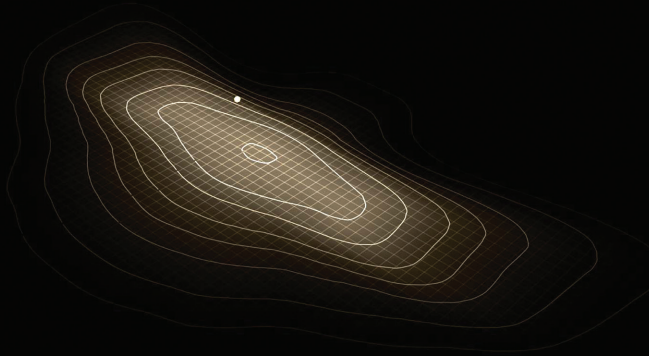
PARKING

EXIT

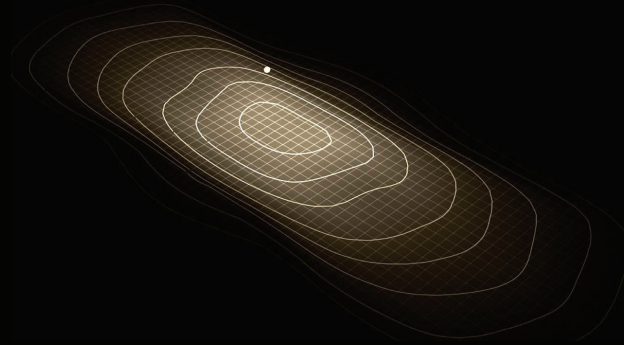


Anatar 4000 / 8000

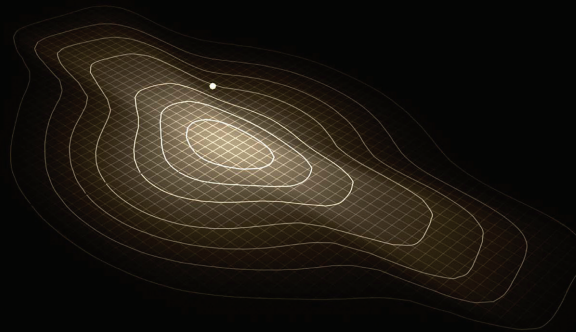
Asymmetric Street



Asymmetric Street with Pathway



Asymmetric Wide with Pathway



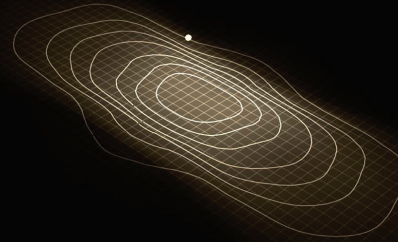


Lukida 4000

Asymmetric Street



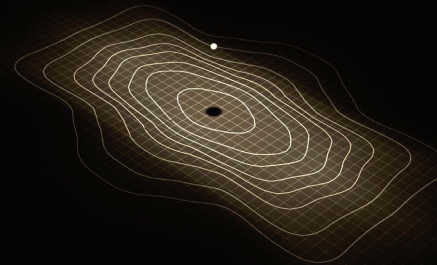
Asymmetric Street with Pathway



Symmetric



Symmetric Long



Application Example - Hiking Path and Parking Lot

Solar luminaires can be used to easily and cost-effectively provide light to spaces such as national parks, parking lots, and footpaths without having to install complex electrical systems. This increases the sense of security

and attractiveness to these environments. Control and sensor technology make it possible to only switch light on completely when it is really needed.





Application Example - Cycling Path

More and more people commute to work by bike. This is good for health and eases the impact on the environment. With the emergence of e-bikes, longer and longer distances are being traveled by bike. Illuminated cycle paths increase

road users' safety. However, these routes are frequently not located near a power grid so solar lighting is the solution that is more cost-effective and quicker to implement.

Selux Solar
Flat Panel Systems



D I S
C E R A



O L I
V I O



A V A
N Z A

Solar lighting provides an alternative power source for rural regions and keeps the environment clean and green

The same good lighting practices used in conventional lighting projects apply to solar lighting projects. Selux delivers a diverse range of architectural luminaires that meet these requirements. Solar lighting is not a new technology but recent advancements in componentry have increased flexibility, performance and dependability. Selux solar lighting provides the most advanced optical designs for visually pleasing lighting solutions up to 6,000+ lumens. Advanced energy management controls enable dimming, custom operating profiles, maximum power-point tracking, and

wireless programming/diagnostics. Absorbed Glass Matt battery technology provides better cold weather performance and large battery capacity makes the system more appropriate for cloudy regions. Whether you are pursuing LEED points, have no electricity on site, or are simply benefiting from reduced installation costs, there are many reasons to consider solar lighting.



Selux Facility

Recycling

- 80% of the water used by the factory processes is recycled
- Luminaires for specific uses
- Spot lighting, max spacing, max control
- Fixed output for strict lighting Programmable profiles requirements
- 100% of our cardboard/paper waste is recycled or reused

Facilities

- Geothermal heating and cooling throughout Innovation Center
- 50% of office power is generated through renewable energy like solar panels on the factory roof
- Extensive use of daylight for natural lighting in all work areas
- Newly-expanded employee parking lot illuminated with solar powered luminaires
- 8 electric vehicle charging stations for employees and guests
- Use of Lean manufacturing methods to reduce usage of raw materials
- Tiger Drylac certified powder coat facility - utilizes a process that reuses up to 98% of all paint powder
- Eliminated all CFC emissions in paint facility
- Biodegradable liquids are used throughout factory

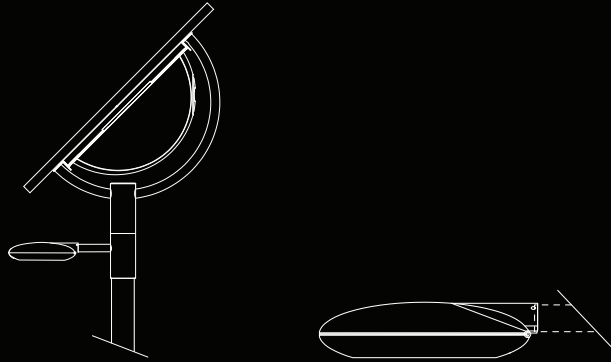




Advantages of using Selux flat panel solar lighting

- Luminaires for specific uses
- Spot lighting, max spacing, max control
- Fixed output for strict lighting requirements
- Programmable profiles
- Components protected and hidden on top of pole
- Remote control interface
- Luminaire and PV rotate independently
- Simple design is easily serviceable





Product Specifications

Series	Discera 4 LED Solar
Mounting:	Pole top
CCT:	2700K; 3000K; 4000K
Distributions:	Type I, Type II, Type III, Type III wide; Type IV; Type V
Luminous flux:	6,000+ lumens
Light Source:	GEN5 LED
Height:	12ft - 18ft
Options:	Motion Sensor; Single or double luminaire; special finishes



Ultimate control of uplight and backlight

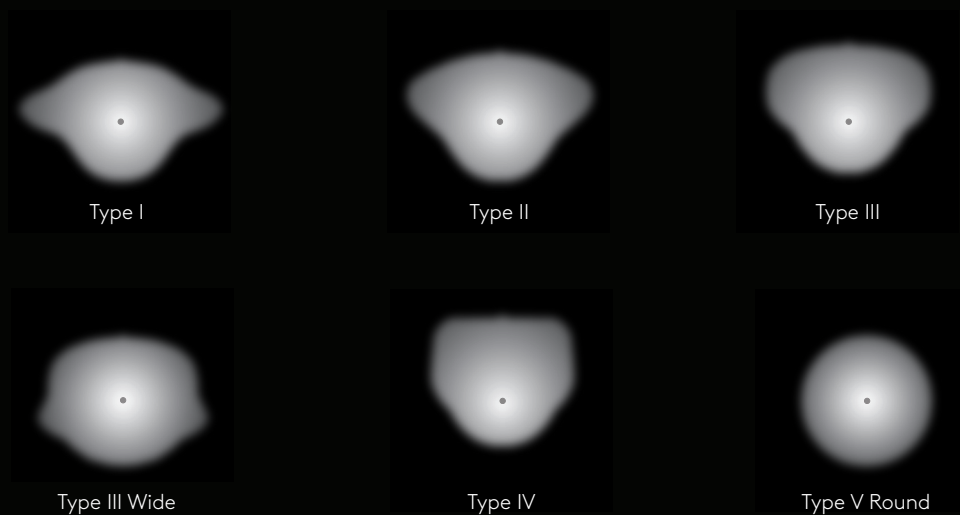
Discera 4 Solar is a sleek LED fixture perfect for any designer needing improved visual guidance and precise placement of light. Discera allows you to put the light where it is needed while maintaining a contemporary and modern aesthetic.

The design of intimate spaces with high pedestrian traffic requires a different lighting approach compared to the typical roadway and parking lot

projects. The recessed optics in the Discera shield the light source for more comfortable viewing. Having the choice of distribution and output level allows the luminaire to be applied in a very tailored way.

Discrete house side shield further controls backlight to address light trespass concerns.

Standard Distributions



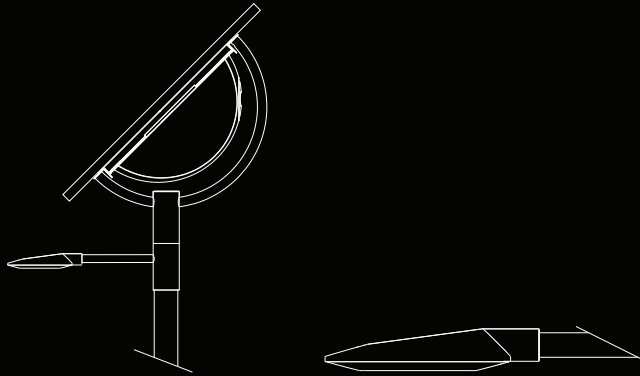
Creating functional lighting distributions that exceed industry standards

Avanza 450 Solar creates functional lighting distributions that exceed industry standards, allow for maximum pole spacing, and consume minimal energy—reducing carbon emissions. Highly efficient

with low glare at critical viewing angles is achieved through direct and reflected light. LED clusters are aligned in the direction of the main light. This cross beam technology is specific to Avanza.

Standard Distributions

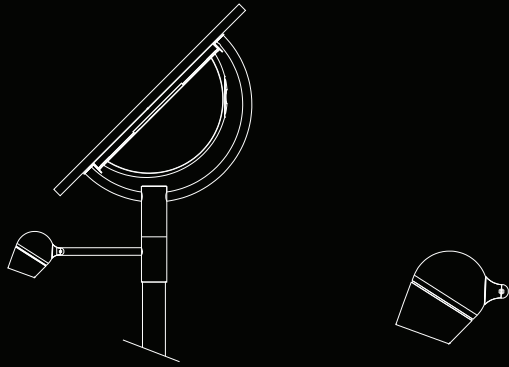




Product Specifications

Series	Avanza 450 Solar
Mounting:	Pole top
CCT:	3000K; 4000K
Distributions:	Type III Narrow or Wide, Type V
Light Source:	Cross Beam Technology
Luminous flux:	5,000+ lumens
Height:	10ft - 18ft
Options:	Motion Sensor; single or double luminaire; special finishes





Product Specifications

Series	Olivio Medio Solar
Mounting:	Tilt/swivel range is 0° through 73°; 360° rotation depending on tilt angle
CCT:	3000K; 4000K
Distributions:	Spot; Medium; Wide; Asymmetric; Spread lens
Luminous flux:	Up to 5,000+ lumens
Light Source:	Recessed COB LED
Height:	12ft - 18ft
Options:	Motion Sensor; Ring or Honeycomb louver; Colored or Spread Lenses

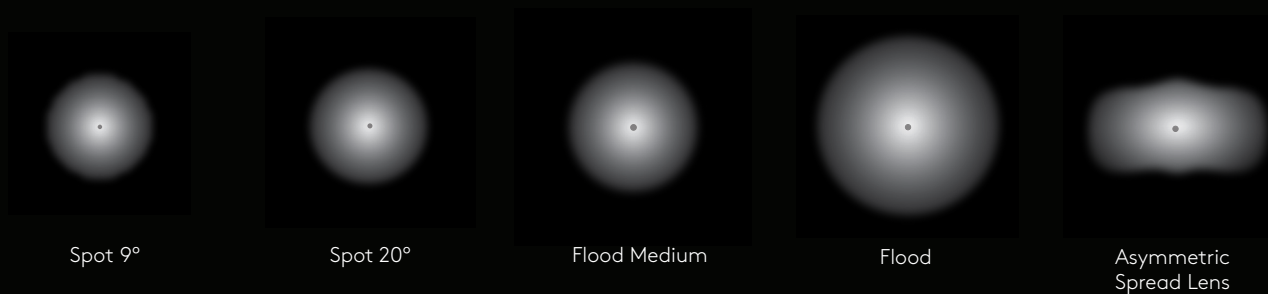


Use spot or accent lighting for monuments, signs, facades, and areas of interest

Olivio Medio Solar can be positioned in almost any direction. You can tilt and swivel the luminaire head to illuminate where you want the light

directed. Ideal for accent lighting. The beam is consistent and uniform. The recessed COB LED is well shielded providing a glare free appearance.

Standard Distributions



Selux Controls

All electrical components including Solar Controller, LED Driver and Overcurrent Protection are centrally located in the modular Selux Control Box. With plug and play connectivity the Selux Control Box can be quickly and easily installed or replaced.

Inside the Selux Control Box is a sophisticated Solar Controller to manage the energy balance between PV

Panels, Batteries and luminaire. A programmable LED driver typically located inside the luminaire is now located with all other critical control components inside the Selux Control Box. Benefits include easy access, focused trouble shooting and close proximity to overcurrent protection devices.

Selux flat panel system

Frame

Decorative Cover

Control Panel

Batteries in Battery Tray



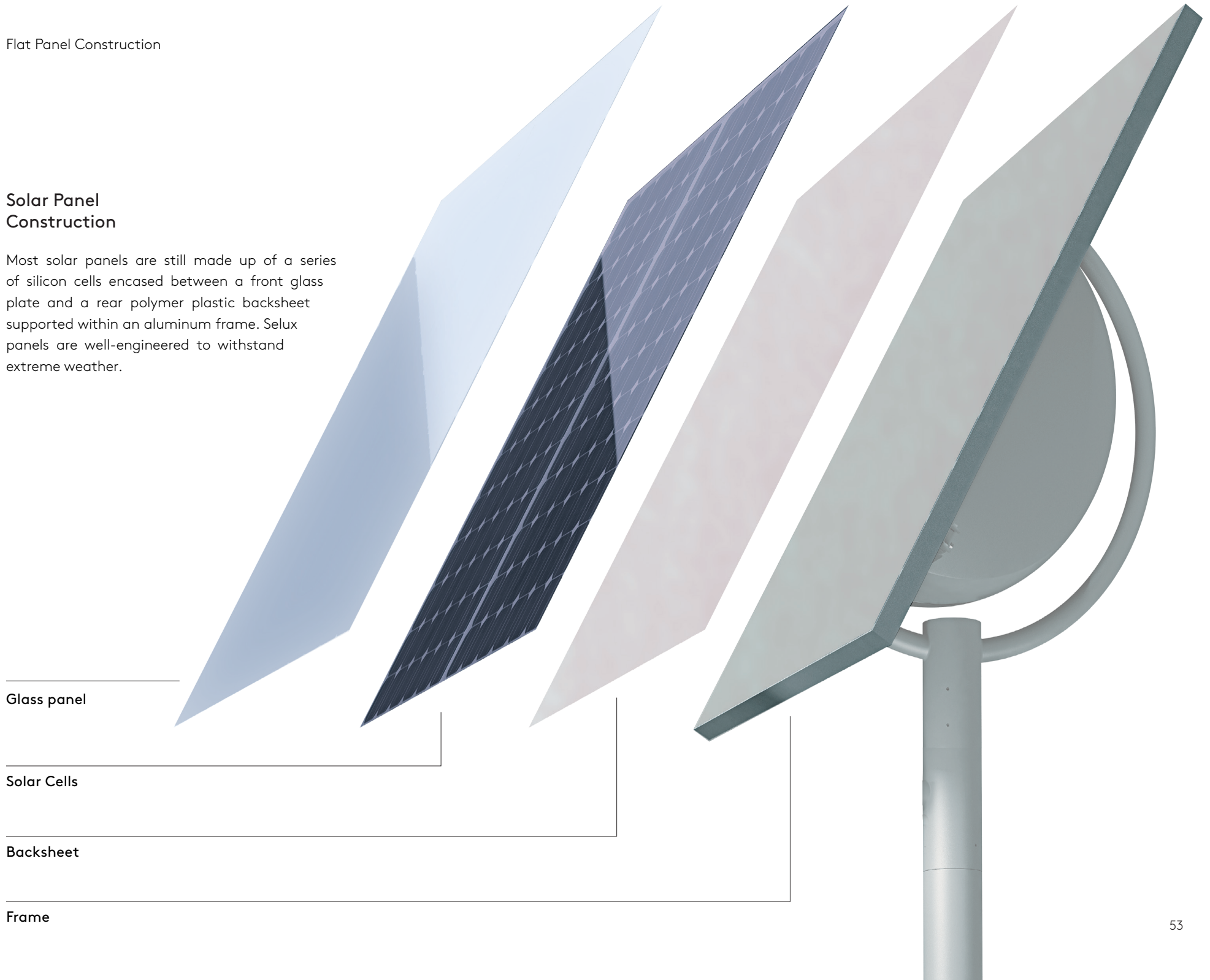
About Solar Panel Construction

Sealed into ethylene vinyl acetate, they are put into a frame that is sealed with silicon glue and covered with a Mylar back on the backside and a glass plate on the front side. This is the lamination process and is an important step in the solar manufacturing process. With no moving parts, photovoltaic panels have a long service life. Typically 20+ years until output is reduced below 80% of spec power.

Flat Panel Construction

Solar Panel Construction

Most solar panels are still made up of a series of silicon cells encased between a front glass plate and a rear polymer plastic backsheet supported within an aluminum frame. Solar panels are well-engineered to withstand extreme weather.



Glass panel

Solar Cells

Backsheet

Frame



Application Example - Parks and waterfront

The Selux Discera 4 LED Solar was selected for this waterfront park application due to the excellent illumination and sustainable design. Selux Discera 4 LED Solar can withstand severe weather conditions where traditional lighting fails.

On October 29, 2012 Superstorm Sandy came ashore, sending a 14 ft. storm surge into areas of New York City. It swamped public transit, flooded lower Manhattan and took out power to much of the southern portion of the city. Sandy remains the second costliest hurricane in US history.

Pictured to the left is the East River Park in Brooklyn, New York. It is a beautiful waterfront park that encompasses seven acres along the East River and features breathtaking views of the Manhattan skyline, as well as remnants of the site's historic past as a 19th century shipping dock. It also

flooded in the storm, however it did not go dark. The 50 Selux Discera 4 LED Solar luminaires remained lit.

Discera 4 Solar provided light to even the hardest hit areas of New York in the aftermath of Superstorm Sandy. The lights and their mountings endured the high winds and illuminated the area thanks to the self-contained electrical work kept well above the rising flood waters.

Application Example - Selux Parking Lot

Selux uses Avanza 450 solar to light the entrance to it's Highland, NY facility. Half of the parking areas are also lit by solar lighting. The solar lighting has been providing reliable operation for over 8 years with the first battery replacement at 6 years. Having an on-site installation allows us to keep tabs on performance, quality, and function.

Selux welcomes you to visit our factory to view the extensive outdoor and indoor lighting collection in person. Contact your sales representative to schedule your in person experience at Selux.



Hei Metal Finishes

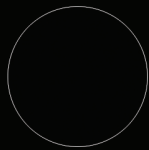


White
Aluminum (silver)

Selux Metal Finishes



White



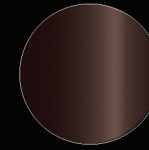
Semi-matte
Black



Black



Silver



Bronze



Custom
RAL



Motion Sensor

Allowing the light to be controlled by a motion sensor cuts down on the amount of wasted electricity. With motion sensor, the lights will only be on when someone is using the area. This makes sound economic sense, and is more environmentally friendly.



House Side Shield

Instead of the typical house side shield that obstructs the look of the luminaire as well as interrupting the flow of a lighting design, Selux has created an exclusive field-installable discrete micro house side shield that clips directly to the lens, blocking light at the source. Gen% light engines only.

General Questions

often asked



How long do the batteries last?

AGM Lead acid batteries typically last between 5-6 years. Lithium battery life can go up to 10 years.



Will solar work in cloudy or cold climates?

Solar can work almost anywhere if the system is sized correctly. Selux considers location, temperature, and historic weather data for every project.



How many days will the system last without sun?

Regardless of the system type, a minimum of 3 days battery reserve is provided.



Will solar work if the panels are getting partial shade?

Because varying degrees of shading are difficult to measure, Selux recommends only using solar when you have an unobstructed view in the direction of the sun.



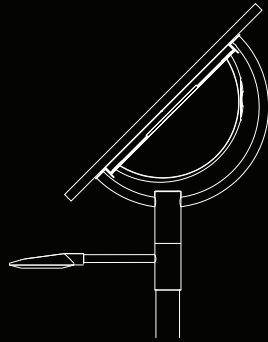
Can I meet IESNA recommended light levels for pedestrian paths and local roadways?

Yes. With the appropriate specification and layout, our systems can meet and sustain recommended light levels for these types of applications.

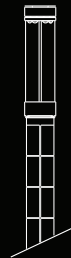


How long does it typically take to size a solar system?

Once Selux has all of the pertinent project information, it typically takes 3-5 days for flat panel systems and 2 weeks for power tube systems.



Selux Flat Panel Applications



Hei Solar Tube Applications

At time of order for the solar system, Selux will need the following in order to process the solution

- 1 Visit selux.us and click on SOLAR on homepage.
- 2 Click on the product you want. Go to specification and downloads.
- 3 Download and complete solar questionnaire.
- 4 Return completed form to Selux Technical Support at selux.technical@selux.com
- 5 Selux provides light/solar calculations.
- 6 Once approved, a specification is created.
- 7 Model numbers from specification will be used to create the official quotation.

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