

# SOLAR LIGHTING PRESENTATION



## **SHORT EXPLANATION OF A SOLAR LAMP**

The cost of a solar lamppost in recent years was quite high, however more than a normal sodium vapor mains-powered or more recent LED luminaire, still today the cost of good quality models whether they are all in one or all in two if well made it is still medium high but you still need to start making some distinctions.

The first distinction is of an aesthetic nature, the lighting fixtures that for simplicity we will call all in one solar lamp have everything integrated in a single body, therefore photovoltaic module, batteries, controller, crepuscular and LED are integrated in a single body, this improves the ease of installation or replacement of the mains-powered lamppost and is less impactful on a visual level.

The all in two model vice versa has everything integrated with the exception of the photovoltaic module, this could suggest that an all in two model is better than the all in one model.

This is not true in reality, the total quality of the solar lamppost depends on the type of module used, the power and type of cell, the capacity expressed in Ah of the battery and the type of battery itself, the controller that we could somewhat define as the motor of the solar lamppost and finally by the LED used and by the Chip.

As you can understand something that seems simple it's not simple at all, it's not enough to actually put these components together to create a good product, like all magic, the components must be skillfully integrated and chosen.

But how does a solar lamppost work?

In exactly the same way as a lamppost connected to the network, the only difference is that instead of taking energy from the electric cable connected to a central unit, the LED lamp is powered by a battery that is charged by the sun and to begin to debunk some commonplace the battery it recharges even in bad weather and in any case if the battery pack is well calibrated a solar street lamp could function from 3 to 5 days without receiving recharge.



But what are the advantages for an Administration or an Industrial Consortium in having solar lighting instead of network-connected lighting?

The first and most obvious is to work with ZERO EURO of management costs, once installed the solar street lights have no consumption and allow you to reduce 100% of management costs.

At the end of these few introductory pages we have included a project carried out for a municipality in the province of Frosinone, the municipality in question has about 3,000 inhabitants and about 1,000 LED street lamps currently powered by the grid, with a consumption of 100,000 euros/year, the cost of replacing the entire street lighting fleet would be eliminated in 3 and a half years, the LEDs used and the batteries have a life of around 13 years, the savings for the Municipality in question are easy to calculate and all without be subject to fluctuations in the energy market.

So the second big advantage is being able to free up resources that are essential for the proper functioning of the Administrations, and to a greater extent than the small ones, freeing up 100,000 euros a year means having money to invest, for example in a gym, in a library, in a Center for the elderly that would improve the lives of citizens or simply reduce budget deficits.

Another important thing, in the construction of roads or in the opening of new roads or districts, lighting must always be considered, the use of solar street lights allows you to do this without connection requests, without work costs for cable ducts, without wait, all you need to do is build the plinth, install the pole and mount the appropriate lighting fixture.

As far as maintenance is concerned, the solar street lamps are virtually maintenance-free unless they are on a particularly dusty road and our products are guaranteed for 5 years instead of the 2 years provided by the Italian legislation for network-connected LED street lights.

But now we want to talk a little more in detail about the solar street lamps we are dealing with.



The products in question are designed by an Italian engineer residing abroad and industrializes in the USA, the production is made in China, but this is actually not a positive aspect, many of the companies that in Europe say they do production buy the product semi-assembled by China and then they brand it, what matters in reality is not where it is produced but how it is made.

Let's talk for a moment now about how it's done.

Solar street lamps normally use a shell where the components are then installed, components that are always single, therefore, a battery, a controller, an LED illuminating part, a solar panel, both poly and mono.

The classic configuration is usually functional, but sometimes this product may be subject to infiltration of water which jeopardize proper functioning.

In our Lamppost instead there is no shell, the batteries (which use Lithium Titanate cells) are split, the controllers are split, the same goes for the solar panels and the controllers, in just one Solar Lamppost there are 2 Solar street lamps, while for what concerns the LEDs their brightness is 210 Lumen instead of the 120/160 Lumen of the standard productions.

The guarantee on defects is 5 years, so it means that we are sure of what we do, the guarantee on products by law in Italy is only 2 years, which means that we give more than double the guarantee we could give.

What does this mean?

Simply two things, that in order to not work, one of our solar street lamps should have twice the defects of another standard, that the relative brightness is greater than the others and that we are very sure of the quality, giving more than double the guarantee we could give .

Having said that, I leave you to read the project that we have curated for the Municipality in the Province of Frosinone, I think the economic advantages of solar lighting are quite clear.



**HYDRA**  
120W -6,200 Lm



**TAURUS**  
120W -7500 Lm

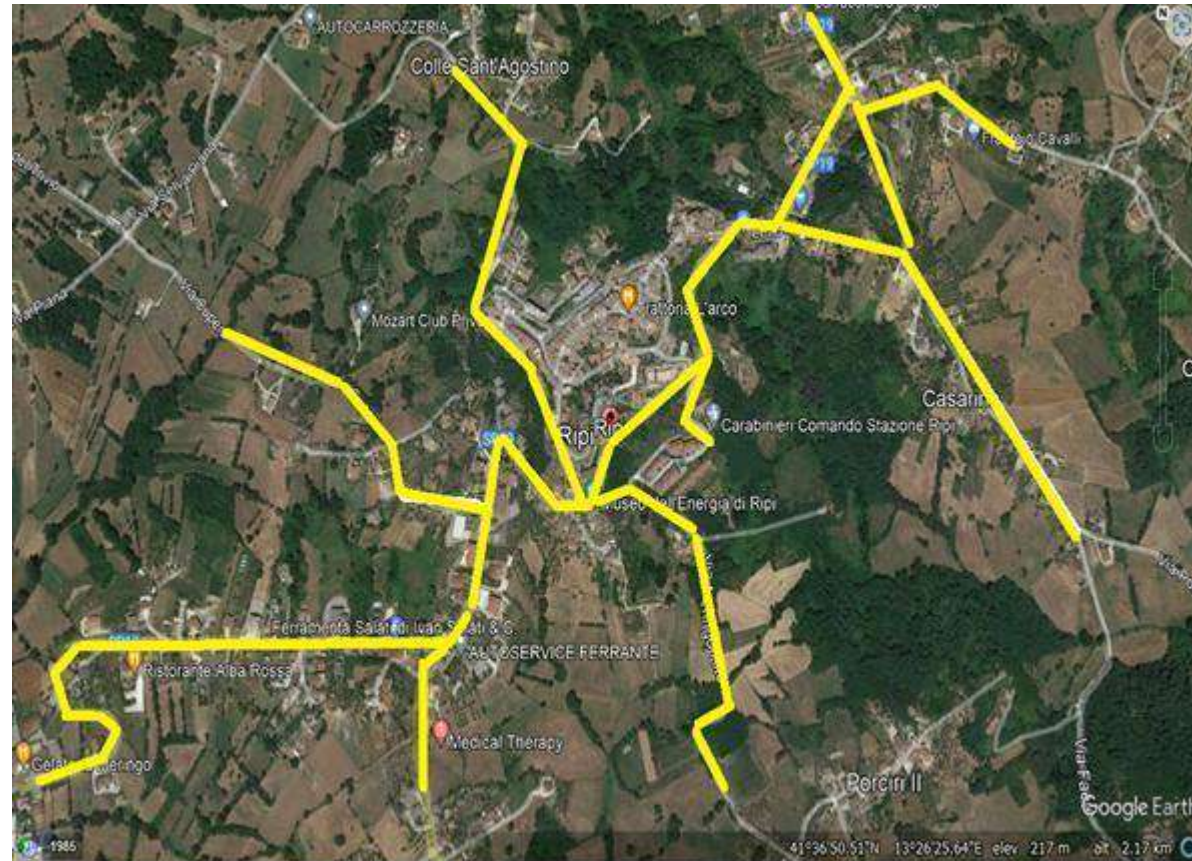


**PEGASUS**  
180W – 8,000 Lm

Primary street lighting project

# PROGETTO

The project is aimed at the roads and traffic areas of the municipality in the province of Frosinone, which already has poles at a height of 7 m.



PROVINCIA DI FROSINONE

The outdoor lighting standard is considered, for public lighting installations in the streets, which asks us for a certain number of lux.

Each type of road has a requirement in terms of lux, in this case see the table on the right, this project concerns primary roads with an average of 4 lux.

The average value is measured according to the height of the posts, the inter-post distance and the width of the road, it is not the maximum point of light perpendicular to the lamppost. That is why we carry out a lighting calculation in the DIALux program to ensure that our customers' projects comply with the established standards, thus having correct lighting that offers safety and comfort to the user.

## Lux advised NOM-013-ENER-2013

Classification	Lighting medium
Highway	5
Controlled access roads (40km/h)	13
Main roads and road axes	15
Main roads and collectors	10
Secondary and residential roads	4
Parking lots	25



## PROPOSED SOLAR LIGHTING

### Specifications

Model	Hydra 120W - <b>6,200 Lm</b>
LED	2 circuits LED 120 LED of 3030 / 3000K-6000K
Lithium battery	2 BAT 3.2V Titanate 18,000MAH each (Total 36,000 MAH) 460.8 Wh
Solar panel	Dual panel 6V 35W + 35W (Total 70W) Mono-crystalline
Controller	2 integrated controllers
Height to install	7m to 10m (recommended)
IP protection degree	IP65
Solar charging times	6-8 Hrs. with sunlight
Download time	12 Hrs. continuous
Size	64*345*1005 mm.
Weight	12 kg
Certifications	CE/FCC/ROHS/BV/BSCI/ISO
Warranty	5 years

### HYDRA 120W

SOLAR LIGHTING



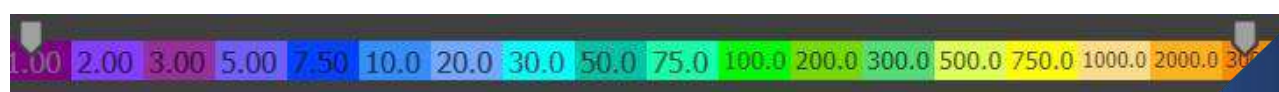
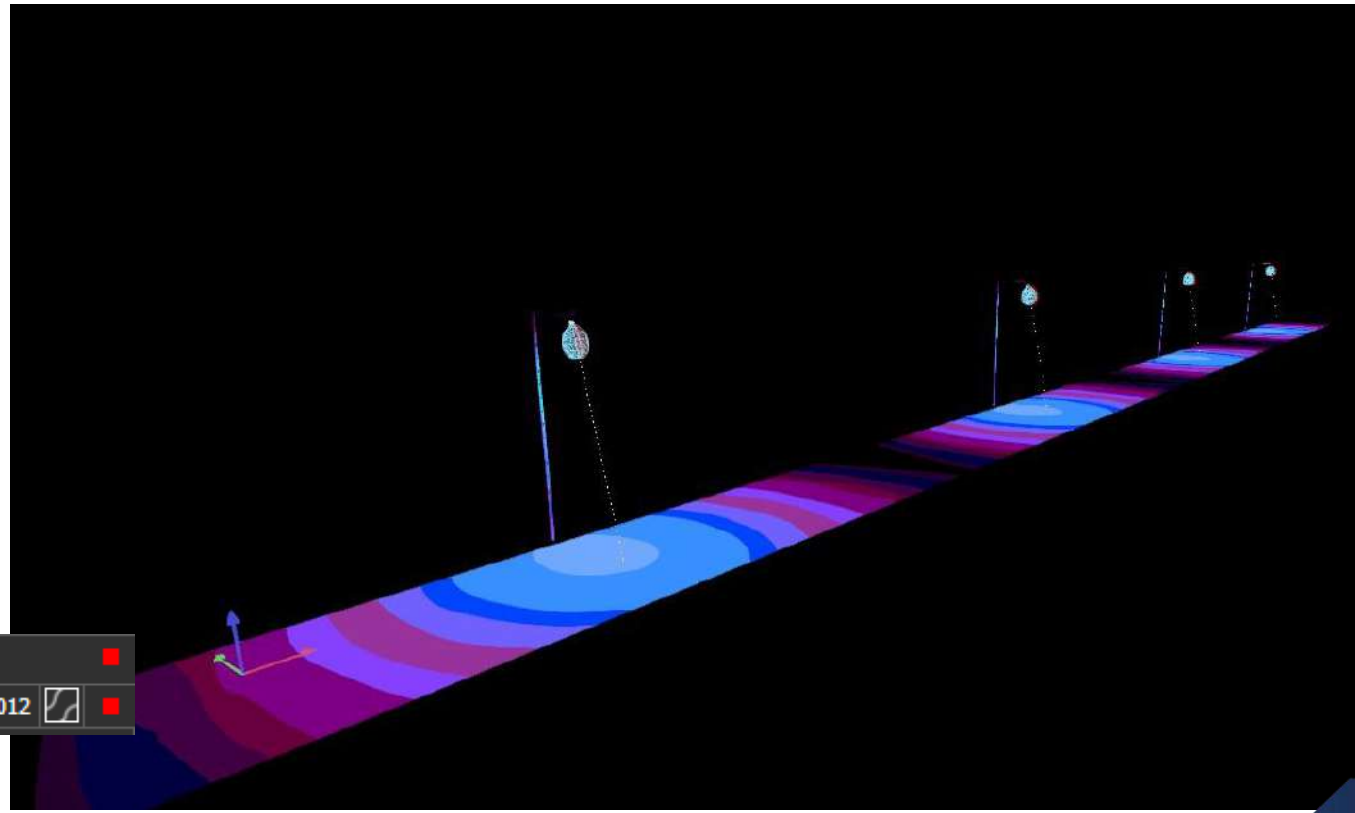
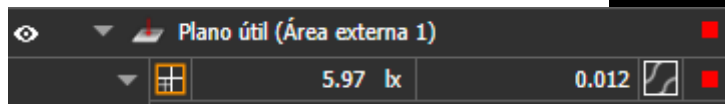
**Hydra 120W** Total: 1.000 Unit Pole height: 7m Road width: 6m



# DIALux

**DIALux calculation**  
False Color Isometric

**Maximum Transit Area: 24 lux**  
**Average: 18.6 lux**



DIALux



**DIALux calculation**  
False Colors  
Top view

DIALux

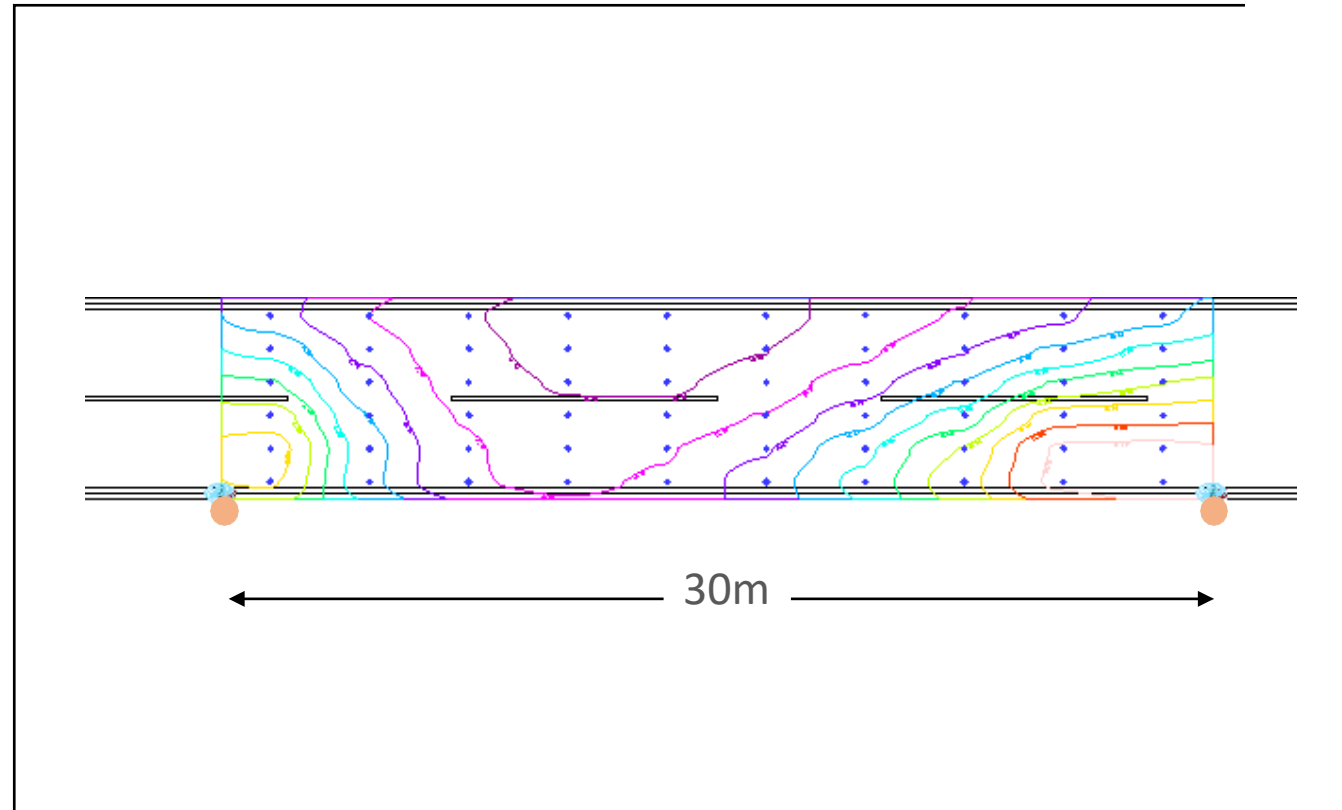
**DIALux calculation**  
Simulation of  
Isometric lighting



## LUMINAIRES LOCATION

**Hydra 120W**  
1000 unit

Pole height: 7m  
Road width: 6m



## PROJECT COSTS

**Note:**  
80% down payment, 20% before delivery. 60-90 days for delivery.  
It is recommended to leave the lighting fixtures exposed to the sun for 3 days to charge the batteries.  
The proposal is based on the indications provided by the Client.  
Installation completion time 20 days.  
It is recommended to do a test before final purchase.  
NB Costs and times depend on the specific needs of the request,  
these data refer to the Project carried out and can obviously vary  
based on the size of the roads, pole height, distance and quantity.

## PROJECT COST WITH ELECTRICAL APPLIANCES OF THE SAME POWER

Components of a work that uses lighting electric:

Electrical Appliance Cost Wiring / Transformer Conduit

Installation / labor

It is calculated that each electrical appliance of equal power in the proposal has a cost of: 300 euros excluding VAT and assembly excluded

The average life of a solar light is 10 years, with a 5 year warranty.

The cost of maintenance is around 1,000 euros/year, the cost of spending due to electricity is zero

In addition to the installation costs, the electrical appliance requires a constant power supply with an average cost to date of approx 100,000 euros/year, the cost of maintenance and any replacements is certainly greater than solar lighting, the average warranty of the products is 2 years.

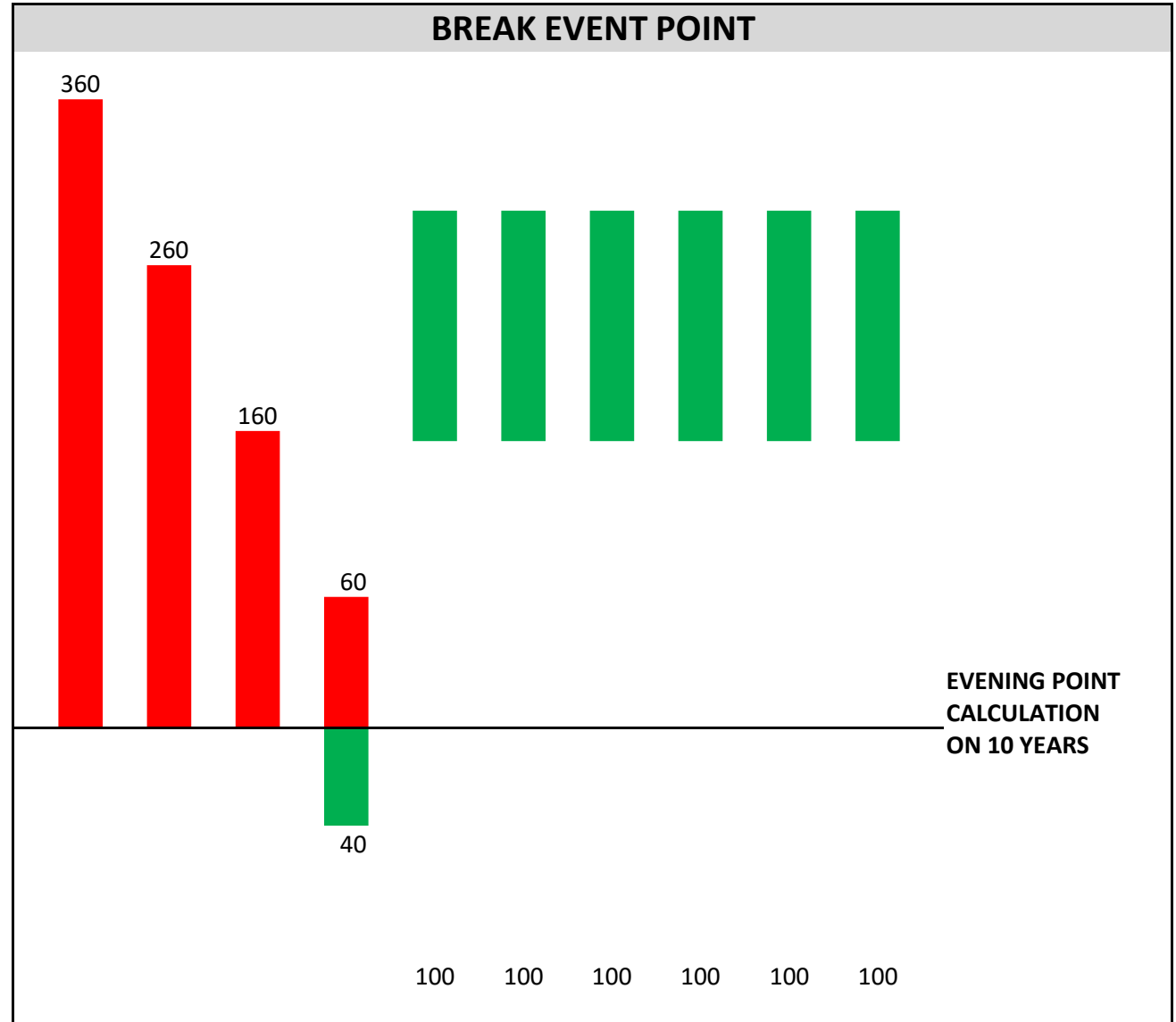
We don't take into account the number of electric lights that fail each year. This type of failure does not depend on the quality of the appliance itself, but rather the electrical network is unstable with current peaks that can damage the electrical appliance, these costs are very high, not so much for the cost of the electrical appliance, but for the high costs of maintenance personnel and cranes with baskets for overhauling.

Electricity companies increase their rates by 8 to 15% every year. Which means that in 5 years this price will increase.

## BREAK EVEN POINT

From the indications given the expense relative to the cost of energy for street lighting Municipality is about 100,000 euros / year, we owe it to this add the maintenance costs and the lower duration related to the solar LED system, an average Product Warranty is 2 years against a 5 year Product Warranty offered, I think it is useless to comment on the operating costs, it is obvious and clear that the solar LED it has no competitor in terms of operating economy.

With this technology, the Municipality can free up around 100,000 euros/year to be used in other activities, offer better services to citizens or simply reduce any budget debt.





## COMPARISON BETWEEN LITHIUM BATTERIES

On the market there are 6 types of lithium batteries with different characteristics and useful life.

Battery Type	Battery life
1. Lithium cobalt oxide (LiCoO <sub>2</sub> )	1000 cycles = 2.7 years
2. Lithium Manganese Oxide(LiMn <sub>2</sub> O <sub>4</sub> )	700 cycles = 1.9 years
3. Lithium, nickel, manganese and cobalt oxide (LiNiMnCoO <sub>2</sub> )	2000 cycles = 5.4 years
4. Lithium iron phosphate (LiFePO <sub>4</sub> )	2000 cycles = 5.4 years
5. Lithium, nickel, cobalt and aluminum oxide	500 cycles = 1.3 years
6.-Lithium Titanate(Li <sub>4</sub> Ti <sub>5</sub> O <sub>12</sub> )	5000 cycles = 13 years

Battery Life ECO ENGINEERING  
IMPLEMENTATION e  
SUSTAINABLE INNOVATION  
Lithium titanate battery

- Solar charging time 6-8 hours
- It has no memory
- Extreme thermal stability at low and high temperature
- Life cycle 5,000 cycles (13 years)



# CHIP LED 210 LM/W

## Spectrum report and electrical test for the lamp

### Color parameters

Dominant wavelength( $\lambda_d$ ): 506.5nm Longitud de onda máxima ( $\lambda$ ): 448.5 nm  
Bandwidth pico( $\Delta \lambda_d$ ): 16.3nm

Color change(duv) 0.011  
Color temperature( $T_c$ ): 6120 K

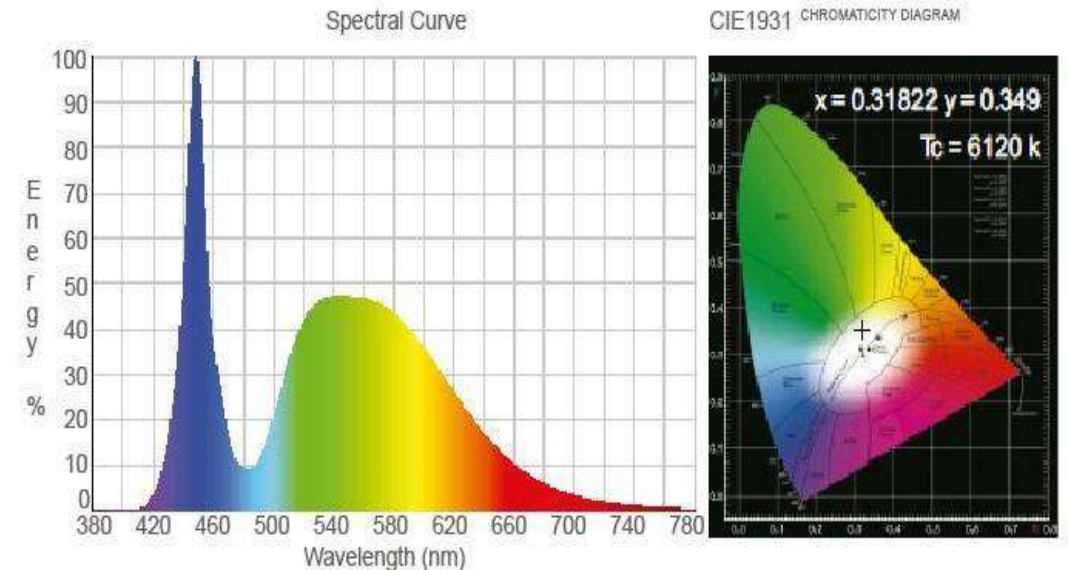
### Optical parameters

Luminous flux: ( $\phi$ ): 92.977 lm  
Luminous efficiency( $\eta$ ): 209.918 lm/W  
Radian flow ( $\phi_0$ ): 0.24W

### Electric parameters

Direct current(IF): 150.0 mA  
Direct voltage(VF): 2.95V  
Power (P): 442.50 mW  
Reverse current(IR): 0.3 uA  
Reverse voltage (VR): 5.00V

CAS PART OF THE IMPLEMENTATION of  
ECO ENGINEERING  
and SUSTAINABLE INNOVATION:



## INTELLIGENT ALGORITHM

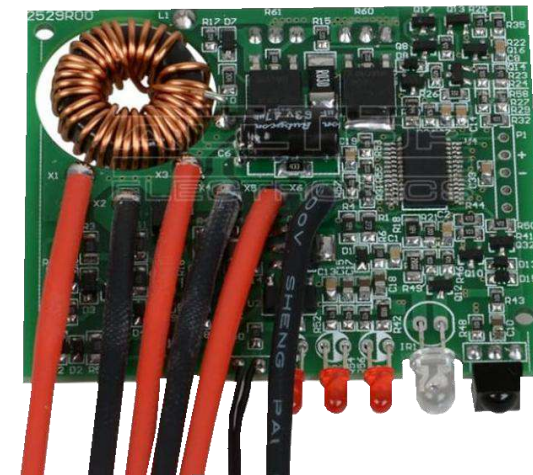
High charging technology, with 6 hours of solar charging, it works for 36 hours of continuous lighting, it also has an algorithm capable of making a measurement every 14 days, which allows it to make calculations of the different seasons of the year, it is In other words, in winter, when the nights are longer, the luminaire has the ability to illuminate for more hours, self-regulating in a light mode, thus covering the user's needs. It is recommended to leave the devices charged for 3 days before turning them on for the first time.



## SOLAR REGULATOR INTEGRATED IN THE CARD

First solar regulator integrated into the control board of solar lighting systems.

The luminaire integrates a separate double solar controller which allows the accumulation of energy collected by the solar panel to be extended, even on the cloudiest days, reaching more than 8 hours of recharge.





THANK YOU  
OF ATTENTION