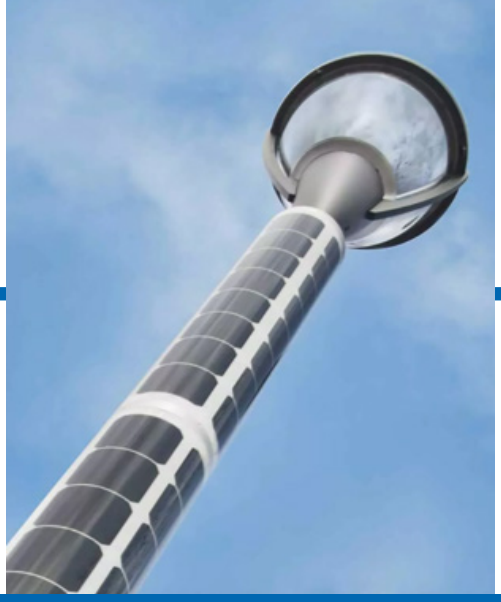
Proven Performance
hapco pole products



SOLAR POLE

Years of development and innovation have led to the most advanced solar lighting pole in the market.

- Light-years ahead in solar technology, Hapco's Solar Pole is completely off-grid and works autonomously, using sustainable solar power.
- Solar energy generated during the day is stored in high-quality lithium batteries, providing the energy to run LED-luminaires and other pole attachments requiring power.
- Constructed like a Conventional Solar Panel, the cells are directly laminated onto the scratch-resistant glass exterior, ensuring that no dirt or moisture can accumulate between the cells and their casings.
- Unique, patented, cylindrical solar modules are the most efficient in the market.

Quick Return on Investment

- No Trenching or Cabling
- No Electricity Bill
- Fast Installation
- Low Maintenance Costs

HAPCO Solar Pole
Tampa, FL

HAPCO SOLAR POLES ARE THE SMART CHOICE IN SOLAR LIGHTING

Circular Panels Deliver Superior Efficiency
Cell Efficiency of >23% is more than 40% higher than many competitor's products.

Modular Solar Panels Allow Designs Incorporating 1-3 Solar Units
Offering the perfect pole specification to match your project requirements.

4G/LTE Wireless Connectivity
Remote monitoring allows for automatic updates and troubleshooting of each pole.

Smart Technology Provides Sustained Lighting
Network connectivity and SMART product design allows the pole to automatically adjust power output based on weather conditions and forecasts.

HAPCO BUILDS POLES FOR THE FUTURE...AND THE FUTURE IS NOW!

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SMART TECHNOLOGY.
MAXIMUM PERFORMANCE.

Proven Performance hapco pole products

SOLAR POLES

Hollow Solar Wrap
The solar modules (panels) are cylindrical and hollow, allowing them to slide over the top of a pole. This gives a pleasing aesthetic while also allowing 360-degree coverage for power generation.

Self-Contained Control and Power
The battery and controls of the unit are all encased in a single unit. This unit is installed inside the pole, behind the handhole cover.

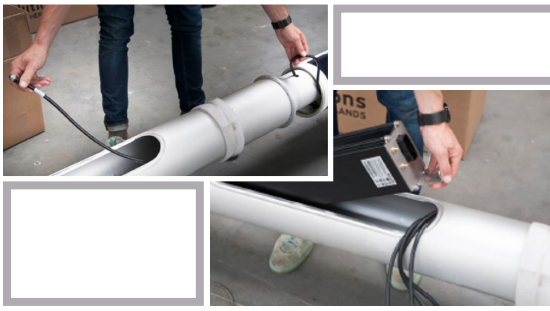
Autonomous System
The control unit is outfitted with network connectivity and a GPS transponder. This allows each individual pole to get an exact Lat/Long position fix which provides the system with live dusk/dawn times; this allows the system to automatically know when to turn the luminaire on and off. The network connectivity also allows the system to be monitored in real-time. Real-time monitoring includes system charge status, battery voltage, system temperature, and light activity. Having real-time monitoring allows any potential issues to be viewed and identified remotely as they happen.

Sustained Lighting
With the GPS fix and network connectivity, the system keeps a log of power input and power output along with weather trends. This allows the system to predict how much power will be coming in with upcoming weather forecasts. With this information, the system will adjust the power output so that the luminaire will always be operable and will not experience down-time due to inclement weather.

Typical Luminaire Power Output
Nominal luminaire Wattage values are 60W for (1) solar module, 80W for (2) solar modules, and 120W for (3) solar modules. Actual Wattage outputs may potentially exceed these values upon consultation of your specific lighting needs.

Grid Connectivity
If desired, the system may also be connected to existing power grids. This gives the option to feed the solar power back into the grid.

Easy, Plug-and-Play Installation
All of the cables needed to connect the system together are labeled and come with quick connects. Each quick connect cable has an indicator on the connector. Installation is as simple as taking two cables with matching labels, lining up the indicators, and making the connection. Complete installation can be completed in less than an hour in most applications.



SMART CITY READY

In addition to luminaires, Hapco Solar Poles can be designed to power accessories such as cameras, sensors, wi-fi hotspots and safety help buttons utilized by today's Smart Cities.

WHY IS OUR CURVED GLASS DESIGN BETTER?

Circular panels allows full use of the available sunlight.
If flat panels of competitor's products become shaded you capture no power.

Plastic ages, yellows, and loses shine.
Glass does not degrade over time.

The smooth surface means that dirt and dust will not stick to our design.
You never need to clean our glass—rain will keep it clean.

Scratches in competitor's plastic can allow moisture into the unit.
The result—shorter life-cycles and higher maintenance costs.

Overview	
Height	13 - 40 Feet
Column Material	Aluminum
Luminaire Power	Up To 120 W
Operating Temperature	-4° to 140°F
Solar Module	
Solar Technology	Monocrystalline Silicon Solar Cells
Solar Modules Per Pole	1-3 Modules
Cell Efficiency	> 23%
Total Power	Up To > 330 Wp (Watts Peak)
Maximum Power Point Tracking Channels	Up To 12
Front Sheet Material	Borosilicate Glass
Solar Module Backsheet Color	White (Optional Black Backsheet)
Dimensions Per Module	7.8 in x to 43.7 in
Weight Per Module	15.4 lbs.
Battery	
Battery Technology	Lithium (NMC)
Battery Capacity	Up To 1200 Wh (Watt Hours)
Service Life	-10 years
Location of Battery	Behind Integrated Flush Door
Turn Around Charge Efficiency	99.5%
Temperature Range	-4 to 140°F
Control Electronics	
On-Board Mobile Communication	GSM | LTE-M
Encryption	TLS 1.2
Global Navigation Satellite System (GNSS)	GPS, BeiDou, Galileo, GLONASS, QZSS
Over-the-Cable Updateable	Yes (USB-Programming Device Optional)
Over-the-Air Updateable	Yes
Remote Monitoring and Configuring	Optional
Time and Date	Astronomical Clock
Smart City Ready	Yes

Lighting	
Wildlife Edition (Bat & Turtle-Friendly Lighting)	On Request
Lighting Scheme	Automatic Adaption To Sunset And Sunrise
Dimming Scheme	Seasonal Dynamic Dimming
Pole	
Pole Size	Up To 8 Inches Diameter With Lengths Up To 40 Feet.
Pole Material	Aluminum
Sensors	
Humidity Sensor	Yes
Temperature Sensor	Yes
Power Input	Yes
LED Output	Yes
Features	
Lighting technology	LED
Time and Date Setting	Astronomical Clock
Lighting Scheme	Automatic Adaption To Sunset And Sunrise
Dimming Scheme	Seasonal Dynamic Dimming Scheme Optimizes Energy Input (=Solar Irradiation) And Energy Output (=Lighting) According To Past Performances, System State, Weather Expectations And More. Fully Automatic And Self-Learning.
Installation	
Assembly	Easy Plug-And-Play System With 1 Break-Out Cable.
Expected Installation Time	±45 Minutes For Assembly (Model Depending)
Installation	Performed Without Prior Training
Cabling	All Cables Coded And Labelled - Easy And Fool-Proof
Connectors	Overmoulded
Serviceability	Easily Serviced Via Oversized Handhole
Connectivity	
Wireless Connectivity	GSM, 4G / LTE
SIM Card	Yes - Global M2M
Positioning System	GPS (And Similar BeiDou, Galileo, GLONASS, QZSS). This Allows Easy Management (Location Is Known) And Accurate Time And Date (For Sunrise / Sunset).
Over-the-Air Updates	Everywhere In The World, Via 4G / LTE Network
Remote Monitoring	Everywhere In The World, Via Web Interface