

ClearWorld

» Lighting the Way in Solar LED Technology

RETROFLEX SYSTEMS



CONTENTS

- RetroFlex Systems
- Smart Poles
- Smart Applications
- AloT Multi-Function Streetlight
- ClearWorld IoT PaaS Dashboard
- ClearWorld App
- Solar Powered Mobile Trailer
- Fixed Wireless Broadband Access



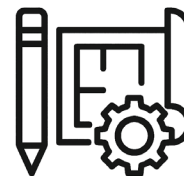
RETROFLEX SOLAR LED TECHNOLOGY

ClearWorld's RetroFlex is a retrofit lighting solution originally designed to harness solar energy and provide efficient outdoor lighting. The patented retrofit design vertically wraps the complete RetroFlex system around poles of any dimension, diameter, or finish.

In addition to lighting, RetroFlex is currently being developed as a stand-alone solar distributed generation system, as well as a centralized, resilient power source and communication node for smart grid infrastructure. RetroFlex is focused on providing solar lighting solutions for:



MUNICIPALS



**ENGINEERING AND
DESIGN FIRMS**



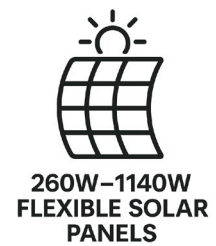
**PRIVATE
DEVELOPERS**



**FEDERAL
CONTRACTORS**

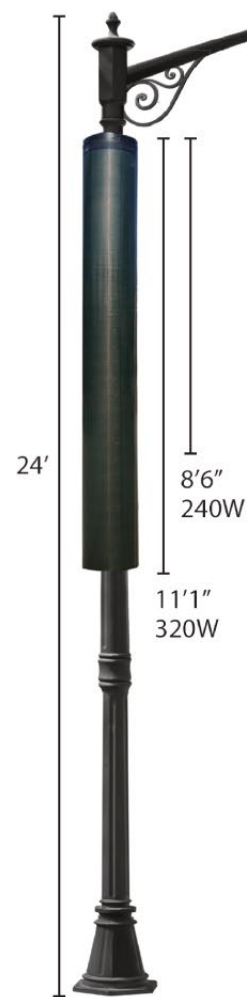
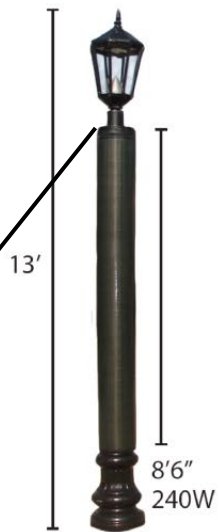


RETROFLEX SYSTEMS





» LIGHTING THE WAY IN SOLAR LED TECHNOLOGY



ClearWorld's patented RetroFlex® system is designed to be Retrofit onto existing or new infrastructure. This aesthetically pleasing solution can be attached to any size pole or diameter, whether round, squared, oval, tapered, wood, concrete or metal. Using our Universal adjustable banding process, it's perfect for all light pole applications.

» OUR SOLUTIONS

- » New Installation - On / Off Grid
- » Retrofit Streetlights LED / Solar
- » Solar Only - Distributed Generation
- » Smart Grid - LED / Solar / Battery
- » Smart City Solutions

» COMPONENTS

- 1. LED Street light
- 2. Universal Adjustable Aluminum Array
- 3. Solar Charge Controller/Regulator
- 4. Rechargeable Lithium Ion Battery Pack
- 5. Solar Collectors
- 6. DC/AC Inverter (On-Grid ONLY)
- 7. Wiring



RETROFLEX VS TRADITIONAL STREETLIGHTS

Product Type	ClearWorld RetroFlex	Traditional Streetlights
Costs	Minimal CAPEX; Minimal recurring expenses; No energy costs; Retrofit to any size pole	High CAPEX; Infrastructure costs; High recurring expenses; Inefficient light fixtures
Performance	Remote communication and monitoring; Dimmable and programmable features; 10-year LED light fixtures	On during day and off during night; Off during power outages; 2 to 3-year light bulb
Maintenance	No cleaning; Hardware designed to withstand hurricane-force winds	Photocell issues; Bulb and wire replacements

RETROFLEX VS FLAT SOLAR PANEL

Product Type	ClearWorld RetroFlex	Flat Solar Panel
Design	Aesthetically pleasing cylindrical pole wrap with integrated communications and electronics	Flat panel mounted on top of the pole
Safety	Firmly retrofitted to pole using industry-standard hardware; Aerodynamic design minimizes EPA (Effective Projected Area)	Large surface area creates a high wind risk
Resiliency	Batteries installed within the 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

RETROFLEX SYSTEM APPLICATIONS

• OFF GRID: NEW INSTALLATIONS

- MINIMAL INSTALL REQUIREMENTS
- ELIMINATE TRENCHING AND CABLING
- REDUCE CAPITAL AND RECURRING COSTS
- REMOTE POWER SUPPLY FOR URBAN AND RURAL AREA DEVELOPMENTS

• OFF GRID: RETROFIT INSTALLATIONS

- RETROFIT EXISTING POLES
- REDUCE RECURRING COSTS
- INCREASED RELIABILITY AND SAFETY DURING ADVERSE WEATHER CONDITIONS
- SYSTEMS COMBINE RENEWABLE ENERGY AND ENERGY EFFICIENCY

• ON GRID: LIGHTING AND GENERATION

- OPTIMIZE SOLAR GENERATION WITH ROBUST ENERGY STORAGE
- MANAGE TIME OF DAY LOAD SWINGS FOR LIGHTING LOADS
- MITIGATE LINE LOSSES THROUGH DISTRIBUTED POWER ON POLES

• SMART CITY: FOUNDATION OF POWER

- CUSTOMIZABLE POWER SUPPLY FOR MOST DEVICES AND SENSORS
- RETROFIT IS EASY INSTALLATION AND FULLY SCALABLE
- HIGH LINE OF SIGHT ON POLE
- RUGGED EXTERIOR PROTECTS COMPONENTS

RELIABLE EVEN WHEN THINGS GO WRONG

Unlike traditional street lighting, ClearWorld's solutions operate

OFF-THE-GRID

meaning that in the event of a power outage, residents won't be left in the dark.

Upgraded, modern infrastructure means reliable lighting when you need it most. In the Gulf South region, hurricanes, tropical storms, and tornadoes are meteorological givens. Whereas the solar rectangular panel or 'wing' design of traditional street lighting can only withstand 70 to 90 m.p.h. winds, ClearWorld's cylindrical design provides a **150+ m.p.h.** wind rating. What's more, it also will survive flooding, as all components are installed atop the light pole.

REDUCE/ELIMINATE COSTS IMMEDIATELY

ClearWorld's patented universal retro-fit design operates at

70-100% LESS
than the cost associated with traditional street lighting.

The savings are two-fold: the solar LED technology decreases energy and maintenance costs while the retro-fit design uses new or existing infrastructure.

- a. Product Payback - cost savings are Immediate for New developments. Through multiple financing options as Retro-fit projects, break-even ranges between **4 to 10 years**¹.
- b. No Money Down - "Structured" financing through ClearWorld partners, can provide No out-of-pocket expense combined with **immediate savings from Day 1**.

¹ Based on your local area energy and maintenance costs

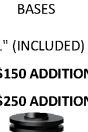
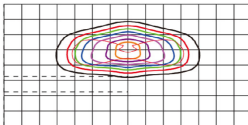
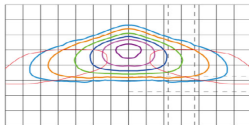
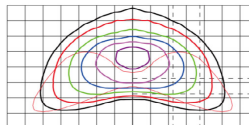
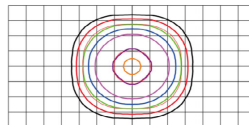
ENVIRONMENTALLY RESPONSIBLE

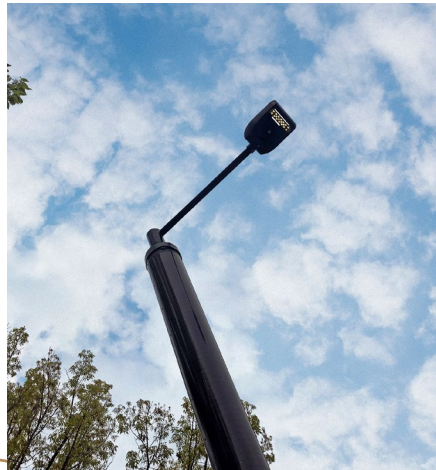
ClearWorld's solar LED technology

ELIMINATES
the carbon footprint of a traditional utility light pole.

- a. The standard street light consumes 550 KWH of fossil fuel energy per year, which translates to 235 kg of CO2 emission light glare, trespass, and pollution annually.
- b. Compliant with International Dark-Sky Association (IDA) regulations insofar as it reduces sky glow and light pollution.
- c. Clear white light offers better clarity and reduces glare at night.

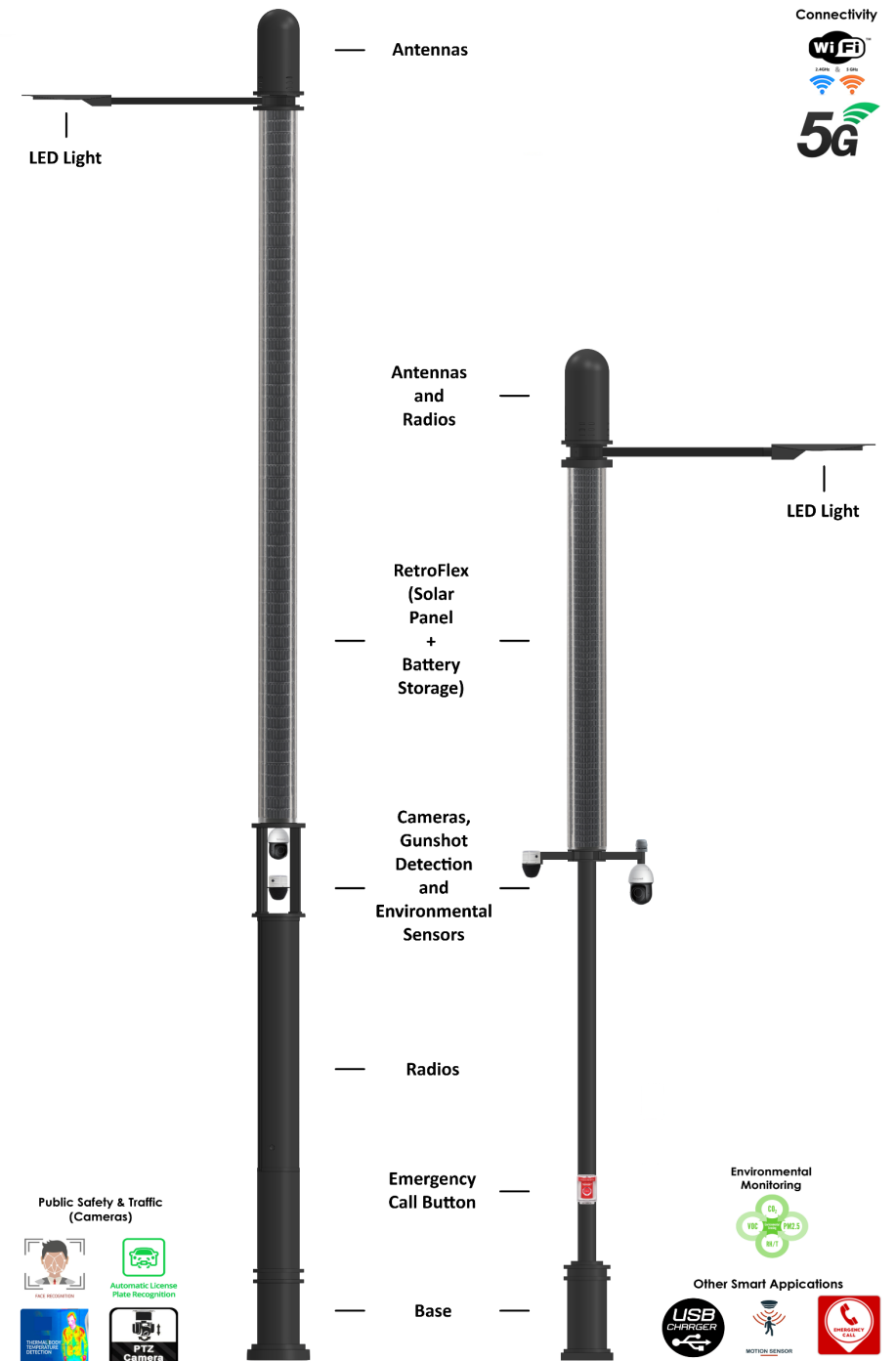
RETROFLEX PRODUCT SPECIFICATION

SPECIFICATIONS	SINGLE HEAD RESIDENTIAL SYSTEM		DOUBLE HEAD	SINGLE HEAD ROADWAY SYSTEM						DOUBLE HEAD ROADWAY SYSTEM			SMART POLE											
MODEL #	RS260	RS320	RS400	RW260	RW320	RW400	RW520	RW640	RW700	RW520	RW780	RW1140	RWSMC320	RWSMC400	RWSMC520	RWSMC640	RWSMC700	RWSMC780	RWS320	RWSM400	RWSM520	RWSM640	RWSM700	RWSM780
SOLAR ARRAY CAPACITY (WATTS)	260	320	400	260	320	400	520	640	700	260 X 2	390 X 2	380 X 3	320	400	520	640	700	780	320	400	520	640	700	780
BATTERY CAPACITY (24VDC AMP HOURS)	60	75	75	60	75	75	90	90	90	60 X 2	75 X 2	90 X 2	75	75	90	90	90	75 X 2	75	75	90	90	90	75 X 2
BATTERY PACK (12+ YRS LIFE EXPECTANCY)	LITHIUM ION		LITHIUM ION	LITHIUM ION						LITHIUM ION X 2			LITHIUM ION					LITHIUM ION X 2	LITHIUM ION	LITHIUM ION				LITHIUM ION X 2
LED LIGHT (WATTS)	40	50	30 X 2	40	50	60	80	90	100	40 X 2	60 X 2	80 X 2	50	60	80	90	100	60 X 2	50	60	80	90	100	60 X 2
LUMENS @ 162 PER WATT	6480	8100	9720	6480	8100	9720	12960	14580	16200	12960	19440	25920	8100	9720	12960	14580	16200	19440	8100	9720	12960	14580	16200	19440
DIMENSIONS (SOLAR ARRAY)	10.66" OD X 8'6" L	10.66" OD X 11'4" L	10.66" OD X 13'8" L	10.66" OD X 8'6" L	10.66" OD X 11'4" L	10.66" OD X 13'8" L	10.66" OD X 17" L	10.66" OD X 22'8" L	12.3" OD X 17" L	10.66" OD X 17" L	12.3" OD X 18'8" L	12.3" OD X 25'6" L	10.66" OD X 11'4" L	10.66" OD X 13'8" L	10.66" OD X 17" L	10.66" OD X 22'8" L	12.3" OD X 17" L	12.3" OD X 18'8" L	10.66" OD X 11'4" L	10.66" OD X 13'8" L	10.66" OD X 17" L	10.66" OD X 22'8" L	12.3" OD X 17" L	12.3" OD X 18'8" L
WEIGHT (LBS)	113 to 118	134 to 138	155 to 160	138 to 164	150 to 176	165 to 191	188 to 206	208 to 226	188 to 206	232 to 244	236 to 248	295 to 302	170 to 196	185 to 211	208 to 226	228 to 246	208 to 226	256 to 268	362	423	449	487	449	497
EPA (SOLAR ARRAY) (SQFT)	7.55	10.06	12.14	7.55	10.06	12.14	15.1	20.13	17.42	15.1	19.13	26.13	12.56	14.64	17.6	22.63	19.92	21.63	20.56	24.64	27.6	32.63	29.92	31.63
POLE SIZE	10' TO 11'6"	12'6" TO 14'	15' TO 16'6"	18' TO 26'			20' TO 26'			22' TO 26'		28' TO 30'	18' TO 26'		20' TO 26'			22' TO 26'	23.5'	28'	31.5'	37'	31.5'	33'
CAP ARMS (STRAIGHT/TAPERED)	TENON / ADAPTER		TENON / ADAPTER	4' TO 6'						4' TO 6' X 2			4' TO 6'					4' TO 6'	4' TO 6'					
BASE	11", 24" AND 30"		11", 24" AND 30"	11", 24" AND 30"						11", 24" AND 30"			11", 24" AND 30"					5.5"	5.5"					
LIGHTING & SOLAR CHARGE CONTROLLER	MPPT		MPPT	MPPT						MPPT			MPPT					MPPT	MPPT					
SOLAR PRODUCTION (WATT-HOURS/DAY)	379	466	583	379	466	583	758	932	1020	758	1137	1662	466	583	758	932	1020	1137	466	583	758	932	1020	1137
CO2 EMISSIONS OFFSET (30 YEARS) (LBS)	3527	4337	5426	3527	4337	5426	7054	8674	9493	7054	10582	15469	4337	5426	7054	8674	9493	10582	4337	5426	7054	8674	9493	10582
LUMINAIRE RESIDENTIAL LED HEAD OPTIONS	 ACORN  ACORN W/CAP  ACORN W/CAGE  ACORN W/CAP & CAGE (INCLUDED)  ASTURIAS  LANTERN  BILBAO  TEAR DROP  LIGHT COLUMN  BRAZO  CONTEMPORARY  VINTAGE 11" (INCLUDED) 24" (+\$150 ADDITIONAL) 30" (+\$250 ADDITIONAL) (\$250 ADDITIONAL)																							
LUMINAIRE ROADWAY LED HEAD OPTIONS	 GOBO L  GOBO F  GOBO A  GOBO T  GAMA T  GAMA L (INCLUDED)																							
LUMINAIRE LIGHT OPTICS	 T2M Type II Medium TRAILS/PATHWAYS  T3L Type III Long ROADWAYS  T4M Type IV Medium PARKING LOTS  T5X Average beam angle 150° PARKS																							

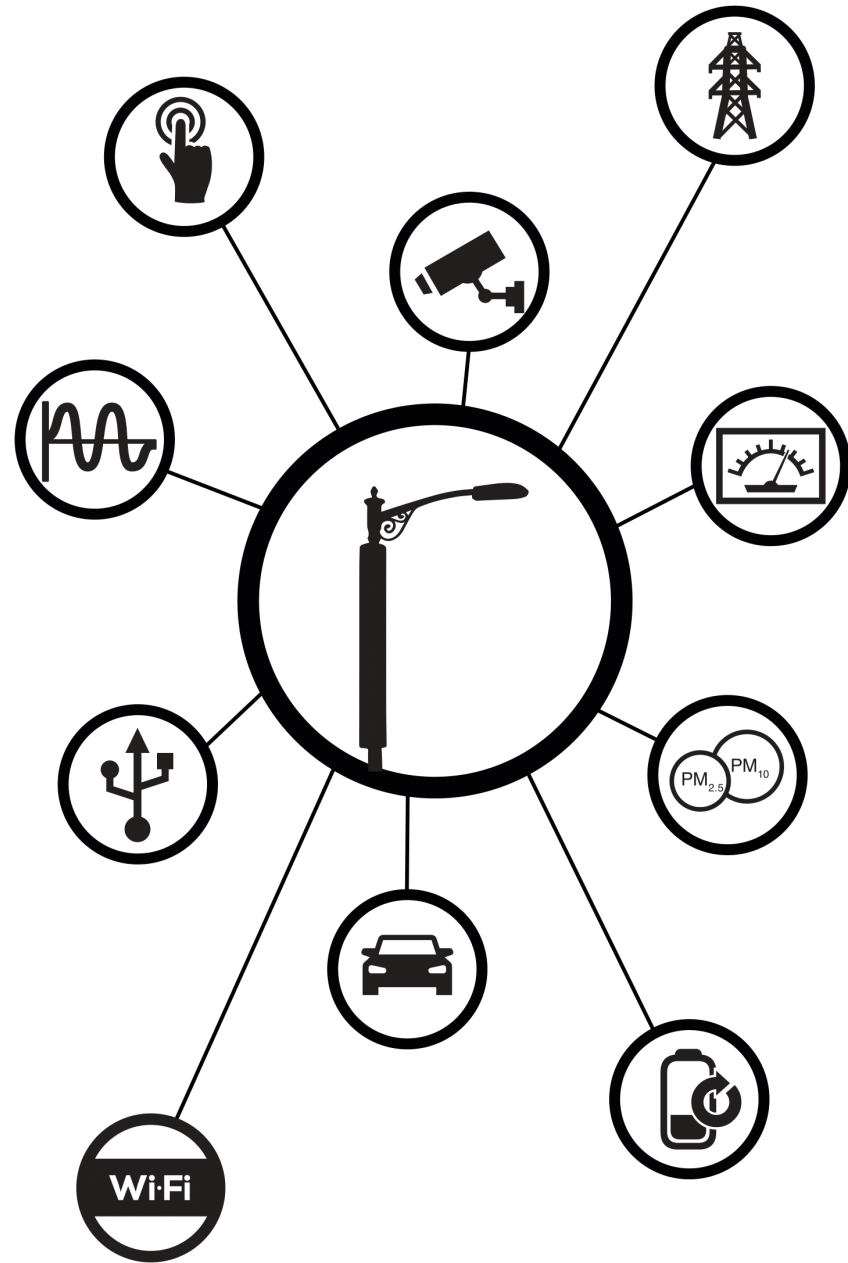


SMART POLES

- ✓ **Security Cameras**
- ✓ **Gunshot Detection**
- ✓ **Traffic Monitoring**
- ✓ **Environment Monitoring**
- ✓ **Wi-Fi, 4G, 5G, RF-Mesh**
- ✓ **Smart Parking**
- ✓ **Digital Signage**
- ✓ **EV Charging**
- ✓ **Emergency Alarms**
- ✓ **Battery Back-Up**



SMART APPLICATIONS



✓ Cameras

- Fixed
- PTZ (Pan-Tilt-Zoom)
- Fisheye (360-Degree)
- LPR (License Plate Recognition)
- Facial Recognition

✓ Gunshot Detection

- ✓ Wi-Fi Access Points
- ✓ Emergency Phone
- ✓ Digital Signage
- ✓ Motion Sensor
- ✓ Wireless Charger
- ✓ USB Charger

✓ Environmental Sensors

- Temperature
- Humidity
- Pressure
- Light
- Sound/Noise
- eTVOC (Equivalent Total Volatile Organic Compounds)
- eCO₂ (Equivalent Carbon Dioxide)
- Discomfort Index
- Heat Stroke Index
- Peak Ground Acceleration
- Vibration
- Seismic Intensity
- Spectral Intensity

AIOT MULTI-FUNCTION STREETLIGHT



EMPOWERED CITY

Public WiFi/5G/4G connectivity
Smart, controlled lighting systems
Multiple sensors for monitoring
Traffic optimization solutions
Integrated far-edge analytics



SECURED CITY

Distress signal detection
Suspicious activity identification
People density heatmaps for crowd management



DECARBONIZED CITY

Reducing public electricity consumption by 80%
Reducing operational costs by approx. 80%
Eliminating separate infrastructure for each system
Fast deployment and Low capital expenditures
Optional hybrid solar system further reducing carbon emissions

ENVIRONMENTAL SENSOR

SMART LIGHTING CONTROL

WiFi ACCESS POINT

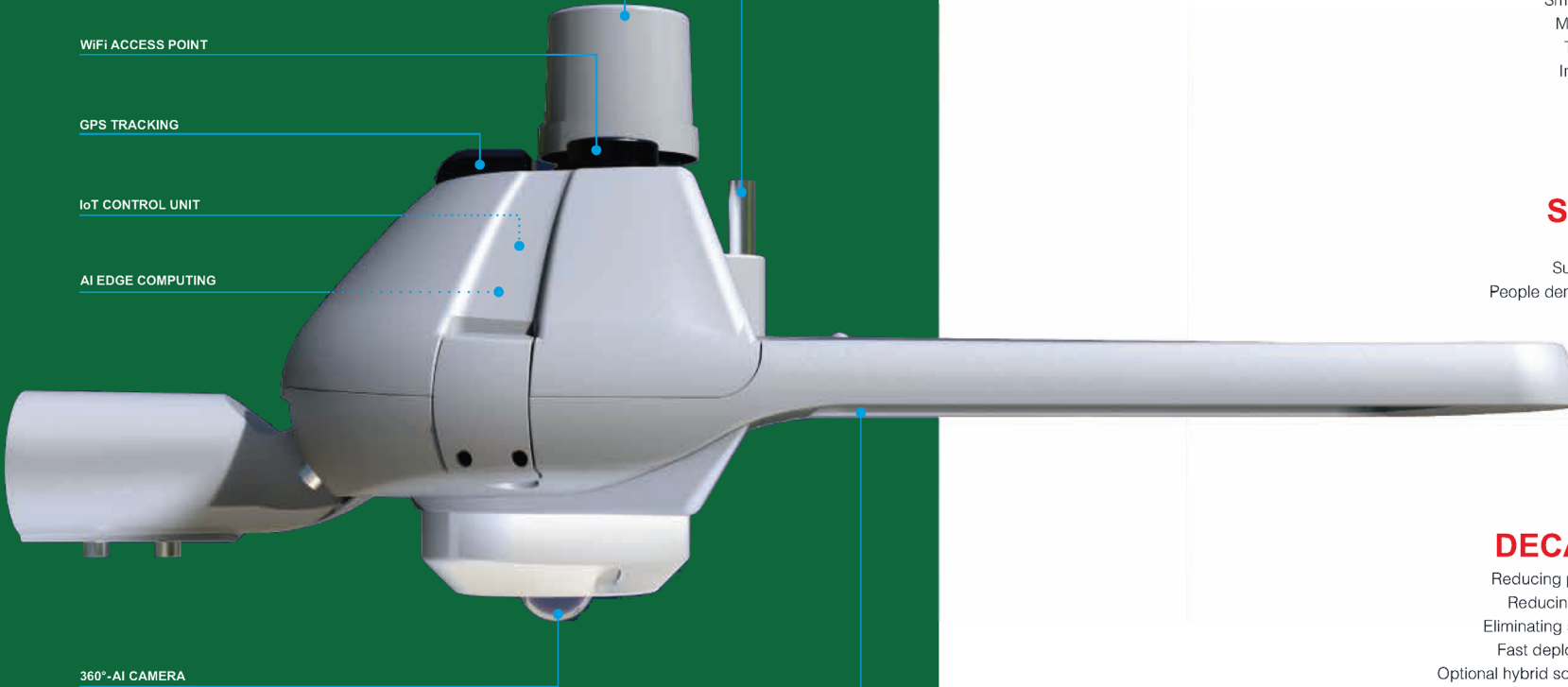
GPS TRACKING

IoT CONTROL UNIT

AI EDGE COMPUTING

360° -AI CAMERA

LIGHTING

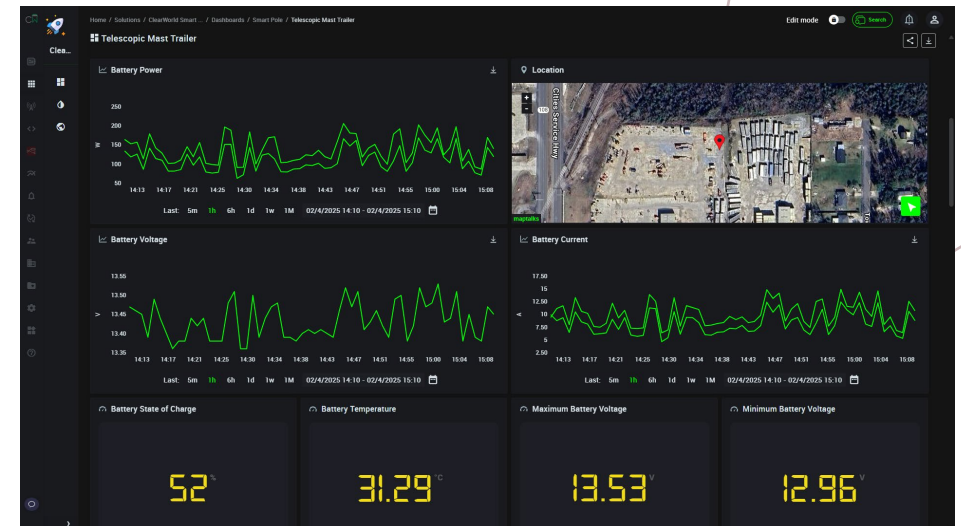
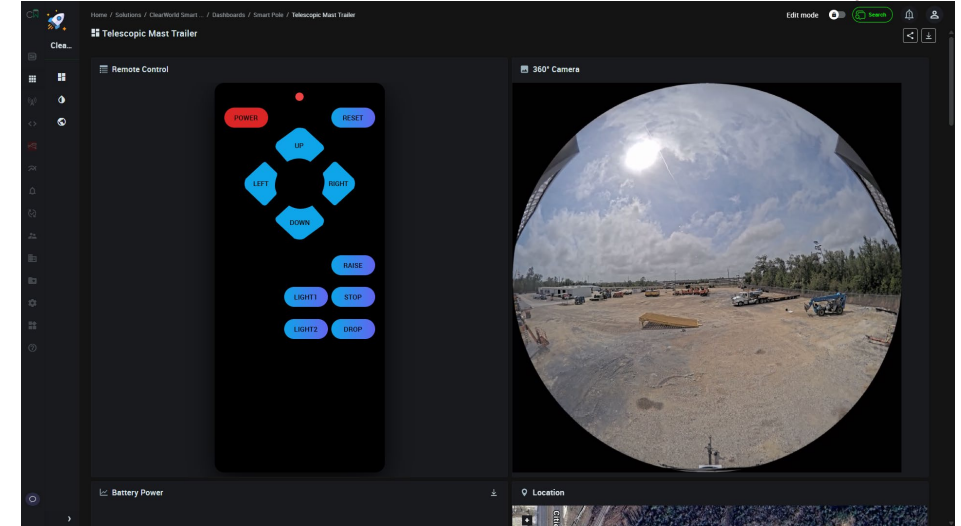


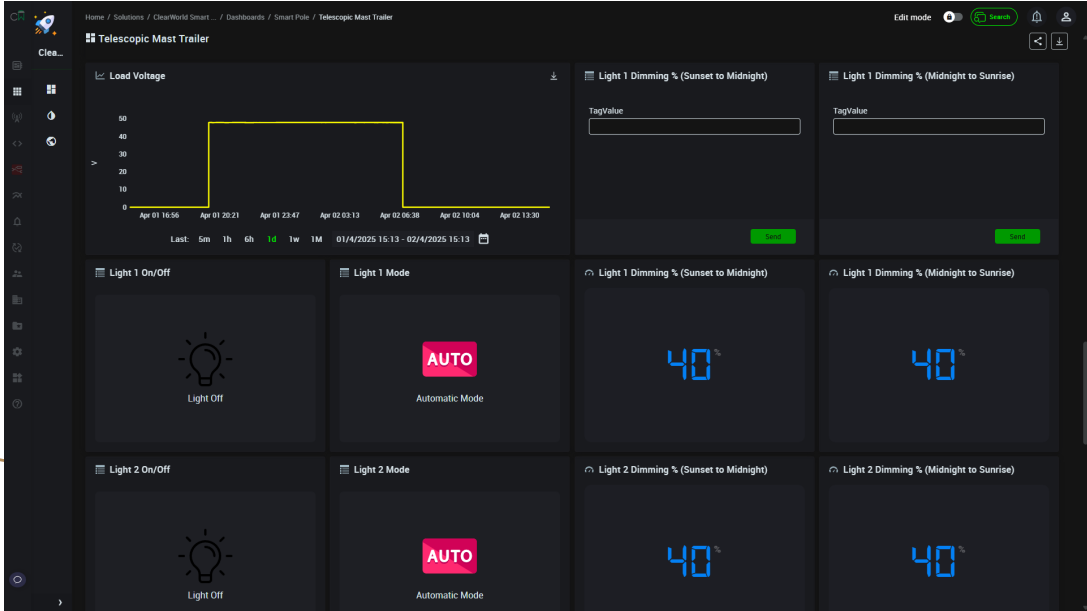
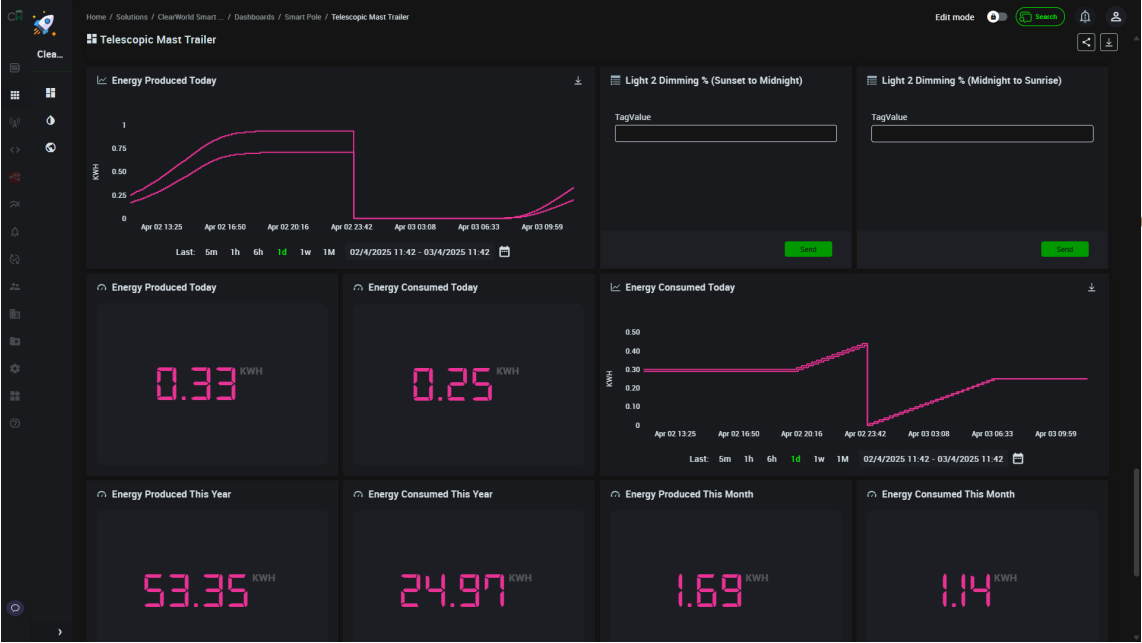
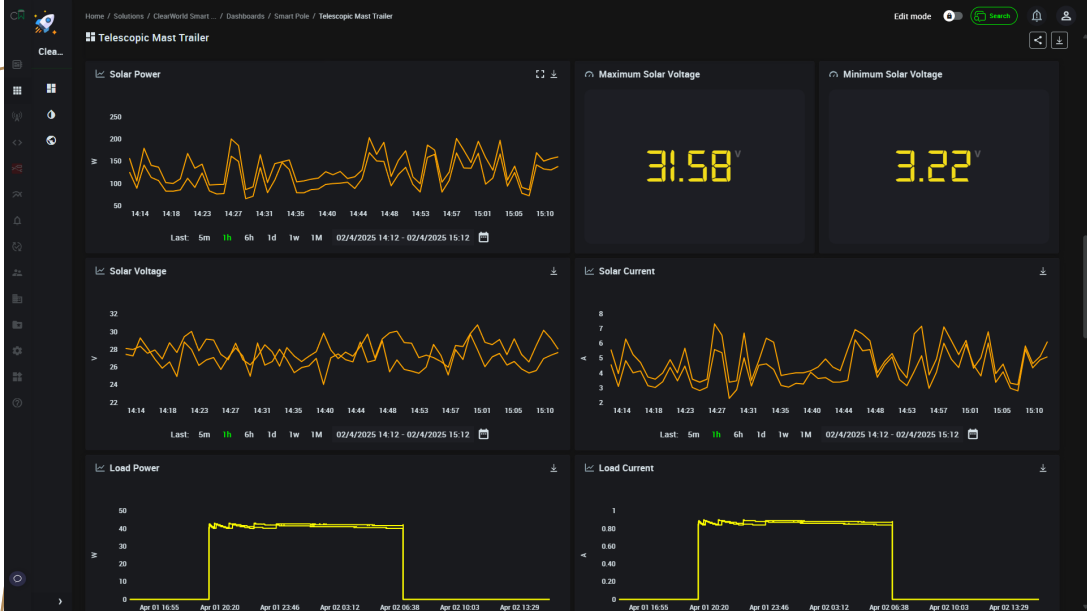
CLEARWORLD IOT PAAS DASHBOARD

ClearWorld's IoT Cloud Platform-as-a-Service (PaaS) Dashboard offers a comprehensive suite of features designed to enhance urban infrastructure management:

- **Device Management:** Efficiently monitor and control lighting and other connected devices.
- **Real-Time Analytics:** Access near real-time statistics on solar/battery/light voltage, current, system performance, and energy production/consumption.
- **Alerts and Notifications:** Receive immediate alerts for system performance issues or maintenance needs.
- **User Management:** Assign and manage administrative and user privileges for secure access.
- **Over-the-Air Updates:** Remotely implement firmware and software updates to keep devices up to date.
- **Mapping Feature:** Visualize device locations and statuses on an interactive map.
- **Dimming Schedules:** Set and adjust lighting schedules to optimize energy usage.
- **Trend Analysis:** Analyze historical data to identify patterns and improve operational efficiency.
- **Open Access API:** Seamlessly integrate with other systems and customize functionalities through a flexible API.

These features collectively support the development of smarter, more efficient urban environments.



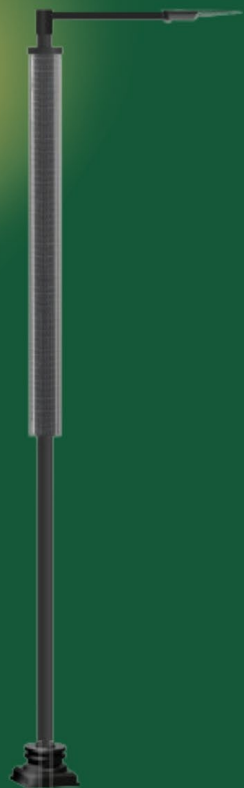




ClearWorld



Date: 2024-11-07T09:34:46



Controller	
Solar 7.27247	Battery 13.333
Grid 16.6251	Load 0



CLEARWORLD APP

- **Live Status Dashboard**

Real-time visual of a solar-powered smart pole. Displays the current date and time. Indicates solar conditions (e.g., sun up or down). Visual indicators show the status of power sources: Solar, Battery, Grid, and Load.

- **Detailed Component Monitoring**

Each key component is monitored with detailed metrics including Voltage, Current, Power (W) and Energy (kWh). Components Monitored: Solar Panel, Battery, LED Light, Charger and Inverter.

- **Energy Analytics (Graphs)**

Voltage and Current Usage Graphs, tracked daily with historical data points.

- **Settings Menu**

Settings are organized by component:

LED Light: Manual ON/OFF toggle. Configure multiple time-based output current settings. Voltage-based trigger thresholds (on/off). Set current output values.

Charger: Set ON/OFF time range. Manual control toggle.

Inverter: Set inverter ON/OFF time range. Manual control toggle.

- **Data Management**

A Download History button allows export of performance data for analysis or recordkeeping.

SOLAR POWERED MOBILE TRAILER

A rugged, off-grid lighting, surveillance, communications and power solution ideal for construction sites, disaster recovery, events, and temporary infrastructure needs.

Solar-Powered Operation: Fully off-grid with no reliance on fuel or external electricity. Equipped with vertical solar modules (ClearWorld's RetroFlex Design) for 360° solar capture. Operates silently with zero emissions.

Telescopic Mast: Telescopic mast provides elevated coverage. Ideal for wide-area lighting, surveillance, and communications.

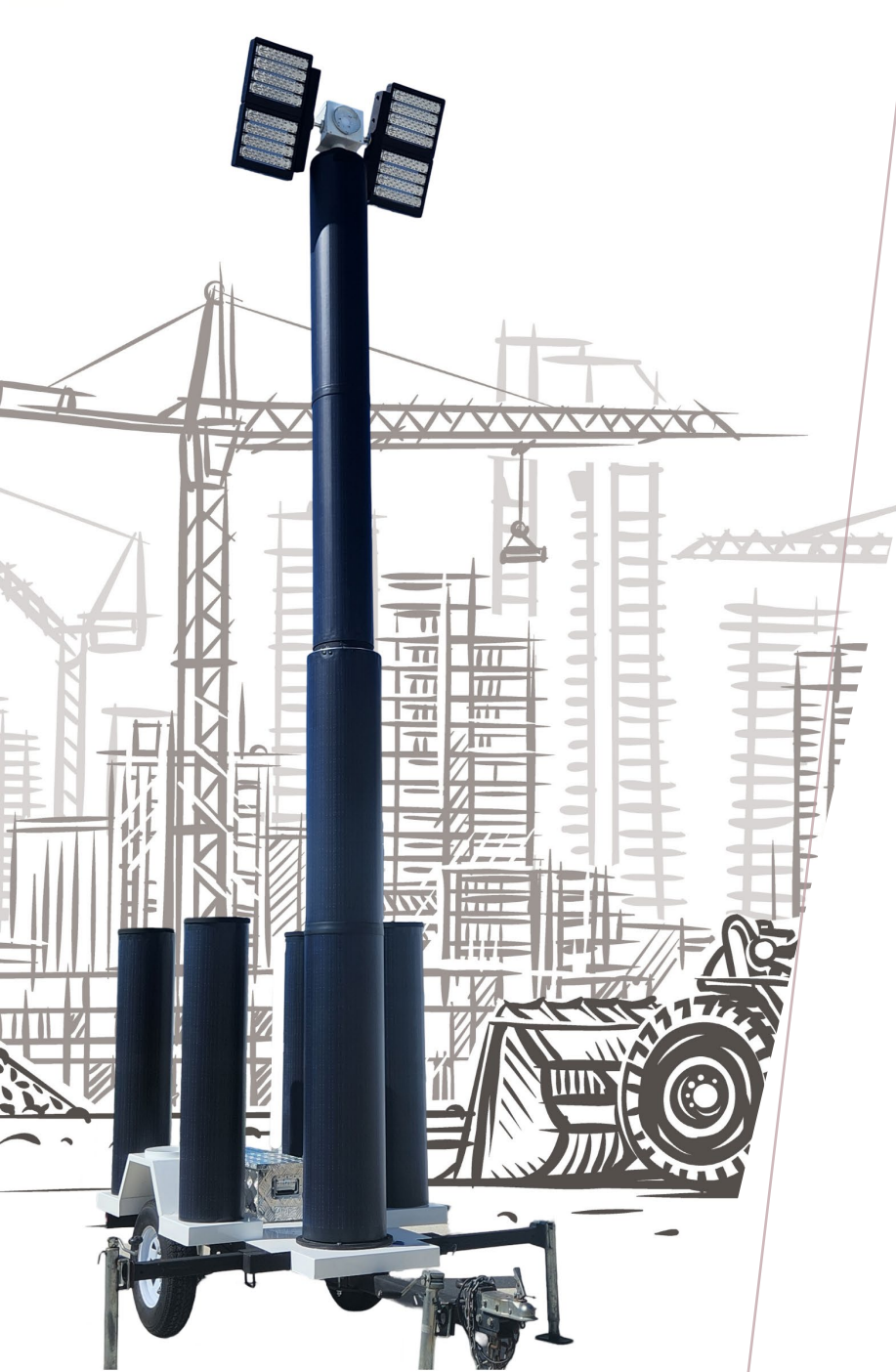
High-Intensity LED Floodlights: Multiple LED fixtures mounted at the top. Suitable for nighttime construction, security, or emergency use.

Security & Surveillance Integration: Centralized camera system integrated at the top. Enables live monitoring or recording of remote/critical zones.

Mobile and Deployable: Trailer-mounted with tow hitch for easy transport. Stabilizer legs ensure balance and durability on uneven terrain. Can be quickly deployed and repositioned as needed.

Durability & Resilience: Built for harsh outdoor environments. Designed to withstand wind, rain, and dust conditions often found in work zones.

Sustainable Infrastructure: Great for organizations aiming to reduce carbon footprint. Eligible for renewable energy grants and clean energy credits.



FIXED WIRELESS BROADBAND ACCESS

ClearWorld's RetroFlex offers innovative approach to deploying fixed wireless broadband in underserved and infrastructure challenged areas. By leveraging existing or new poles into a resilient solar power.

Rapid Deployment: Installs in hours not weeks. No trenching/conduit. Ideal for rural/suburban and hard-to-reach urban environments.

Flexible Broadband Expansion: Mounts wireless radios, antennas and mesh network nodes. Enabling public/private broadband infrastructure.

Reliable Power Backbone: Solar Power with upto 1140W of clean energy for critical recovery zones.

Scalable and Customizable: Modular wrap design fits new or existing poles. Supports Wi-Fi, LTE, 5G and Mesh Networking.

Applications:

Tribal Lands-Bridge the digital divide with fast community-wide Wi-Fi Access.

Smart Cities-Enable public connectivity at scale.

Disaster Recovery Zones- Maintain communication and lighting when the grid fails.

Low-Income Communities-Partner with non-profits and municipalities to extend access.





ClearWorld Integrated Solar



Conventional Solar

THANK YOU

- Larry Tittle
- 504-615-9000
- larrytittle@clearworld.us
- www.clearworld.us

