Etneo Italia Smart off-grid solutions

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Mail: energia@etneo.com - https://www.etneo.com/en/smart-energy/

Commercial Proposal

Supplier: Etneo Italia
Contact: Alessandro Drappo
Project name: HYBRID POLE
Quotation nr.: xx.xx of xx/xx/2020
Presented to:
Offer validity: 60 days

Technological revolutions: from cable to wireless

TELECOM IN THE 1970S

- Massive & Costly
- Wired Infrastructure

AFTER THE WIRELESS REVOLUTION

- Centrally Managed
- Low Cost
- Wireless Infrastructure

POWER TODAY

- Massive, Costly
- Inflexible
- Wired Infrastructure

AFTER THE NEXT POWER REVOLUTION

- Centrally Managed
- Low Cost
- Wireless Power Anywhere
- Off-Grid

Wireless Power (Off-Grid) is the next evolution in Power!

Delivering the Next Generation of Power with Smart Off-Grid

Our vision

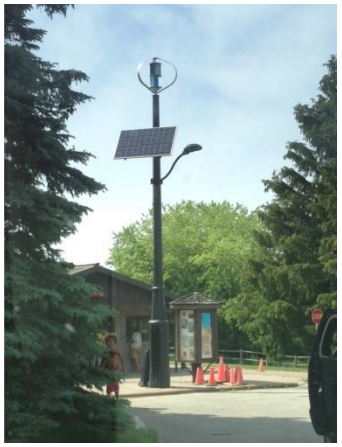
Etneo Italy, the Smart Off-Grid company, was founded on a vision of delivering clean, managed, “wireless power” to meet the global need for reliable, low-cost, solar and hybrid power for lighting, telecom, security, and Internet of Things devices.

What does Etneo offer and what solutions do you adopt?

- **Company: Etneo Italia srl**
  - Smart Off-Grid technology integrated into a variety of OEM products and Smart City product line
  - Charge controllers, communications, Illumience cloud management and control software
  - Managed off-grid power supply service
  - https://www.etneo.com/en/hybrid-energy/




- **Monitoring: integration of monitoring via cloud to off-grid solutions**
  - Hybrid lighting solutions (sun + wind) with remote control
  - Hybrid e-bike charging solutions (sun + wind)
  - 24V low voltage devices (sun + wind) power supply solutions

Software & Hardware

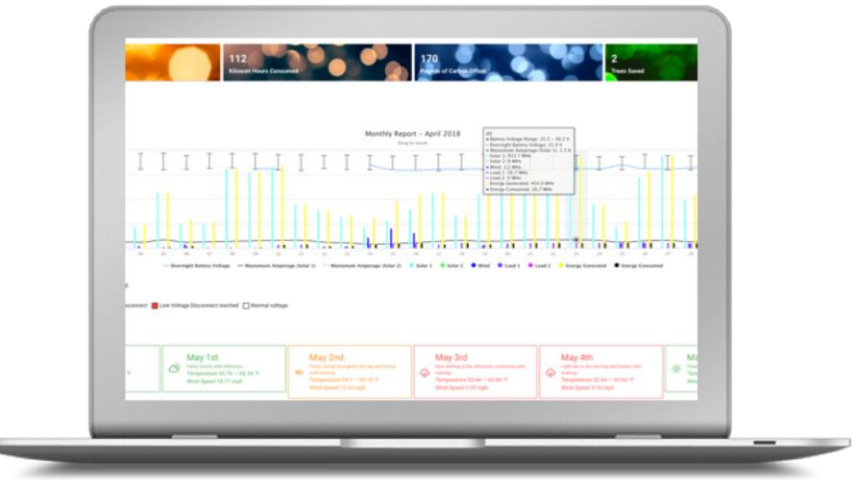
PRE SALES	INSTALLATION	AFTER SALES

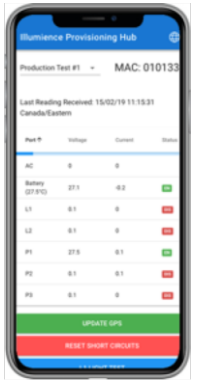
• Site lighting and power analysis
• Configured according to local conditions never undersized
• Quality components
  • Extensive options
  • Modular poles with options and customizations possible
  • Sun/Wind
  • Choice to charge 24 or 220V devices
  • Motion sensor
  • Security cameras
	• Drill and drop – no cabling/trenching cost
	• No technical training required
	• 14 Smart Meters on phone to validate install
	• Built in communications for Smart Off-Grid
	• Proven, tested to meet lighting standards
		• Smart Off-Grid means 7x24x365 remote monitoring, control and servicing
		• 80% reduction in maintenance costs
		• Proactive maintenance, service calls eliminated
		• Public website generated to promote green energy savings
		• Partnership approach – Illumient is there after the sale too!

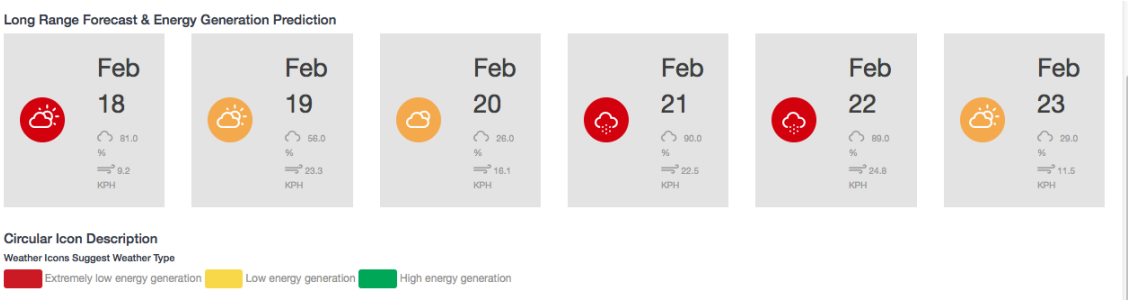
A technology to ***manage, control and maintain*** off-grid systems over the Internet

Smart Off-Grid, what is it?

A technology to proactively manage, control and supply off-grid systems via the Internet







Why Does Smart Off-Grid Matter?

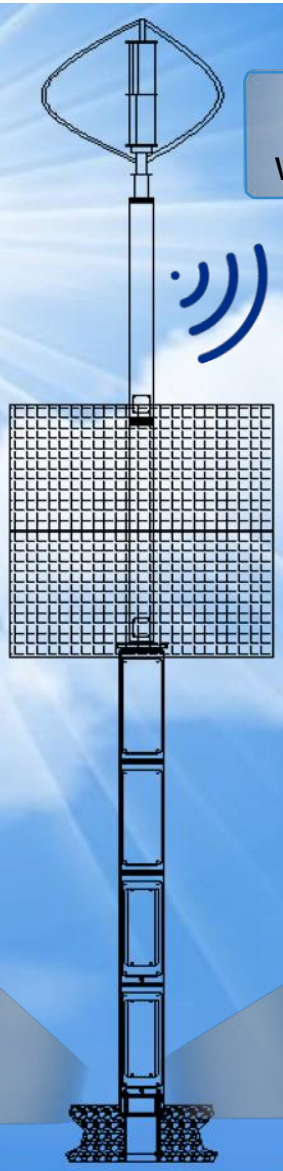
Smartphone App to Verify Installation

Brighter Lights w/ Configurable Profiles

Remote Visibility & Control - Increases Reliability and Reduces Installation & Maintenance

Modular engineered pole

SMART Controller Integrated Connectivity



Lead acid or Lithium batteries

Most Cost Effective & Reliable System in the Market!!

Why install Smart off-grid solutions in the world?

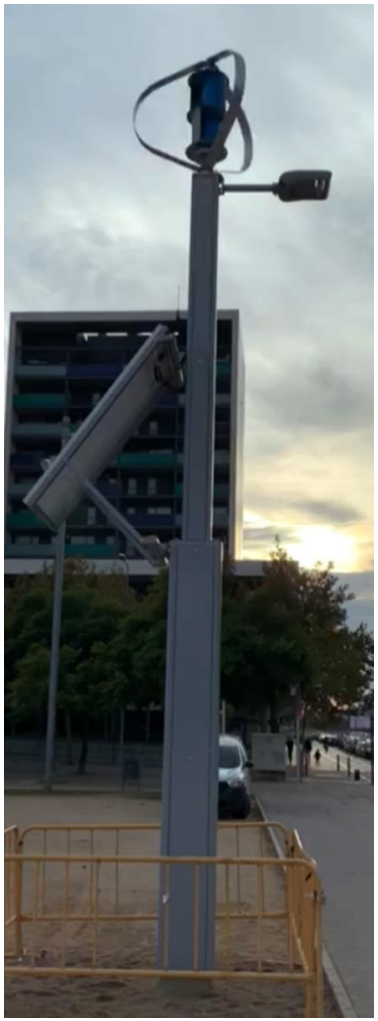
- **No mains power available in the proximity and very high or difficult to manage wiring and distribution costs**
  - Parks, remote areas, extra-urban areas, etc…
  - Examples:
- **Willingness not to disturb the existing environment**
  - Parks, urban roads, cycle paths, mountain trails, etc…
  - Examples:
- **Willingness to become really green and demonstrate sustainability**
  - Public administrations, schools, companies, etc…
  - Examples:

Why the modular pole and what can it become?

The modular pole offers the advantage of being a Smart container capable of hosting technology, the modularity allows an easy and rapid transformation of the final product. Thanks to the use of two renewable sources, which compensate each other, such as sun and wind, we can guarantee a continuous battery storage, this allows us to add low voltage powered devices to increase the level of services offered.

Some examples:

- Bicycle rack at the base of the pole and 220V sockets transform the streetlight into a system for charging e-bikes, electric scooters and similar products.
- Camera in the pole structure allows us to activate video surveillance solutions, license plate checks, parking control, fire signaling or dangerous situations with the help of aritificial intelligence systems, etc.
- Air quality or vibration monitoring sensors can be useful to create an extensive data collection network for the development of future projects related to the reduction of pollution or the control of seismic areas.



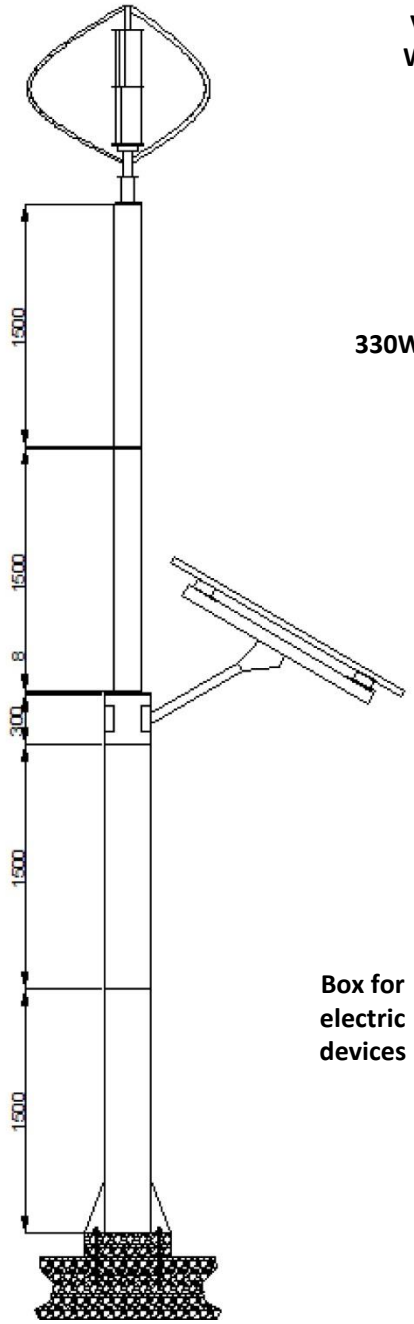


Hybrid pole 6m single pv

Off-grid Lighting

Hybrid pole 6m double pv

Illuminazione off-grid



Vertical axis
Wind turbine

330W single or double
solar panel

Box for
electric
devices

Configuration:

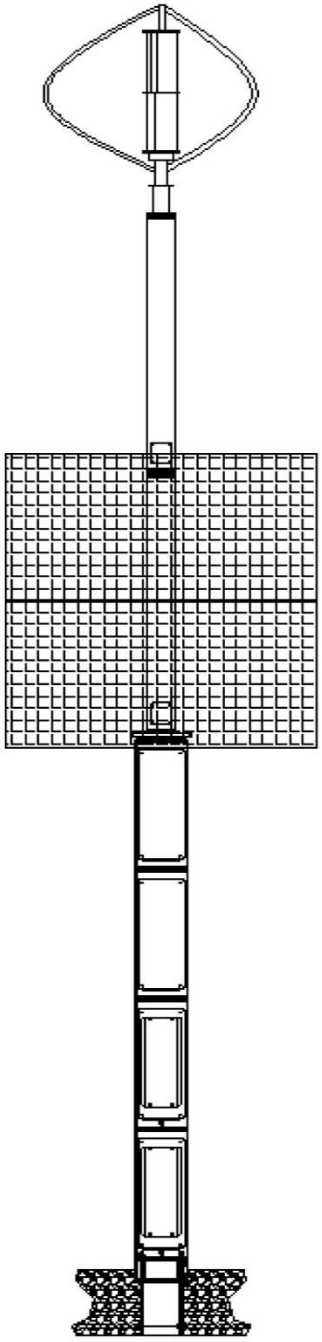
- Modular quadrangular pole in sandblasted steel of 6 m total height with cabinet for electric kit in the lower part.
- ***Smart Off Grid Controller*** complete with photovoltaic module and wind module wiring
- 3 years of monitoring and control included ***Illumience Smart Off-Grid cloud based monitoring and control***
- Includes 3 years of cellular communications for single-pole projects
- 30 to 120W LED lamp, 4.160 to 16.250 lumens, remotely dimmable (available options motion sensor)
- Single 330W monocrystalline solar panel with relative module-holder structure
- Two 24V 50Ah LiFePO4 type batteries configured in 24V-100A battery pack (2.5kWh storage capacity)
- 300/500W vertical axis wind turbine with unique double rotor design and vibration damper

Price based on project

What is excluded: transport, installation and various works related to the installation and preparation of the site, everything that is not expressly indicated.

Hybrid pole 6m

Off-grid Lighting



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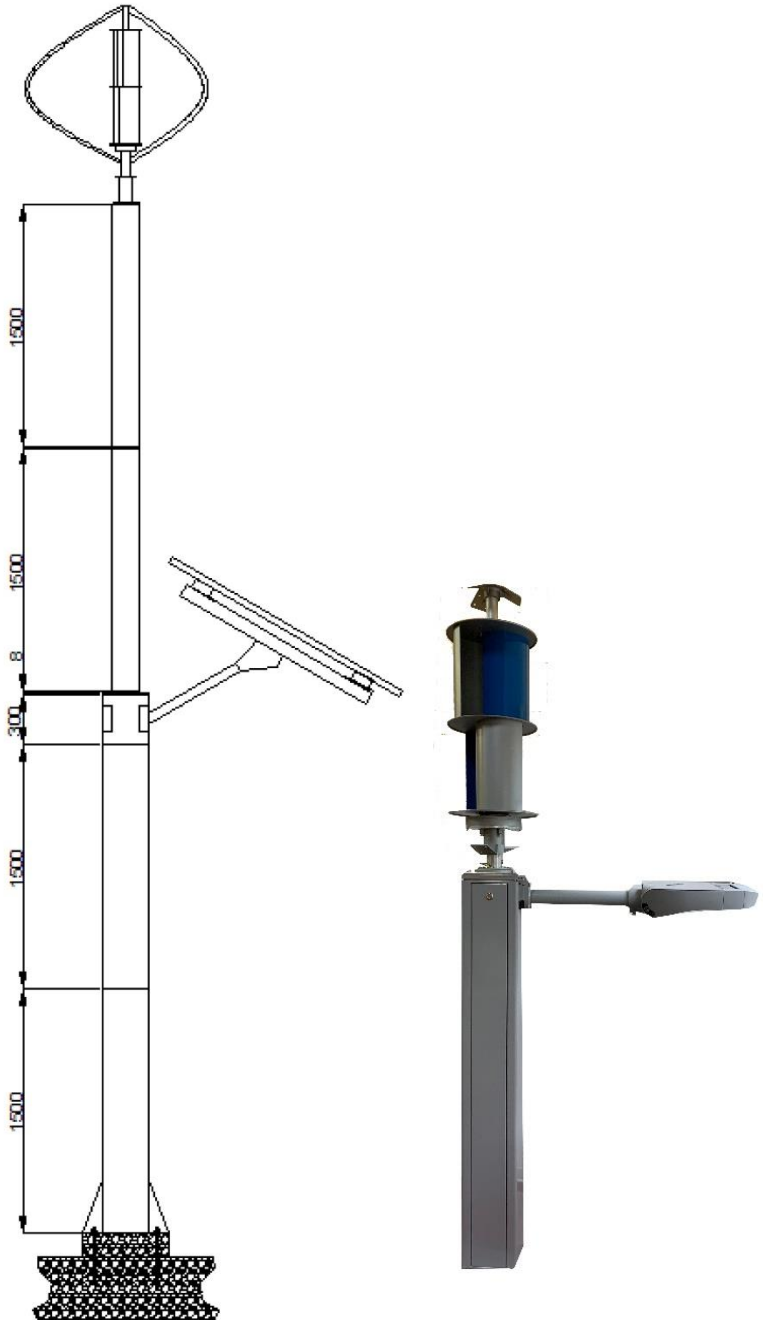
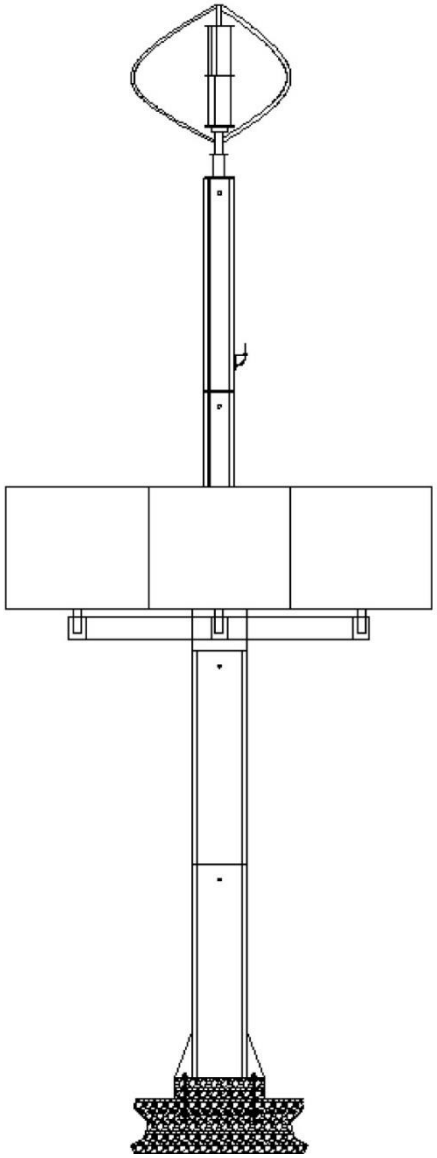
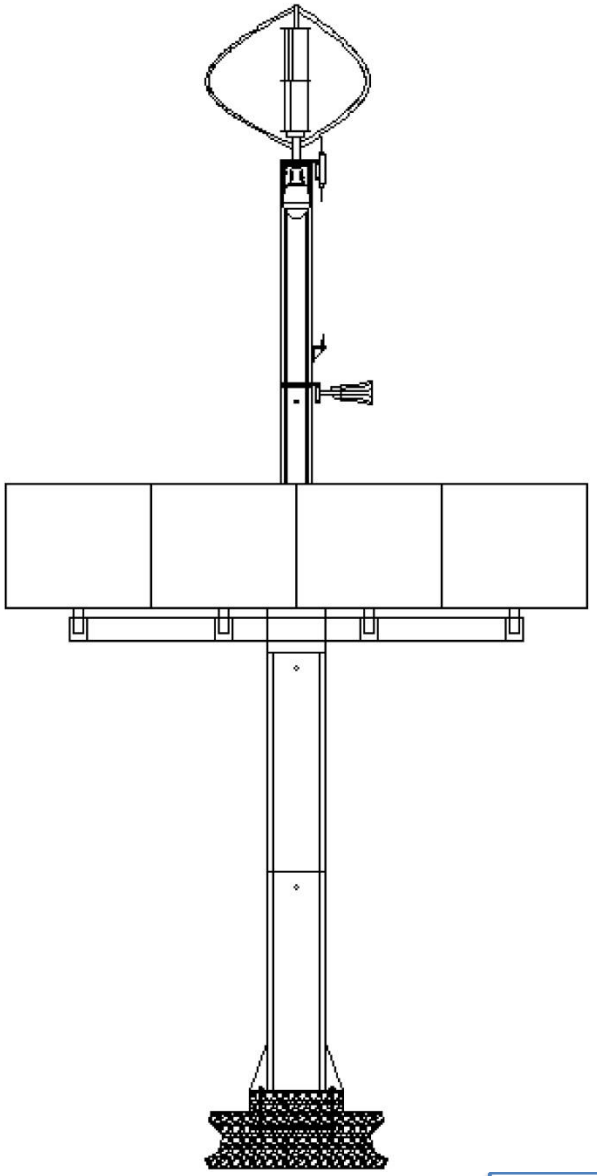


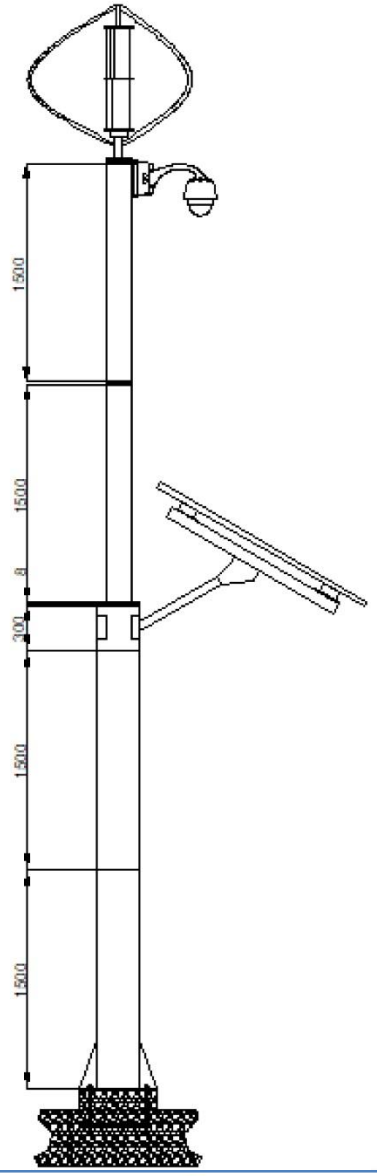
- Material: sand-blasted steel tube
- Treatments: tubular worked with 3d laser; Lathe joints with CNC machining center; Sheet metal components cut with laser plane; MIG welding made with semiautomatic positioners; CNC bending; Welding satin made in semiautomatic positioners; Sandblasting with microspheres; cataphoresis process; Powder coating; Anti-theft system with metal doors equipped with a lock with coded key; CE marking in each component and composition; Structural certification 1090; Guarantee of 300 hours of saline spray paint; Each individual component is marked with a code and a batch number
- Maximum height: 6,25m
- Weight: 150kg
- Standard color: Grey
- Degree of protection: IP20
- Pole composed of a spacer and a base basket, 2 rack modules to contain electronic/electrical devices H150cm, lock, shutter for the rack module, 2-pole extension H150cm, support for photovoltaic panels, support for wind turbine, support for led lamp .

Hybrid pole 6m

Off-grid Lighting



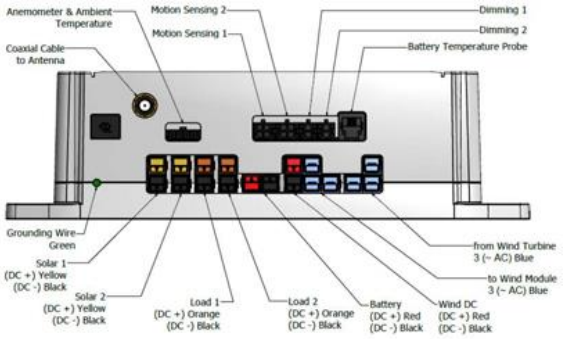




3 to 4 solar panels

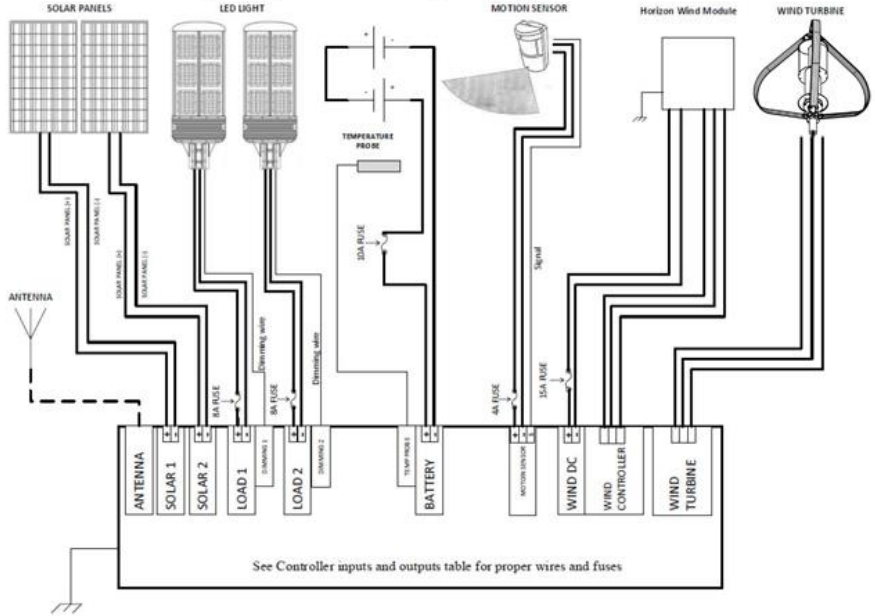
Modular hybrid smart pole

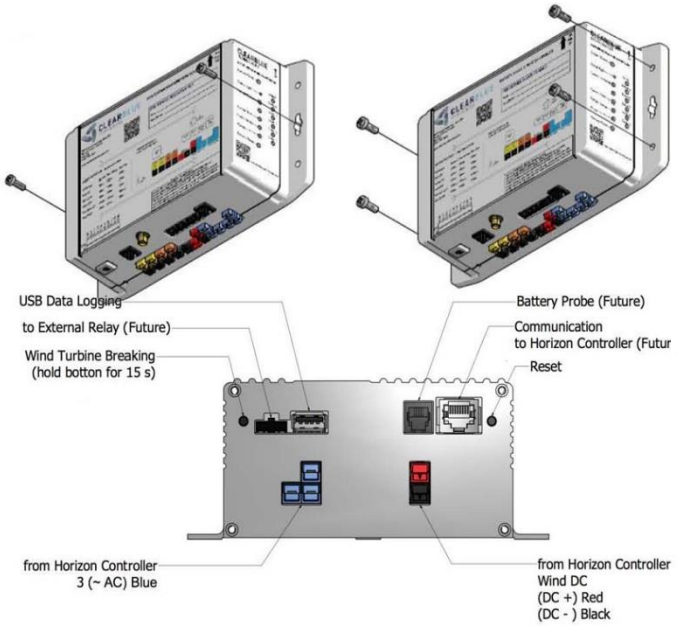
Solar and main controller



Wind controller

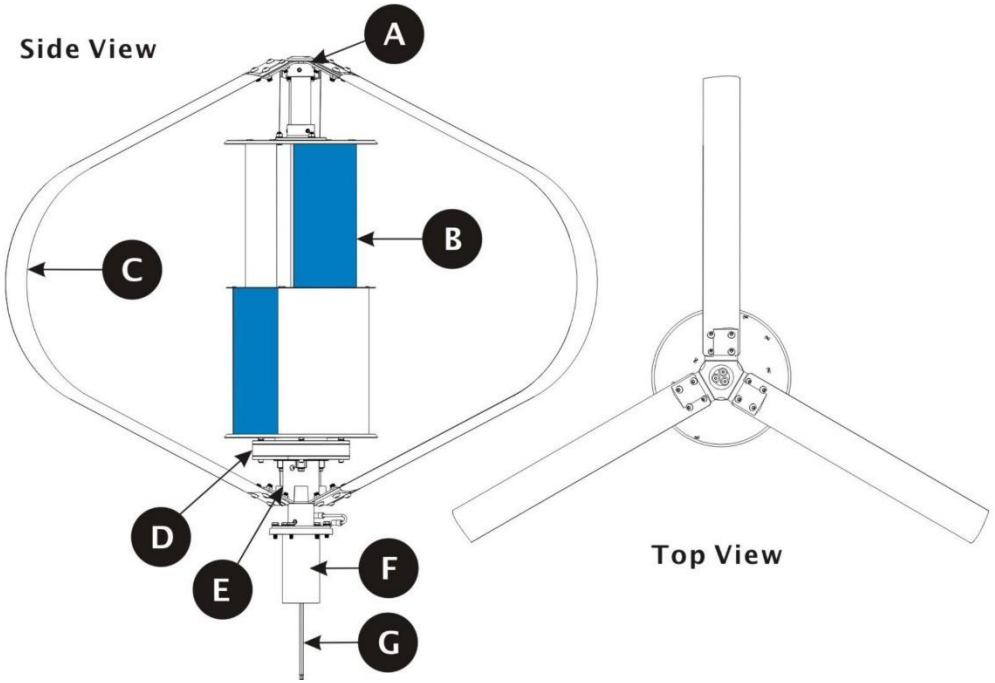
Diagram (2): a schematic diagram of a generic installation

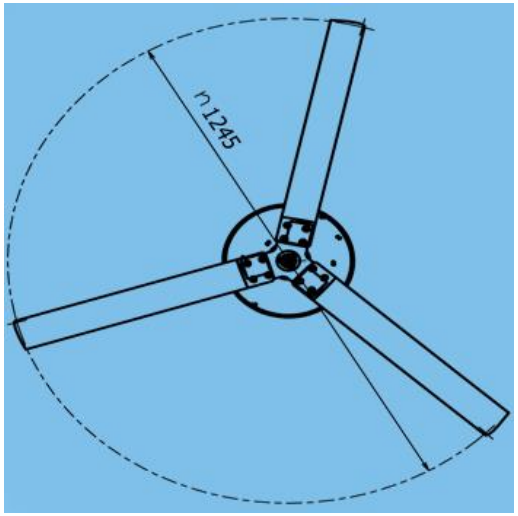


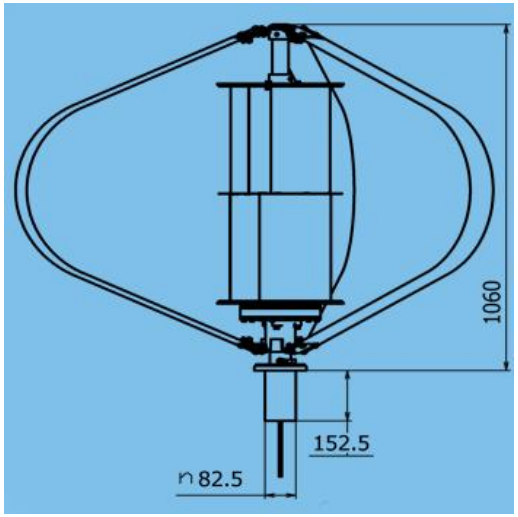


Components

Special controller







Parts	Description
A	Upper Darrieus Blades Connector.
B	S-Type Savonius.
C	3 Darrieus blades with built-in airfoil.
D	3-Phase, Direct Drive, Weather Sealed, Mechanically Integrated Permanent Magnet Generator.
E	Lower Darrieus Blades Connector.
F	Damper.
G	3-Phase R-S-T Generator Wires.

Components

Vertical axis wind turbine

Number of LEDs	18
Luminus Flux (lm)	5480
Power Cconsumption (W) Max	42
LED Driver Current (mA)	700
Correlated Color Temperature (CCT) (K) (Typ.)	4000K – 5000K
Operating Voltace (VDC)	18-32 VDC
Color Rendering Index (CRI)	>75
Power Factor (PF)	> 0,95 at full load
Total Armonic Distortion (THD)	< 20% at full load
Operating Temperature Range (C°)	> -40 ~ +55C°
Ingress Protection Classification	Suitable for Wet Conditions, IP66 / IP54* Rating. * With Drain Holes
Material Characteristics	Aluminum Die Casting, UV Resistant PC
Weights (Kg)	7
Surge Protection	10KV, 10KA

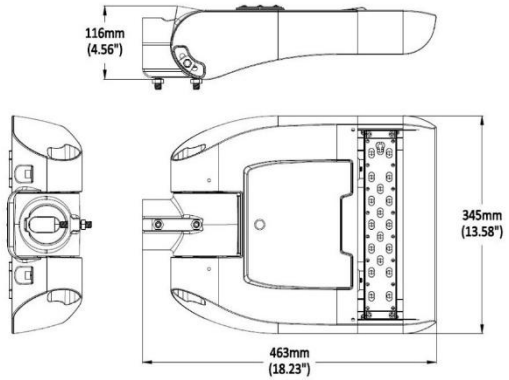
Some peculiar details of the product:

Each pcb is mounted with a transient voltage suppressor to protect the LEDs from voltage transients induced by lightning and other transient voltage events

The high uniformity LED optics are made of impact resistant polycarbonate and resistant to UV rays

The metal plate provides double protection for the LED lighting engine and extends the service life of the LED optics.

Each LED module is 100% tested before assembly, which is classified as IP67.



CERTIFICAZIONI PRODOTTO

Componentes

LED light 40W

Number of LEDs	36
Luminus Flux (lm)	8600
Power Cconsumption (W) Max	61
LED Driver Current (mA)	700
Correlated Color Temperature (CCT) (K) (Typ.)	4000K – 5000K
Operating Voltace (VDC)	18-32 VDC
Color Rendering Index (CRI)	>75
Power Factor (PF)	> 0,95 at full load
Total Armonic Distortion (THD)	< 20% at full load
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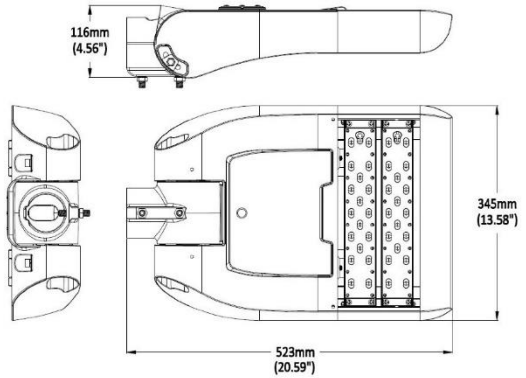


CERTIFICAZIONI PRODOTTO

Componentes

LED light 60W

Nominal Voltage	25,6V
Nominal Capacity	50Ah
Internal Resistance	≤ 50mΩ
Cycles	>2000 cycles
Self Discharge	<3% per month
Energy Efficiency	>96%
Charge Voltage	28,8 ±0,4V
Charge Mode	CC/CV: Costant Current/Constant Voltage
Contiunuous Charge Current /Maximum Charge Current	25A/50°
BMS Charge Cut-off Voltage	29,4±0,2V
Contunuous Discharge Current	75A (1,92kW)
Maximum Discharge Current (<30s)	115A (3,0kW)
BMS Discharge Cut-off Voltage	20V
Charge Temperature Range	0~45C° at 60±25% relative humidity
Discharge Temperature Range	-20~60C° at 60±25% relative humidity
Storage Temperature	0~40C° at 60±25% relative humidity
IP Protection Level / Casing Material	IP66 / ABS
Dimensions	L 260* W 168* H 212mm
Weight	13,6Kg
Terminal	M8
Certification	CE, RoHS, UN 38.3, UL and CB

The use of **LiFePO4** batteries offers significant advantages over lead technology: small size, higher energy density, possibility of deep discharge up to 100%, higher resistance to high temperatures, longer life. Integrated BMS with automatic cells balancing.

Components

LiFePO4 24V50Ah (*2)

335 Watt

MONO HALF CELL SOLAR MODULE

Features

High power output
Compared to normal module, the power output can increase 5W-10W

High PID resistant
Advanced cell technology and qualified materials lead to high resistance to PID

Excellent weak light performance
More power output in weak light condition, such as haze, cloudy, and morning

Lower hot spots
Reduce the hot spots and minimize panel degradation

Extended load tests
Module certified to withstand front side maximum static test load (5400 Pascal) and rear side maximum static test loads (3800 Pascal) *

Withstanding harsh environment
Reliable quality leads to a better sustainability even in harsh environment like desert, farm and coastline

Certifications and standards:
IEC 61215, IEC 61730, conformity to CE

The photovoltaic panel actually used is a model with power of 330W monocrystalline type with half-cell technology for increased energy yield.

Components

Solar Panel 330W

Electrical Characteristics

STC	STP335S-A60/Wfh	STP330S-A60/Wfh	STP325S-A60/Wfh
Maximum Power at STC (Pmax)	335 W	330 W	325 W
Optimum Operating Voltage (Vmp)	34.9 V	34.7 V	34.5 V
Optimum Operating Current (Imp)	9.60 A	9.52 A	9.43 A
Open Circuit Voltage (Voc)	40.9 V	40.7 V	40.5 V
Short Circuit Current (Isc)	10.21 A	10.13 A	10.04 A
Module Efficiency	19.9%	19.6%	19.3%
Operating Module Temperature	-40 °C to +85 °C		
Maximum System Voltage	1000/1500 V DC (IEC)		
Maximum Series Fuse Rating	20 A		
Power Tolerance	0/+5 W		

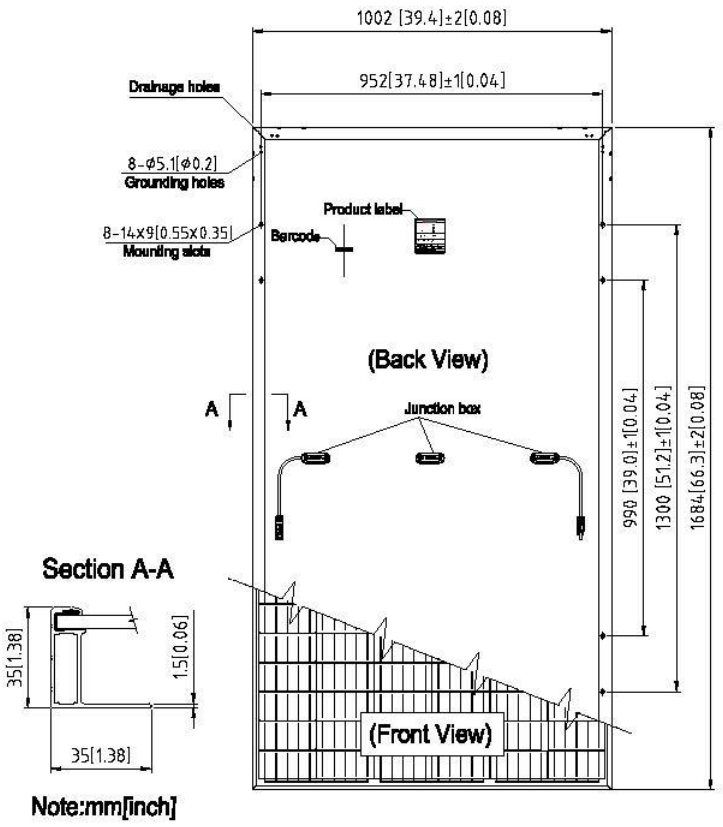
STC: Irradiance 1000 W/m², module temperature 25 °C, AM=1.5;
Tolerance of Pmax is +/- 3% and tolerances of Voc and Isc are all within +/- 5%.

NMOT	STP335S-A60/Wfh	STP330S-A60/Wfh	STP325S-A60/Wfh
Maximum Power at NMOT (Pmax)	252.1 W	248.6 W	244.9 W
Optimum Operating Voltage (Vmp)	32.1 V	31.9 V	31.7 V
Optimum Operating Current (Imp)	7.85 A	7.79 A	7.72 A
Open Circuit Voltage (Voc)	38.3 V	38.1 V	37.9 V
Short Circuit Current (Isc)	8.24 A	8.18 A	8.11 A

NMOT: Irradiance 800 W/m², ambient temperature 20 °C, AM=1.5, wind speed 1 m/s;

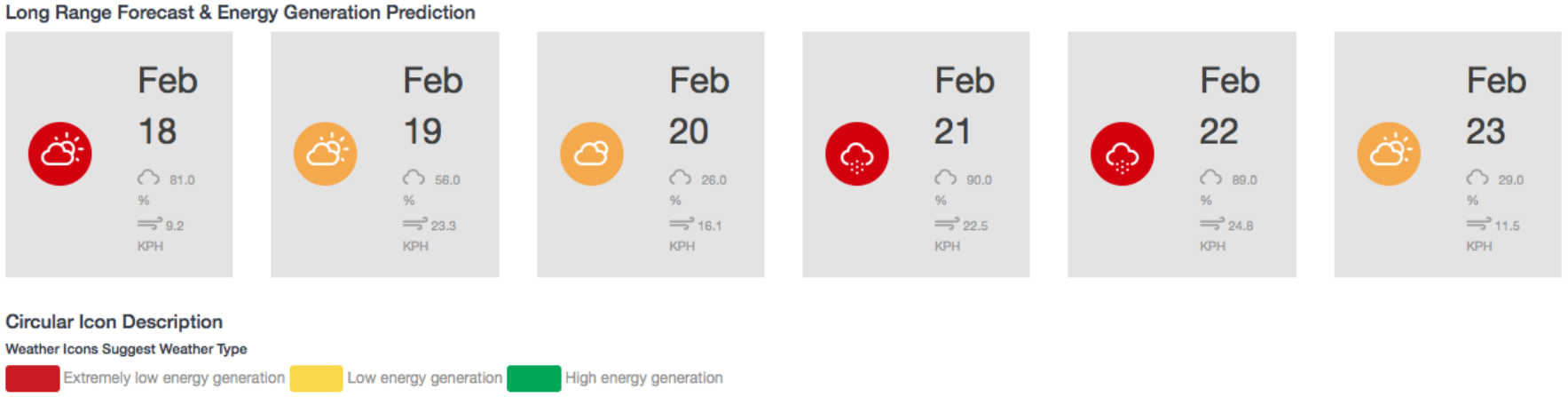
Temperature Characteristics

Nominal Module Operating Temperature (**NMOT**)	42 ± 2 °C
Temperature Coefficient of Pmax	-0.37%/°C
Temperature Coefficient of Voc	-0.304%/°C
Temperature Coefficient of Isc	0.050%/°C

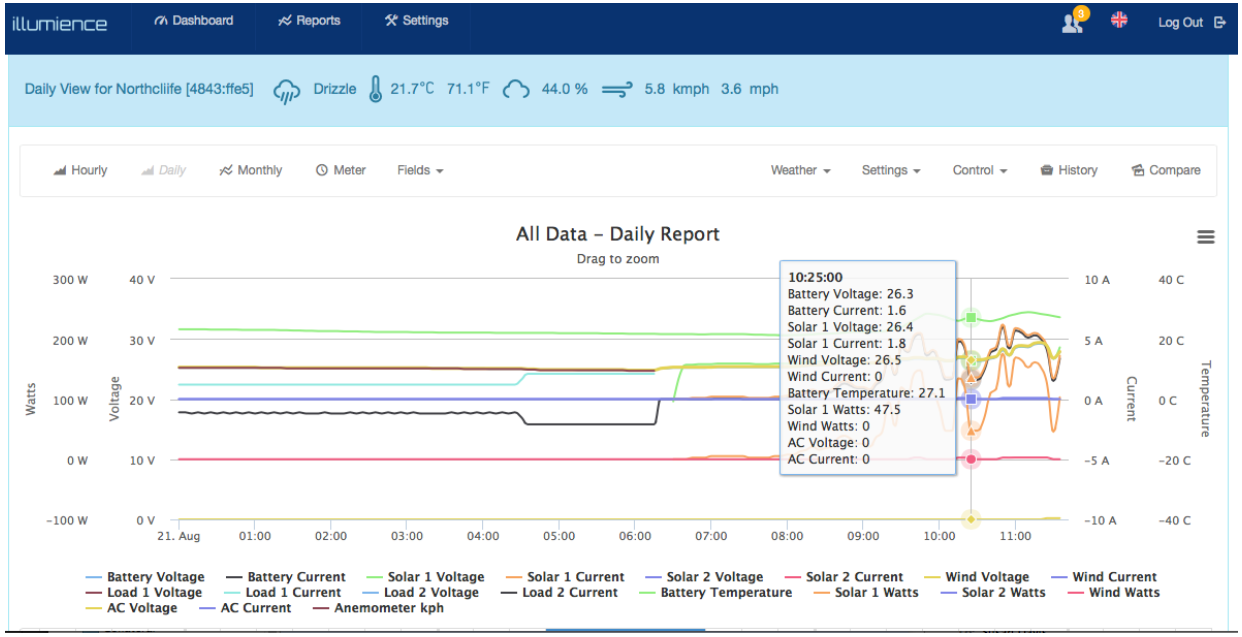


Components

Solar Panel 330W



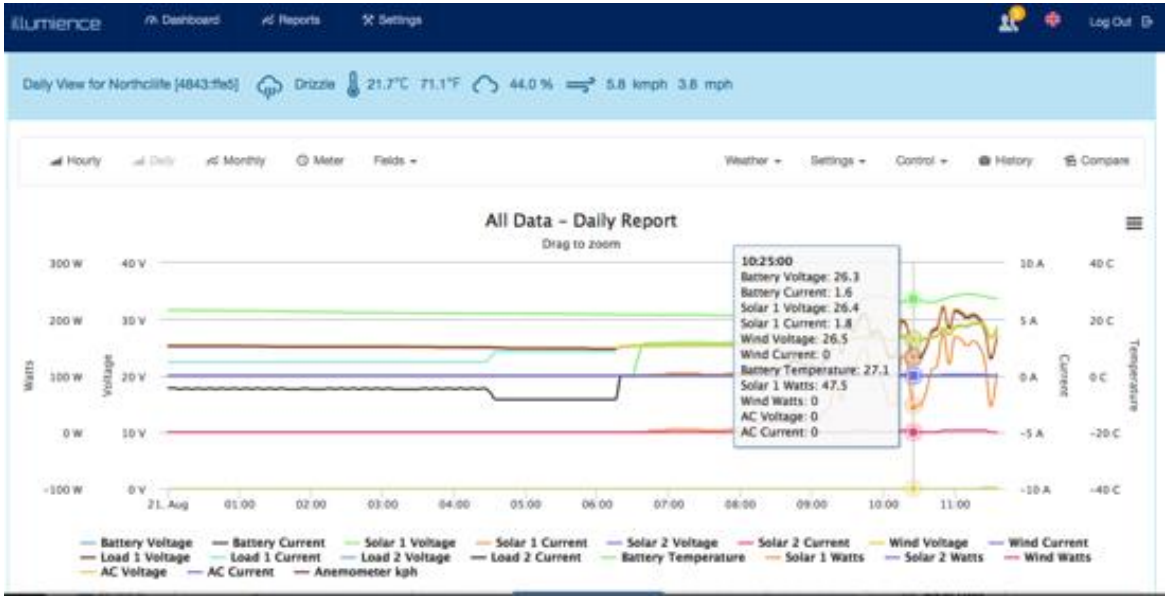
Real-time (and historical) monitoring via cloud of the components installed on the pole. Ability to set proactive and predictive alerts and error / alarm messages for real-time interventions and remote maintenance.
Connection to the weather forecast for the following week to always keep under control the possible energy generation, are some of the features included in the package offered.



Components

Cloud remote control

Illumience Remote Management and Control



Entire system is fully remote controllable and adjustable via Clear Blue's cloud-based Illumience software, including charging parameters, temperature compensation, remote solar panel troubleshooting and testing, emergency remote override, lighting profiles and more.

Specification:

- Smart Off-Grid remote management and monitoring service must be delivered by the supplier on an ongoing basis with remote technical trouble shooting and support
- Remote management and control is delivered via a Cloud-based service
- All communications between units and Cloud shall be fully encrypted
- System shall have ability to provide forward looking weather forecast for the site with indications of whether the system will run out of energy
- User configurable alarms for any system failures and also WARNING alarms should an anticipated outage be expected in the near future
- Installation remote commissioning test must be able to do a light test, solar panel test, battery test, short circuit tests, etc.
- Full ability to remotely control each individual system AND also all systems together as a group
- Ability to detect shading of the system during different times of the year and also be able to adjust individual systems based upon shading.
- Ability to adjust lights remotely to ensure system up time even during extra long 'no sun' and low sun periods, up to 5-10 days.

THANKS FOR THE ATTENTION

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