

## Technical Information

### 1. Where are the best applications for the system?

Roadways, Parks, Pathways, Sidewalks, Parking Lots, Security Lighting

### 2. Do the panels come in different sizes and lengths?

Yes, there are four different solar panel application sizes

- 240W - 8'6"
- 320W - 11'1"
- 400W - 14'5"
- 480W (2x 240W) - 17' (Dual head)

### 3. Are there different luminaire wattages available?

There are luminaire styles for Roadway and Residential poles

- Roadway (Parking Lot, Flood & Street Lights): 37.5W & 60W
- Residential (Lantern Style): 30W
- Other custom wattages available

### 4. How is the panel attached to the pole?

The panels are fixed around a universal aluminum array. The adjustable arms of the array are banded to the pole with straps in multiple locations.

### 5. Can this solution be retrofitted onto any pole?

Our arrays can be retrofitted onto any pole (wooden, aluminum, concrete, steel, etc.) (round, square or tapered).

Our standard arrays fit around poles with diameters up to 6". For wider poles we use a special larger array, for diameters up to 10".

For the standard array, tapered poles can be max. 6" in diameter at the location of the battery, however can be wider along the array below the battery.

### 6. Where is the Battery located?

The battery pack is located between the solar panel and pole, and slides into the array from the top, which is sealed. The battery is located at the top of the array to prevent theft & flooding damage.

### 7. What is the battery lifetime? What is the advantage of the Lithium Ion battery over lead acid?

The batteries approximately last between 12 & 15 years with 2000 shallow discharge cycles (normal operating temperatures).

In extreme temperature conditions (hot/cold) the warranty is prorated.

Lithium Ion batteries are much lighter and have higher energy density.



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### 8. Can the lights be dimmed and scheduled?

The lights can be prescheduled for a specific dimming requirement prior to shipment. They can also be monitored in real time and be programmed in the field via Bluetooth app, which is available for download.

### 9. How does this system compare to a flat panel?

Product Type	RetroFlex	Flat Solar Panel
Design	Aesthetically pleasing cylindrical pole wrap with integrated communications and electronics	Flat Panel on top of the pole
Safety	Firmly retrofit to pole using industry standard hardware, Aerodynamic design minimizing EPA	Large surface area creates high wind risk
Resiliency	Batteries installed within solar array at the top to avoid flooding Flexible Thin Film Panel withstands strong impacts (hail, stones, flooding)	Battery boxes mounted on pole Crystalline panels vulnerable to external impacts
Performance	High efficiency, low light CIGS panels, no maintenance required due to vertical orientation	Tilted panel = dust and snow accumulation; Fixed orientation
Maintenance	No dirt, dust or snow accumulation due to vertical array	Angled panel surface requires periodic maintenance

### 10. Do you have certifications on your lights and solar system?

Solar Panels: UL & IEC certified

Batteries: UL certified

Lights: UL certified, IP65, CE, CB, ANSI C136.31-2001, RoHS Compliant



## Performance

### 1. How durable are the solar panels?

The panels have a 7-layer 3M-film super-barrier plastic cover. The panels are resistant to impacts such as hail, stones, as well as baseball bats.

### 2. How prone is the system to vandalism?

Though most impacts are covered, gun shots and other punctures will reduce productivity over time until they fail.

Graffiti can be removed with cleaning solutions.

Due to the battery location at the top of the array under a ceiled cover, battery theft is very difficult.

### 3. Does this solution work year round?

Yes, however, we size the system based on the geographic location of the install, as well as solar production and any potential shading issues using NREL data from over 30 years.

### 4. How does the system perform in hot and cold conditions?

In hot and cold climates we provide either insulated battery packs or vented battery packs with temperature sensitive settings to keep the battery packs at operating temperature.

### 5. Will the lights stay on in prolonged periods of cloudy/overcast conditions?

The system is designed for 8 days with no sun or 4 weeks with clouds and rain every day.

### 6. What is the typical autonomy of the system?

The system has an autonomy of 6 to 8 days and can be sized accordingly based on customer demands.

### 7. Can this solution be installed at any location?

The solution can be installed at any location with less than 50% shading throughout the day. In questionable locations a shading analysis will be performed to determine the applicability of the system.

### 8. How does this solution affect the wind loading of the pole?

Due to the pole wrapping aerodynamic design, the panels have small EPAs

- 240W      3.09 ft<sup>2</sup>
- 320W      4.03 ft<sup>2</sup>
- 400W      5.26 ft<sup>2</sup>

### 9. What are the maintenance requirements?

Some periodic maintenance is suggested, however, dust or snow does not accumulate on the vertically attached panels.



## Options

### 1. Which types of luminaire heads are available?

There are different head designs available including

- Street Lights (Cobra)
- Parking Lot Lights (Shoebox)
- Flood Lights
- Area Lights
- Post Top Lantern

### 2. Can I chose between ClearWorld's and other manufacturers' LED lights?

Our system can be used with a variety of LED luminaires. When using another manufacturer's lights we would request a physical sample if not already validated to test the adaptability at our facility before the project.

### 3. Do the panels come in different colors?

No.

### 4. For a new install can I buy my own pole? Can I buy my own arm?

We prefer to supply poles from our preferred partner. However, we can retrofit the system onto any other existing or new pole based on engineering requirements.

### 5. Are the decorative scroll & base optional?

Yes, the pole & arm kit can come without base and/or scroll, which lower the cost of the kit.

## Economics

### 1. Are there incentives & rebates?

Incentives & rebates for renewable energies based on zip code can be accessed under [www.dsireusa.org](http://www.dsireusa.org).

### 2. Do you have financing?

Yes, ClearWorld can provide financing and also offers leasing options based on project size and credit worthiness.

### 3. What is the energy cost savings breakeven point?

New Installs:

The overall cost is less than 50% of traditional on-grid solution (no trenching, wiring, metering, utility bill).

Retrofits:

It depends on several factors:

Operational and maintenance costs, as well as available incentives and rebates. The exact period can be calculated based on these factors.



## Purchase

### 1. Is this solution compliant with the Buy American Act?

Yes.

The certificate can be provided as needed.

### 2. What are the warranty terms?

Overall full system parts warranty for 10 years

Solar Panels: 25 years.

At least 90% output on years 0-10

At least 83.5% output on years 10-20

At least 80% output on years 20-25

### 3. What is your typical lead-time?

Typical lead-time is 75-90 days. Based on inventory stock level it can be provided in 30-45 days.

## Installation

### 1. Do you use local or national installers?

We prefer local installers and sending our installation certifier to train the local installation team.

### 2. How long does the installation take?

A retrofit takes a team of two approximately 1 hour; new Installs take even less time.

### 3. Do you have training videos and instructions?

Yes, we provide an installation manual and video. Training & Certification is available as well and comes with an associated cost.

