

Schröder
Experts in lightability™

FOCUS

Bicycle paths

Lighting solutions to make the difference



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Changing the way we commute, live, work and play

As traffic keeps increasing, the freedom we traditionally associate with cars is no longer a reality. Traffic jams are everywhere. The car has become a victim of its own success.

Big and expensive, cars congest urban areas, pollute the environment and provide zero exercise. Moreover, they are less efficient than other modes of transport in cities.

As a regular cyclist, I experience it a lot, even for medium distances. Cycling has become more efficient than driving. But the benefits are not only related to the time saved. When I cycle to work, I am getting my daily exercise, I feel more relaxed and I can use the journey to think about important topics and decisions.

I am not saying that bicycles are the ultimate solution to mobility issues but they are definitely part of the answer. We only have to look at the success of electric bikes. It means that more and more people are using cycling infrastructure. It is definitely worth investing in quality bike paths!



Key facts and figures

Reinventing the wheel

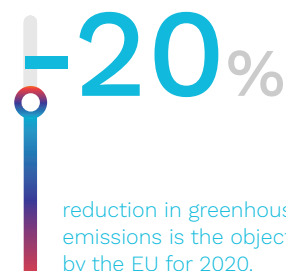
Like it or not, the trends show that the way in which cities design their transport systems needs to be a central concern nowadays. We have no other choice than to reconsider how we organise mobility in and between cities.



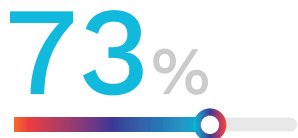
72% of the EU population lives in urban areas.



50% of all private car journeys in cities are under 5 kilometres (European Union).



reduction in greenhouse gas emissions is the objective set by the EU for 2020.



73% of Europeans think that bicycles should benefit from preferential treatment compared with cars.



A motorist breathes approximately twice as much CO₂ as a cyclist and 50% more nitrogen oxides.



3 new bicycles are sold for every car in Europe. More than 20 million bikes are sold every year in the EU.



10€ is the minimum investment in cycling infrastructure per year and per citizen recommended by specialists for a coherent cycling policy.



1,000,000 jobs could be created for the EU cycling economy.



Key facts and figures

5 benefits for the community

Cycling has many proven advantages

- **Social:** mobility is more accessible, giving a lot more autonomy to both older and younger people. As they take advantage of safe cycling facilities, parents no longer need to drive their children to and from school, saving time and money.
- **Economical:** more cycling means less hours are spent in traffic jams, commuting to work. Cycling can significantly cut the household budget allocated to the car, which is often the second largest expenditure for a family. The regular exercise improves physical and mental health, lowering costs linked to health problems. Easy and quick access to shops, restaurants and cultural facilities brings more people into city centres.
- **Ecological:** cycling reduces pollution and the need to build, service and dispose of cars. Cycling 10km each way to work saves 1,500kg of greenhouse gas emissions each year. A study by the European Cyclists Federation (ECF) concludes that Europe could reduce its overall emissions by a quarter if its population cycled as regularly as the Danes.
- **Political:** reduction in dependency on fossil fuel, saving non-renewable resources.
- **Urban planning:** less space is needed for both driving and parking, leading to a more balanced use of public space for parks, playgrounds, larger squares...



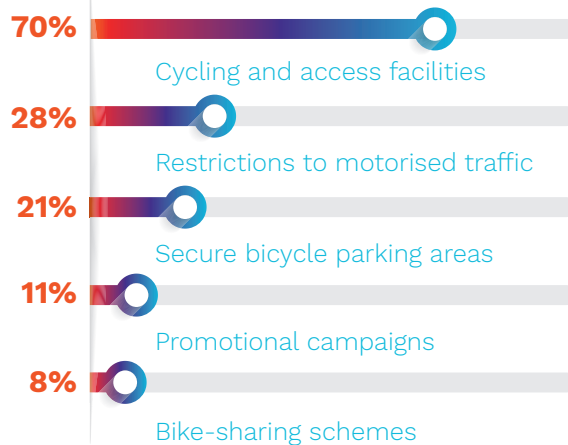
A great bike path?

Cyclists consider various parameters to rate the infrastructure they use.

- Quality of bicycle path surfaces
- Lighting, especially in difficult zones such as crossroads
- Clear and visible signage
- Presence of traffic lights or small roundabouts
- Sense of safety (objective and subjective)



Incentives to cycle in cities



Regulations and standards

What are **the rules**?



Lighting bicycle paths is essential to provide a secure route, to ensure safety (subjective and objective) for cyclists and to guide them on their way. It also increases comfort.

The European Committee for Standardization (CEN) has established a series of standards for public lighting (**EN 13201-x Road Lighting**). For cycling facilities, these standards provide recommendations for the level of illumination according to the presence or absence of speed-reducing devices, the risk of aggression, the need for facial recognition and the ambient light level.

In general, a **value of between 5 and 10 lux** is recommended for bicycle paths.

The lighting must enable cyclists to **follow their route safely**, regardless of the time and the season, otherwise the bicycle path risks being under-used.

The lighting must also allow cyclists to easily **see obstacles in their path and to understand the marking** on the ground. This is known as horizontal illuminance. It measures the amount of light hitting the surface in lux.

The lighting should also **make all vertical objects clearly visible**. It is important for cyclists to be able to read signposts, to identify nearby buildings and to see cyclists or pedestrian coming towards them. It is also essential that motorists can see them, if the bicycle path is beside or near a road. The illumination of these vertical objects (traffic signs, cyclist's shadow, etc.) provides what is known as vertical illuminance. It is measured 1.5m above the road.

The level of illumination should be as uniform as possible and always prevent black holes.



Challenges and solutions



6
solutions
that go the
extra mile

1 Ensuring the utmost safety

Subjective safety is the feeling or perception of safety. However, there are objective criteria to define that a bike path is safe. It must have a **high level of uniformity** to prevent patches on the ground. Cyclists must be able to clearly see uneven surfaces and obstacles.

It should guide cyclists so that they can easily follow the markings. The right vertical luminance level is key for **facial recognition or reading signs**. It also helps to see other cyclists coming from the opposite direction.

As e-bikes can go up to 45km/h (12,5m/s), it is essential that cyclists can **quickly spot hazards** such as unexpected bends, steep drops, barriers or intersections. Different colour temperatures can be used for difficult zones such as crossroads.



Schröder luminaires

With the Teceo S and Ampera Mini, widely recognised by independent bodies, Schröder offers a large range of **lighting solutions optimised for bike paths**.

The combination of the right lumen package (from 800 to 8,900lm) and the right light distribution enables our application engineers to propose the best configurations to **meet the safety challenge**.

2 Providing **comfort** for all users

Performance cannot be compromised at the expense of comfort. As bike paths require luminaires to be installed at low mounting heights, it is crucial to **limit glare**. Not all solutions are able to provide the level of visual comfort end-users expect.

Cyclists also want to clearly see their surroundings, be able to read signs and recognise other users. The quality of light plays an important role in **colour recognition**.

When it comes to providing the right light in the right place at the right time, **light-on-demand** can ensure that people benefit from the best conditions in a given environment. This is particularly true for bicycle paths where the activity at night can vary a lot.



Schröder luminaires

Schröder sets **high standards in terms of glare** (G class) and colour rendering (CRI). Teceo S or Ampera Mini, for instance, respect the **G*4 class** to offer a high level of visual comfort. They also deliver a gentle warm white light with a **colour rendering index of 80**, to show colours as they are during natural daylight, for a better experience.

As they can be equipped with an **optional integrated motion detection sensor** (PIR), Ampera Mini and Teceo S are ready to create intelligent lighting scenarios that maximise safety and comfort for cyclists.





3 Optimising the resources

Lighting accounts for a large part of a city's energy bill, yet with the right technology and the right partner, it can be considerably reduced.

The relevance of an investment has to be measured over time, considering the savings it provides in terms of **energy and maintenance costs over the years**.

Quality products offer high efficiency and performing photometries that can increase the spacing between the poles, reducing the number of lighting points per kilometre and **optimising the use of energy**.

The savings can be further extended with control features, including dimming and motion detection options.

Schröder luminaires

When it comes to designing an installation, Schröder prevents excessive lighting by providing the best solution to **ensure that only the necessary energy will be used**, taking into account the natural output depreciation over time (maintenance factor).

The Teceo S has been optimised for typical low-height applications such as bicycle path lighting. Ultra-compact, energy efficient (**up to 144lm/W**) and available with high performing light distributions, it integrates the latest LED technology to offer **long term performance** (LED lifetime of 100,000h or 25yr) and optimise the total cost of ownership. With a very low power consumption, that can be reduced further by integrating sensors, Teceo S is **a cost-effective solution for any type of bicycle path**.



Teceo S

4

Preserving wildlife and the environment

In some areas, bat roosts can be present. Trees and hedgerows are natural environments for bats while rivers and canals are also important for foraging.

Certain species of bats are very sensitive to light.

Installing inappropriate lighting can destroy feeding areas and prevent bats from moving through the landscape. Yet, bats are not the only animals that need to be protected from light spill and uncontrolled lighting.

Fauna and flora can suffer from a high light intensity, colour spectrum (blue light) and excessive lighting over time. Only experts can ensure the right lighting solution to protect these natural elements.

Schröder solutions

Schröder strives to implement good practices for fauna and flora. Our high-end lighting distributions **meet dark-sky specifications** (0% ULOR) and can be combined with accessories (backlight control) to focus the light only on the bicycle path.

With warm white LEDs, the blue light spectrum is limited. We can further reduce it by using **amber LEDs**.

As our solutions are smart, we can programme lighting scenarios for specific purposes, such as only lighting the bicycle path during the winter months when bats are in hibernation.



5 FutureProof and vandal proof

In public areas where there is little activity, vandalism might occur. This could be the case for bike paths in the suburbs or between two towns.

Thus, it is important to consider the **robustness of the lighting installation**. Bicycle infrastructure may need to be extended or adapted over time. It is worthwhile to invest in systems that can be **easily expanded and updated**.



Schröder solutions

Schröder's philosophy is to design and develop **FutureProof** products. This means that they can be upgraded at any time to add new features to take advantage of future technological developments.

With our wireless control systems, you can also easily extend an installation by adding new luminaires.

Our vandal proof (IK 09) Teceo S and Ampera Mini luminaires are built to last.

6 Preventing bike theft

With e-bikes becoming more and more popular, they are being targeted by thieves.

Bike theft is on the rise, matching the growing popularity of this alternative mode of transport.

Protected bicycle parks can help prevent these thefts.



Shuffle

Schröder solutions

The Shuffle offers a unique solution for bicycle parks as it can combine multiple features in the same column.

While comfortable ambient lighting creates attractive and welcoming places, **state-of-the-art surveillance cameras**, with digital zoom or fully motorised control, keep an eye on bikes.

They can **deter people with bad intentions** and provide a heightened sense of security. Shuffle can also offer charging stations for e-bikes.

Optimised light
distributions for
safety
(horizontal and vertical
luminance)
and **comfort**
(low glare)



Teceo

Wildlife friendly and
dark sky compliant
(0% ULOR)

Ampera



High efficiency
(over 140lm/W) and
maximised spacing



Custom LED handrail
solutions (IK 10 / IP 66 or 67)



MY1 LED



Schröder solutions for bicycle paths



**Control
with motion
sensors**

Shuffle



**Vandal proof
and
FutureProof**

Owlet control solutions



Schröder
Experts in lightability™

SCULPline



Technical characteristics



IP 66

IK 09



Ampera Mini

Recommended Installation height 4 to 8m

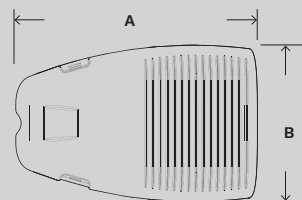
Typical luminaire output flux (range) 800 to 8,900lm

Power consumption 10.3W to 78W

Colour temperature Warm or neutral white

Nominal voltage 120-277V / 50-60Hz

Surge protection 10kV



Dimensions

A 583mm

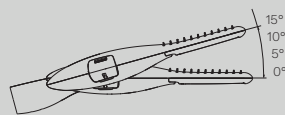
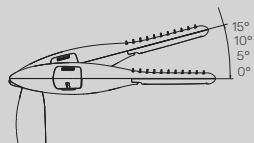
B 340mm

C 90mm

7.8kg



Universal mounting piece (side-entry and post-top):
 Ø32 - 48mm (1.25") - Ø42 - 60mm (2") - Ø76mm (3")



IP 66

IK 09



Teceo S

Recommended Installation height 4 to 8m

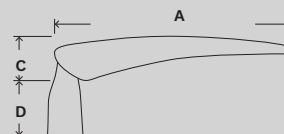
Typical luminaire output flux (range) 800 to 8,600lm

Power consumption 9.7W to 78W

Colour temperature Warm or neutral white

Nominal voltage 220-240V / 50-60Hz

Surge protection 10kV



Dimensions

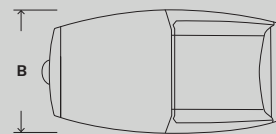
A 450mm

B 252mm

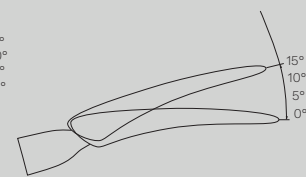
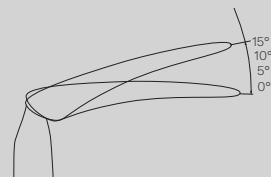
C 99mm

D 150mm

5.1kg



Universal mounting piece (side-entry and post-top):
 Ø32 - 48mm (1.25") - Ø42 - 60mm (2") - Ø76mm (3")





IP66

GLASS
IK 07

PC
IK 08

GROUND-
RECESSED
IK 10

DMX
512

DALI



SCULPline

| | |
|---------------------------------------|-----------------------------|
| Typical luminaire output flux (range) | 2,500 to 6,100lm |
| Power consumption | 28W to 56W |
| Colour temperature | Warm, neutral or cool white |
| Nominal voltage | 120-277V / 150-60Hz |
| Surge protection | 10kV |

| | SCULPline 1 | SCULPline 2 |
|--------|-------------|-------------|
| Length | 500mm | 1,000mm |
| Weight | 1.5kg | 3kg |



IP 66

PC
IK 09

PC
IK 10

PMMA
IK 09



Shuffle

| | |
|---------------------------------------|--------------------------------|
| Typical luminaire output flux (range) | 1,300 to 5,900lm |
| Power consumption | 20W to 55W |
| Colour temperature | Warm or neutral white |
| Nominal voltage | 220-240V / 120-277V 50-60Hz |
| Surge protection | 10kV |



IP 67

IK 10



MY1 LED

| | |
|---------------------------------------|-----------------------|
| Typical luminaire output flux (range) | 1,500 to 11,100lm |
| Power consumption | 23W to 89W |
| Colour temperature | Warm or neutral white |
| Nominal voltage | 120-277V / 50-60HZ |
| Surge protection | 4/10/20kV |

| | |
|--------|------------------|
| Length | 295mm to 1,581mm |
|--------|------------------|

| | |
|--------|--------------|
| Weight | 1.4kg to 6kg |
|--------|--------------|

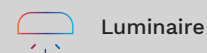
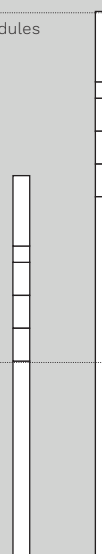


6.84M

MAX. 5 modules

2.28M

Min. pole height



Luminaire



CCTV



WLAN



Light ring



Loudspeaker



SOS Intercom



EV charger

Cycling infrastructure

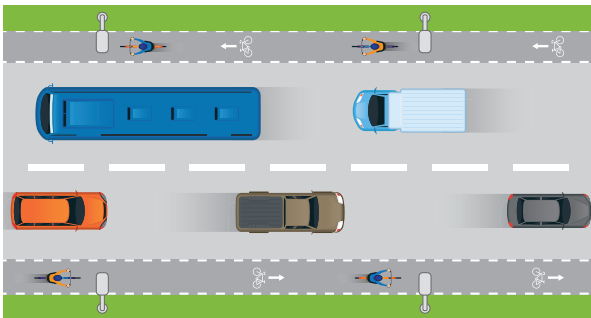
How to optimise the **various layouts**

Several types of bicycle paths exist. All of them have their specificities and require dedicated lighting solutions.



Road-marked bicycle lanes

Markings on the ground that show arrows and a cyclist act as a visual reminder that the road is used by bicycles and cars. Striped lanes with a cyclist in the middle or buffered bike lanes are the area of the road reserved for cyclists. These are not real bicycle paths.

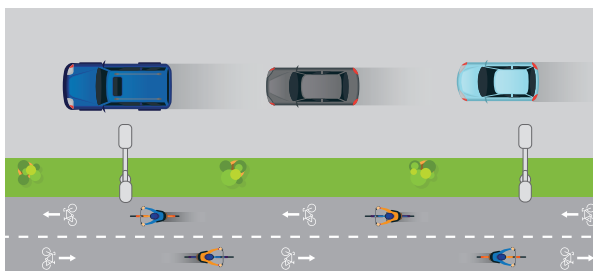


How do we light them?

In this case, the bicycle lanes are part of the road. We propose luminaires with the right light distribution to cover the entire surface, including the lanes. In full compliance with CEN 13201-1, we select the light distribution that respects class -1 of the main road for the bicycle lane.

Cycle tracks

A cycle track is located next to the road, but is made distinct from both the sidewalk and general purpose road by elevation differences, barriers or plantations.

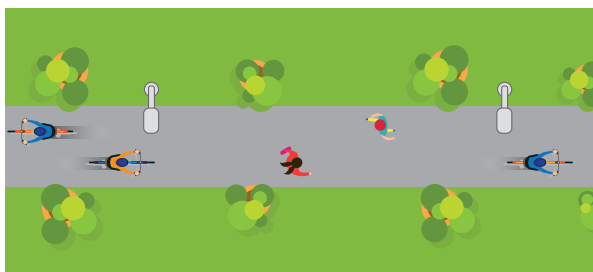


How do we light them?

As we only want to light where it is necessary, we recommend using poles with luminaires mounted on two types of brackets: one fixed at 6 to 10 metres for the main road and another, at the back of the pole and at a lower height, for the cycle track. The rear bracket allows the luminaire lighting the cycle track to be deployed to use extensive light distributions, matching the spacing of the poles for the road lighting.

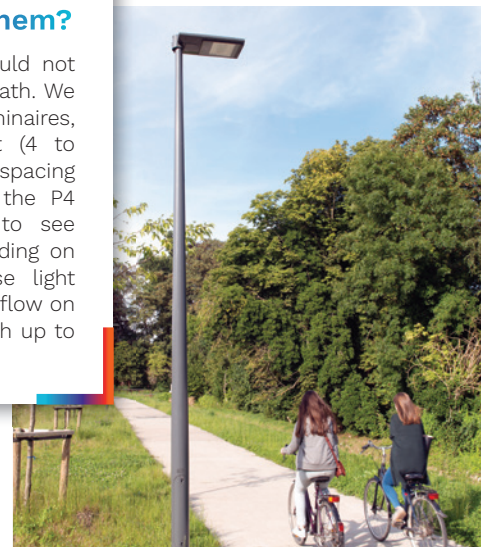
Bicycle paths

A bicycle path is a bikeway separated from motorised traffic. It is dedicated to cycling or shared with pedestrians or other non-motorised users.



How do we light them?

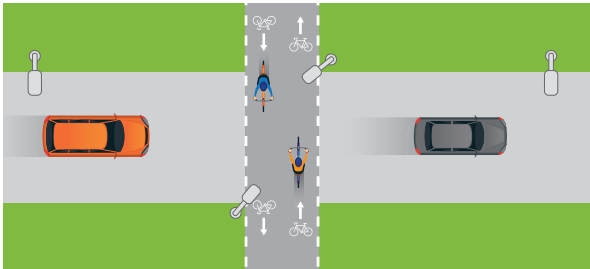
The lighting columns should not impact the width of the path. We use our highly efficient luminaires, dedicated to low height (4 to 6.3m) installations with a spacing of 6 to 8xh to respect the P4 class, enabling cyclists to see 30 to 40m ahead. Depending on the environment, we use light distributions that can overflow on both sides of the bike path up to 1.5m.



Cycling infrastructure

Road crossings

Cycle tracks or bicycle paths can sometimes cross main roads. In these difficult zones, where cyclists meet motorists, safety is the absolute priority. Barriers, marking and lighting protect the weakest users.



How do we light them?

At 50km/h, motorists have a narrow field of vision and need 28m to stop (13.5m at 30km/h). Thus, it is crucial to provide a maximised vertical luminance to enable them to see cyclists ahead. Creating a contrast with a specific colour temperature for this area also helps motorists to see cyclists crossing the road. For these difficult zones, we use the same specific lighting distributions as with pedestrian crossings to provide a high level of vertical luminance and with cool white LEDs to ensure the sharpest contrast.

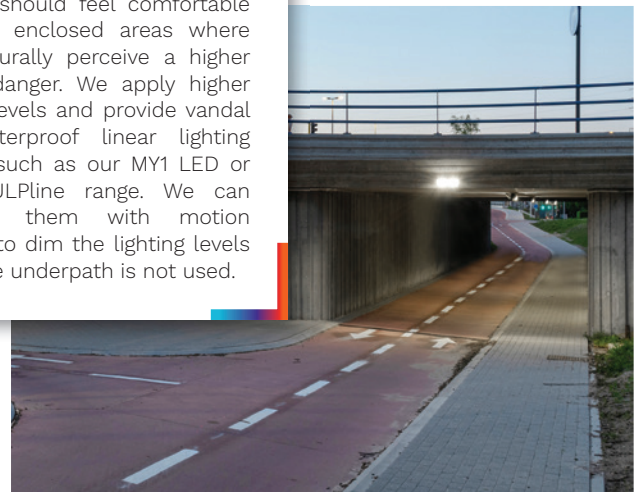
Underpaths

To avoid crossing roads, underpasses are often created. They provide shortcuts and enable cyclists to avoid motorised traffic.



How do we light them?

Cyclists should feel comfortable in these enclosed areas where they naturally perceive a higher risk of danger. We apply higher lighting levels and provide vandal and waterproof linear lighting fixtures such as our MY1 LED or our SCULPline range. We can combine them with motion sensors to dim the lighting levels when the underpath is not used.



Bridges

Cities that consider mobility and the bicycle user experience as high priorities have built a lot of bicycle bridges. Some of them have become really remarkable structures in the landscape.



How do we light them?

As the architectural aspect is crucial, we tend to integrate the lighting into the structure of the bridge. We can create custom handrail lighting systems to light the deck while we use our SCULP LED floodlight range to enhance the structure with coloured lighting schemes.



Control solutions

Flexibility, maximised savings and **enhanced comfort**

Our smart solutions ensure that we provide the right light at all times in the right places. They minimise energy consumption, facilitate network expansions, optimise maintenance operations and asset management while offering the best user experience. We offer a full range of solutions, from basic dimming features to full remote management systems.

Bluetooth for easy on-site adjustment

Available with the Teceo and Ampera ranges, the Schröder Bluetooth solution is **ideal for the on-site configuration of individual luminaires**.

From the ground, the user is able to switch the luminaire on or off, adapt the dimming levels and get data.

A **user-friendly mobile app** provides an easy and secure access to the control and configuration features.

It enables you to adapt the dimming scenarios whenever you want while simply standing by the pole.



Key advantages

- Cost-effective stand-alone control solution
- No need to use a cherry-picker or to open the luminaire
- Easy dimming settings and adjustments over time
- Collects diagnostic and statistic data



Autonomous local network with motion sensors

Luminaire equipped with Owllet LUCO AD controllers can create a **closed network** that provides light-on-demand scenarios with motion sensors.

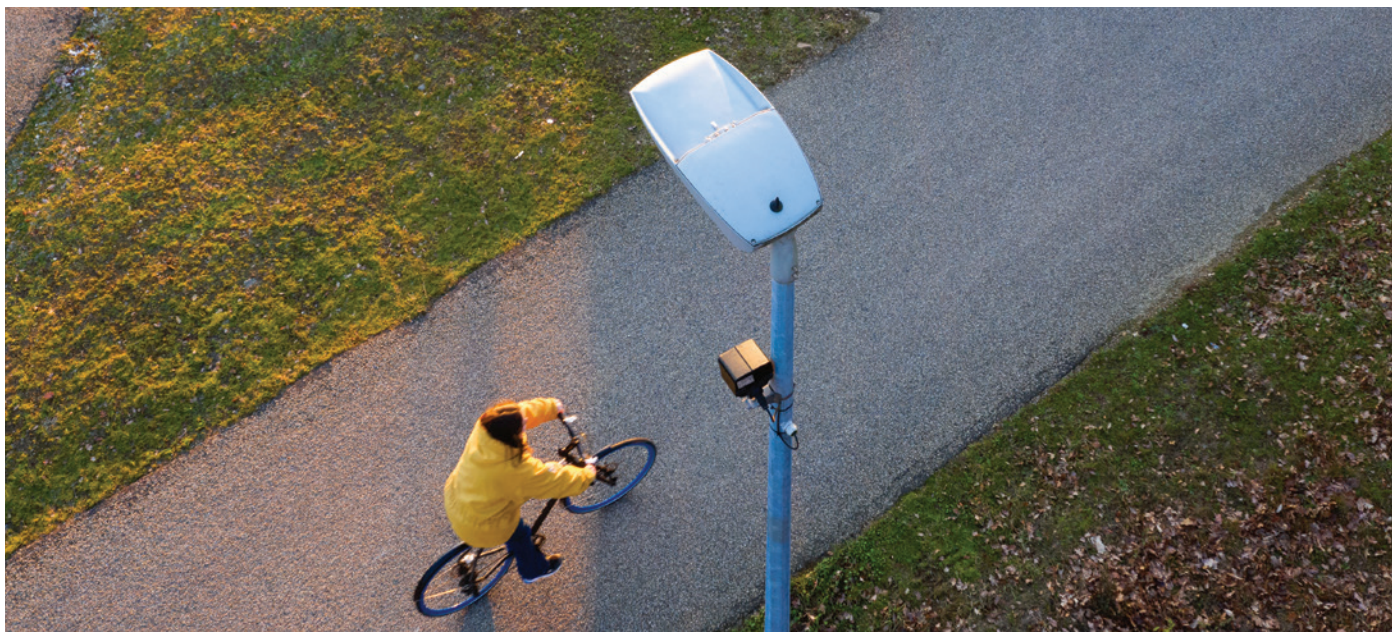
The lighting levels are dimmed most of the time to maximise energy savings. When cyclists arrive, the sensors detect their presence and the luminaire ahead of them increase the light output to deliver the best conditions in terms of safety and comfort.

Thanks to the wireless communication between the luminaires, **sensors can be installed in the most appropriate places.**

The network can be expanded at any moment as it only means adding new luminaires to the loop. Scenarios can also be changed over time to adapt to new situations.

Key advantages

- Smart autonomous solution
- Advanced light-on-demand scenarios
- Maximised savings with optimised use of energy
- Utmost safety and comfort for the cyclists
- FutureProof with possible on-site adjustments



Control solutions

Owlet IoT remote management system

The Schröder Owlet IoT is a remote control system for **monitoring, metering and managing a lighting network**.

It is a unique combination of state-of-the-art technology and an **easy-to-use web interface** to control each luminaire at all times through a secured internet connection.

With bi-directional communication, the **operating status, energy consumption and possible failures can be monitored**.

Owlet IoT can be combined with a large range of sensors to create **responsive lighting scenarios**.

Thanks to its API's and open standards, Owlet is easy to integrate into interoperable systems. It means it can **interact with larger 3rd party smart city platforms** to exchange data or interoperate with neighbouring systems so that you can gain important data.



Key advantages

- Smart interoperable system with 3rd party devices and platforms
- All-in-one system (photocell, astronomical clock, control features...)
- Light-on-demand scenarios upgradable at any time (bi-directional communication)
- Same system for the whole city (not only the bike paths)





PIR or radar?

When it comes to choosing a detection device, how do you choose between PIR and radar? It is a matter of flexibility and cost.

Traditional motion sensors have been designed using **PIR** as it is a **cost-effective and simple detection device**. The PIR sensor detects changes in the amount of infrared radiation.

A **radar** uses the Doppler principle to determine an object's **motion, speed and direction**.

So the required features will ultimately dictate the choice of technology.

Is distance important? If yes, take into account that PIR sensors have a detection range of roughly 5 metres.

Radar can work within a range of 2 to over 30 metres.

If the speed and direction of the moving object are key parameters, radar is the best solution as it can detect both characteristics.



A few of our projects



Wetteren (Belgium) - Product: Teceo



Temse (Belgium) - Product: custom handrail lighting



AS (Belgium) - Product: Teceo (with sensors)

A few of our projects



Heidelberg (Germany) - Product: Teceo



Tiel (Netherlands) - Product: Yoa



London (UK) - Product: Yoa



Tilburg (Netherlands) - Product: Piano



Tessenderlo (Belgium) - Product: Teceo (with motion sensors)



Póvoa de Varzim (Portugal) - Product: Piano

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