

## FAQ's

### Can the light engines easily be removed from the poles (vandalism)?

1st series products: light engines were put on poles via an adjusting screw DIN911

2nd series products: safety screws with special screwdriver is needed to take them out (SecuFast)

3rd series products: the LED luminaire is made of a cylindrical LED module, and can easily be adjusted on a given light on the right spot. They are fixed with M4 x 10 DIN 913.

4th series products: in development and information will be provided by the end of November 2015

Fully controllable remotely over the internet. Each lighting fixture is a GPS, gyro sensor, pir and compass.

Armature 30 Watt LED (+/- 4000 lumen output)

Battery > 250 Watt 16 Vdc Lifepo4

### How are the poles put firmly in the ground?

We do this with a square tubular profile in the soil to lock in quick-drying concrete or stabilizer; one week later (after the concrete has dried) tubes are pushed over the profiles. The SBP100-tubes are put firmly with 4 screws (metric M6 = 6 = 6 mm) (1 per side), SPB300 tubes with 8 screws (2 per side)

### Can the modules be damaged?

The poles (bollards) with three solar panels have protection for an impact-resistant 3 mm Lexan plate mounted to each solar panel. Between the solar panel and Lexan protection, there is an air layer provided to absorb any blows. As for the SPB400 pole the solar 4-panels are mounted so high that protection is not required.

### Are the poles protected against corrosion?

Direct after inside production, the poles are 25 micron anodized; otherwise there can be corrosion of the aluminium. Lower quality companies will first do anodizing and then milling (i.e. The Chinese). Solar Path does the reverse. Each hole that we have drilled or milled are anodized. In addition, the adonization layer provides for good adhesion if the poles (bollards) are to be painted in a different color.

The adonization is a good carrier to put on top colour coating paint.

### How long will the light be lit in the evening?

The light only works on detection (persons/cyclists). There is a full capacity battery light for + - 9200 cyclists. Each pole is on for 7 seconds (2 seconds to 1 second and 1 second after the detection (standard 4 lights).

### Why are the 1y poles shorter than the 3-4 yard poles?

The walking / cycling distance is shorter so the light-up time must be adjusted.

7 sec at 1 yard, 15 sec at 3 yard poles.



### **Can the time be adjusted on the lights?**

We can, if desired, adjust the light-on time via software, but according to the requirement by the customer.

### **How far apart the poles can be placed?**

1 yard poles between 422 – 590 inches

2-3-4 yard poles 688 – 787 inches

Optionally, greater distances are possible to implement special antennas.

### **Can there be other illumination patterns set?**

We have the following software available:

1. Group stand-alone
  - a. Light is switched on immediately upon detection, as well as a group of lighting poles next.
2. Running track ( circle )
3. Group standalone sequentially
  - a. Light is switched on upon detection directly in a group of lights, after which they are proceeding sequential.

### **How much light is coming out of the lamp?**

The current types give 130 lumens per watt.

Solar Path uses 3 x 3 watt LEDs but only at max.

Standard set at 3 x 1 Watt. (390 lumen)

### **Can the lights be set to another (smaller) value?**

We can set the light density through software.

100% factory setting = 390 lumens, 10% by 39 lumen.

Example: if the bike path runs through an open space, and suddenly the bike path runs through a residential area then we can lower the light density.

### **Can the light be set to a higher value?**

We can set the light density through software.

The LEDs has 3 x 3 Watt Type on board (9 watts total)

In the factory they are set at 3 watts (390 lumens)

100% factory setting = 390 lumens. 150% for example, 585 lumen.

Example: if the bike path runs through an open space, and suddenly the bike path runs through a residential area we can leave things or increase light density.



We do not recommend this; the lumen output is more than enough in normal circumstance. In special cases it might be advisable to adjust the lighting to a higher value. This gives a complication on consumption.

**Is the same amount of light always emitted?**

No. The darker it is, the less light is needed. At nightfall, and sunrise, there is more light needed.

**Why is only 1 watt per LED used?**

LEDs give off heat, and we want a long LED life. Therefore, we propose use the LEDs at 1W per LED. For models with adjustable Optik, higher values can be set as an additional cooling is provided in the fixture. (Flexsol series)

**Can the light output be bundled?**

Solar Path uses special optics (lenses). These reflect light in a cigar-shaped beam. Depending on the pole height that covers a larger or smaller illumination surface. You can choose between 6 ° 15 ° 30 ° lenses. (optics)

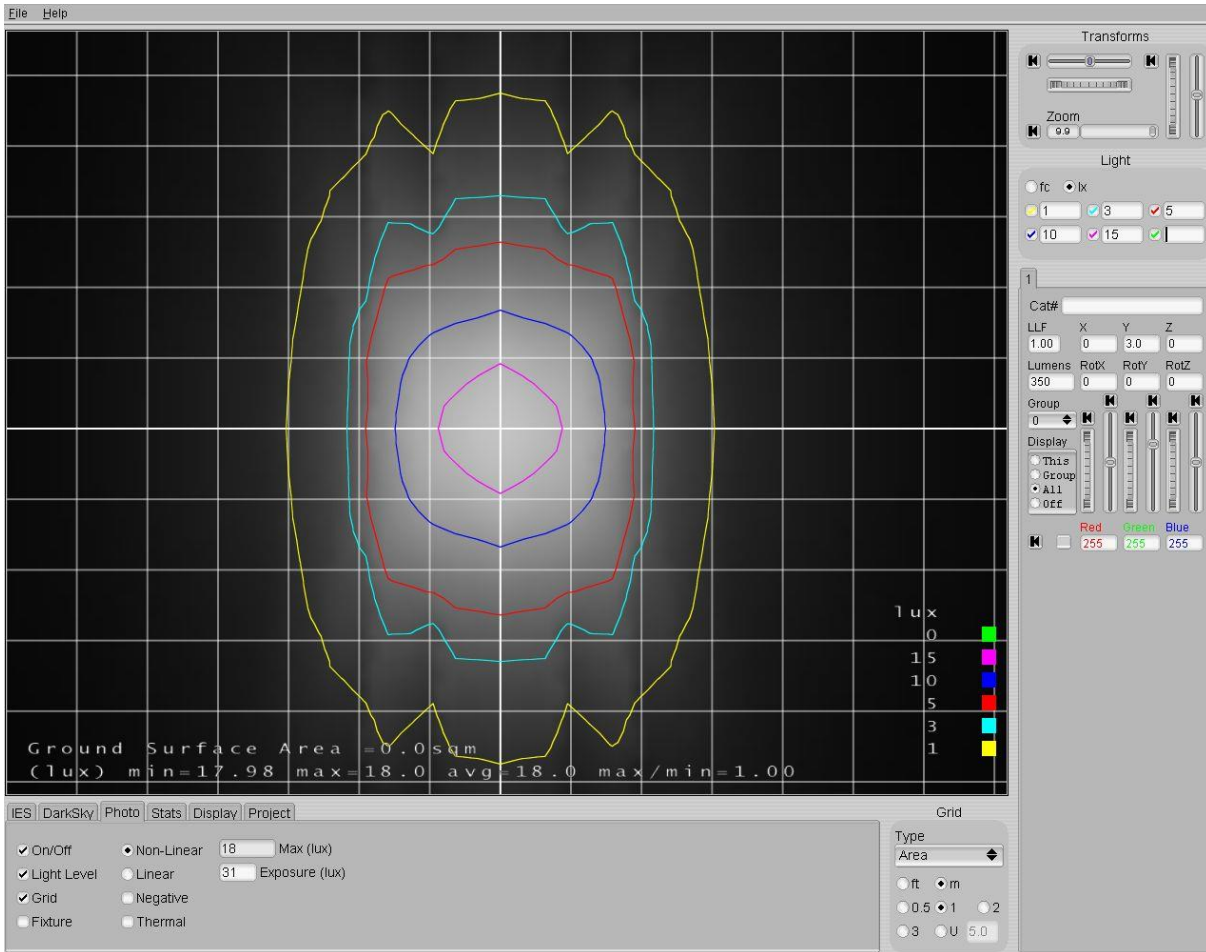
**Can the light radiate illumination before being adjusted?**

With the new type of flexible variable led module, you can adjust the light of +/- 10 degrees to +/- 45 degrees. The optics and sensor is integrated in an adjustable and rotary Led tube. By loosening the screw on either side, you can adjust the lighting tube, so that the light in the right place get projected.

**Why is the light bundled?**

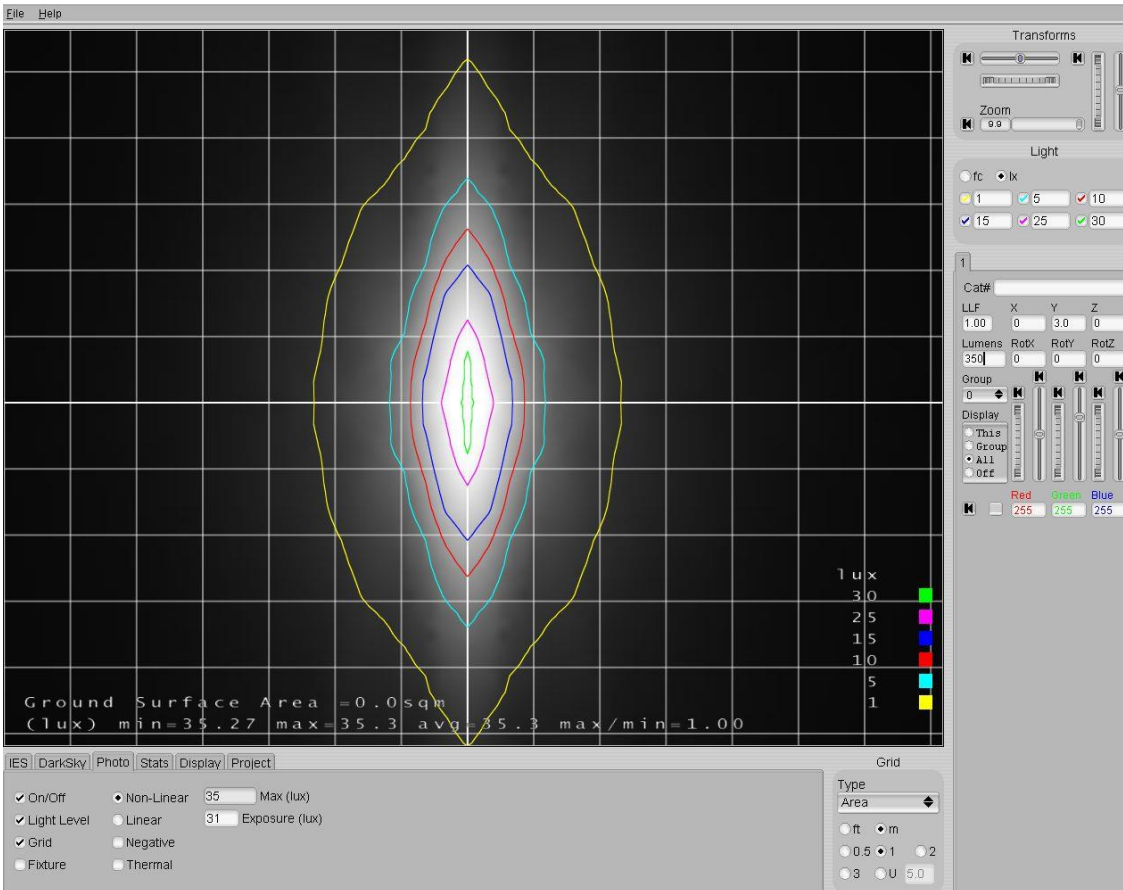
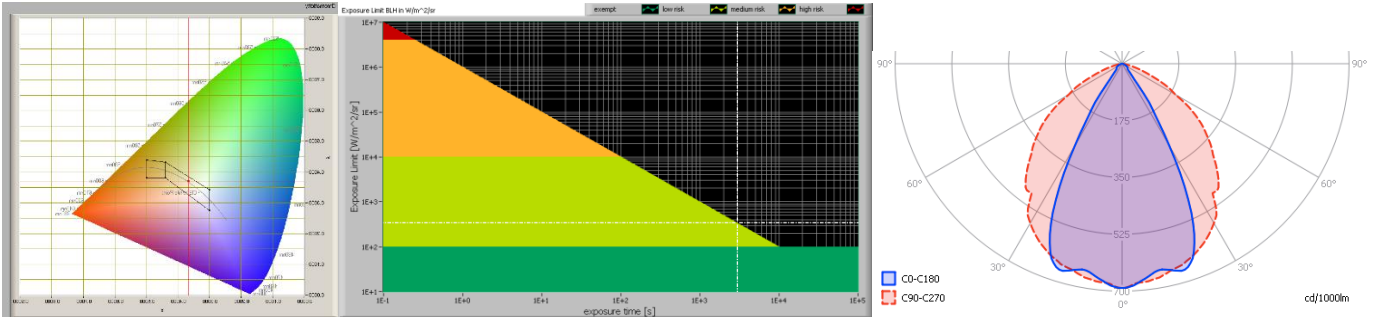
In order to provide more light at a specific area (little light pollution: light only shines down) For a narrow path you can obtain for a thin beam of light (eg 10 °) For wider paths we recommend to choose 30 ° beam. Depending on the height of the pole, the light surface will cover a desire area. For example, a SPB300 pole has a light area of 32.8ft x 16.4ft 30 °





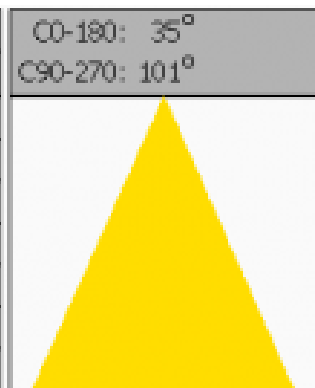
Light output example of 30° optic 32.80ft x 19.68 meter on surface

m.	Ø 50%		C0-180: 58° C90-270: 99°	E (lux)	Luminaire Efficacy 79 (lumen per Watt)	Energy Label <b>A</b>
	C0-180	C90-270				
1	1.1	2.35		165	Half-peak diam C0-180 1.1 x diameter(m)	240 3 Lumen Watt
1.5	1.65	3.53		73	Half-peak diam C90-270 2.35 x diameter(m)	
2	2.2	4.7		41	Illuminance 165 / distance² (lux)	
3	3.3	7.05		18	Total Output 239 (lumen)	
4	4.4	9.41		10		
6	6.6	14.11		5		
8	8.8	18.81		3		



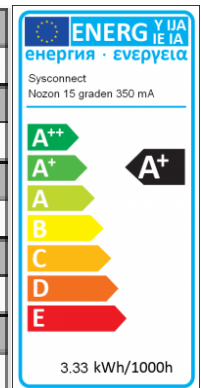
Light output example 15° for SPB300 pole 32.80ft m x 14.76ft, 245 lumen (today we are on 360 lumen + 30%)

m.	Ø 50%	
	C0-180	C90-270
1	0.63	2.41
1.5	0.94	3.61
2	1.25	4.81
3	1.88	7.22
4	2.51	9.63
6	3.76	14.44
8	5.02	19.25

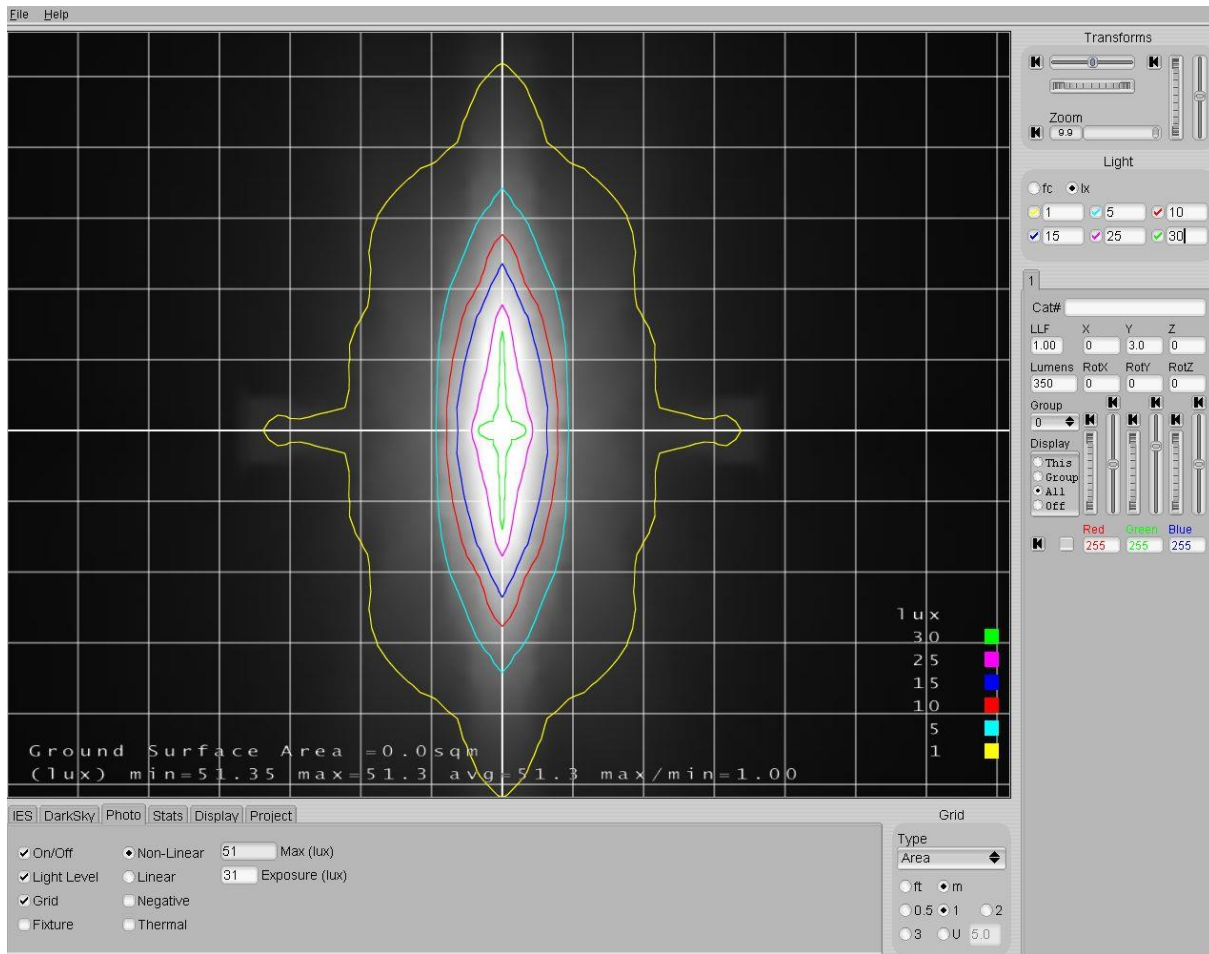
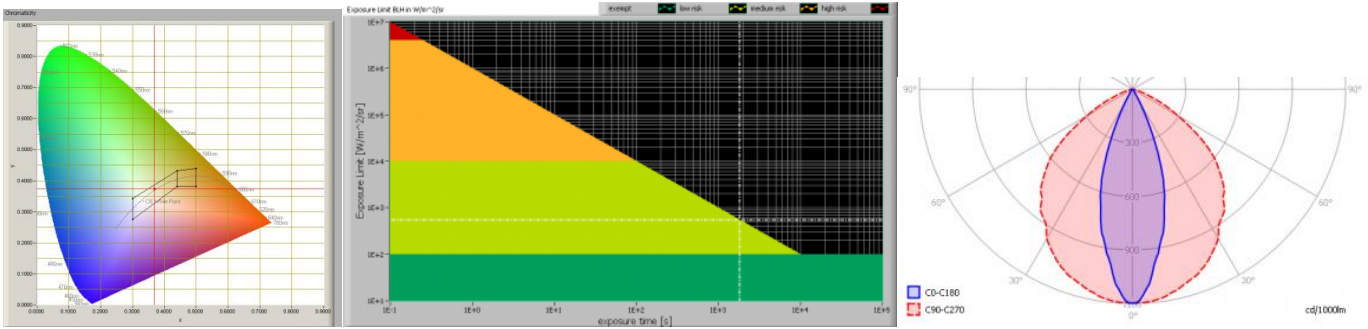


E (lux)
293
130
73
33
18
8
5

Luminaire Efficacy
81 (lumen per Watt)
Half-peak diam C0-180
0.63 x diameter(m)
Half-peak diam C90-270
2.41 x diameter(m)
Illuminance
293 / distance <sup>2</sup> (lux)
Total Output
245 (lumen)



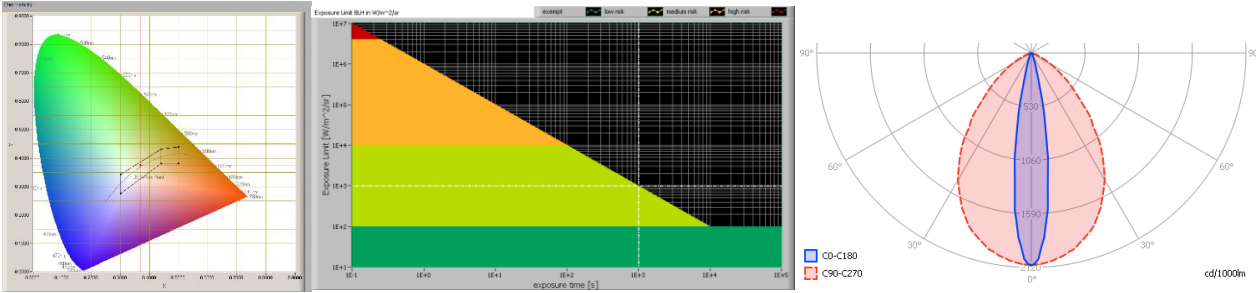
SolarPath Sun Solutions  
 WWW.SOLARPATHUSA.COM  
 1-888-333-7652



Exemple of SPB300 lightpole 32.80ft x 13.12ft 6°



m.	Ø 50%		C0-180: 18° C90-270: 77°	E (lux)	Luminaire Efficacy 80 (lumen per Watt)	ENERGY LABEL Sysconnect Nozon 6 graden 350 mA A++ A+ A B C D E 3.33 kWh/1000h
	C0-180	C90-270				
1	0.32	1.59		507	Half-peak diam C0-180 0.32 x diameter(m)	
1.5	0.48	2.38		225	Half-peak diam C90-270 1.59 x diameter(m)	
2	0.64	3.17		127	Illuminance 507 / distance² (lux)	
3	0.95	4.76		56	Total Output 241 (lumen)	
4	1.27	6.34		32		
6	1.91	9.52		14		
8	2.55	12.69		8		



**How much LUX comes out of the pole? (See charts above)**

See table above is calculated on 245 lumen output. (Today you can count 30% more, leds giving 150lm/Watt)  
 10 lux at 30 degrees @ 350 lumens  
 35 lux at 15 degrees @ 350 lumens  
 51 lux at 6 degrees @ 350 lumens  
 The lux is given to the ground  
 This is normally given at one meter.

(Note: on bike lanes you only need 8 lux)

**Why is the lighting system activated after you pass the second light?**

The reason for this is that we measure the speed between the first and the second pole. Then we activate the system and communicate between the poles in a further sequence. So the sequential lighting is born.

Optionally, you can be set the first pole to light up directly by the first detection. (Software setting)

**How long will the batteries last?**

The customer has the choice between two types of batteries:

Type lifepo4: it can be recharged up to 2,000 times, up to 5-7 years of lifetime. (If we should charge every day the lifespan would be means +/- 2000 times charge / 365 days = 5.5 years)  
 Normally, we do not charge them daily.

Type Eco energy: it can be charged up to 1,000,000 times means minimum 10 year lifespan..





### **What is the storage capacity of the standard battery?**

By default, our products come with Lifepo4.  
It has a capacity of 15.6Ah. 3.6 volts (+/- 56 Watt)

LED 3 Watt = 56watt / 3watt = +/- 18 hours of theoretical continuous light.

18 hours means 64.800 seconds / 7 seconds lit for a passer-by passers-by = 9257 full battery.  
We set the light output to light up 14 seconds per passing, and then it means that we can light 4,628 visitors.  
21 seconds highlight = +/- 3.085 passers-by full battery.

### **Is there enough energy storage for a wooded area?**

In the winter, the trees lose their leaves, thereby the sun's rays can reach the solar panels and good energy storage is possible.

In the summer there is lighter and therefore need less energy.

### **Why are the solar panels larger in the SPB400 poles than at the SPB100\200\300 poles?**

SPB400 poles have four solar panel +/- 15 watts, 60 watts in total  
SPB400 poles are more used on darker and / or in wooded areas.  
If there is no direct sunlight, by having larger solar panels, batteries can be easily charged.

### **How is it that no cables are required for the sequential lighting poles developed by Solar Path Solutions?**

We use Xbee/ZigBee radio communication. This is an open standard for wireless connections between devices. It is intended to complement Bluetooth and Wi-Fi, it is used for transmitting data information.

ZigBee is specifically designed to have as low power consumption as possible. The retrieve data rate is therefore not large, in principle, 20 Kbit /S, and to increase up to a maximum of 250 Kbit /S.

### **What is the difference between ZigBee and Bluetooth?**

Bluetooth = point-to-point (from device to device)

ZigBee = point-to-multipoint so from pole 1 to different posts (depending on transmission distance)

### **How is the communication between the lampposts?**

An intelligent transmitter and receiver are built in each pole (lamp post).

Which allows communication between front and rear poles.



### **How far apart can the poles communicate with one another?**

In principle, the transmission distance between lighting poles is up to 0.3ft (if there are no obstacles between). Interference signals can reduce the range.

But the system is working as an endless system. This means the poles communicate with each other and know when to turn on/off.

Extra optional antenna integration can enlarge the transmission between pole to pole.

### **Is there a central control system?**

No, each point of light (each post) is intelligent and communicates with its present and after lying poles.

### **Web interface development (Vili Series)**

Bicycle path can be remotely online checked online. Light post by light post.

Each light post contains a built in GPS, gyator, compass, pir, xbee controller, that communicate with our server through GPS.

We can consult the light pole by the web.

Example: number of detections (per day / per week), the battery state, how much energy happened a day. Etc....

### **Who are our target groups?**

Towns and cities, rural areas. Bike paths, hiking trails, waterways, wildlife areas, marinas, golf courses, recreation leisure parks, theme parks, museums, architectural buildings and parks.

### **What are our advantages compared to utility supply companies?**

- We do not need cable.
- We do not need means.
- Electricity supply companies must complete schedule drawn up: they enable engineering companies for cabling and trenching and this takes a long time!
- The "time to installation" can be kept very short with SolarPath. We do to have any heavy infrastructure (no cabling)
- No electricity costs (no energy cost)
- If you later find that the light poles are too far apart, you can just the light poles between places (wiring is not so obvious)
- Maintenance costs at Public Electricity supply companies 1 Year maintenance cost = +/-> US\$480

Before the cycle track light turns into night mode it looks (the electronic control system store the daily data) how much energy was stored during the day. When the battery is completely full and someone passes, the system will be maximum light output.



**What happens if there is less stored energy in different poles?**

Our battery system provides by full load +/- 9200 cyclists passer-by's, we will distribute the energy over 9200 cyclists. If the battery for one reason or another runs empty, the controller realizes this and the energy distribution is automatically recalculated.