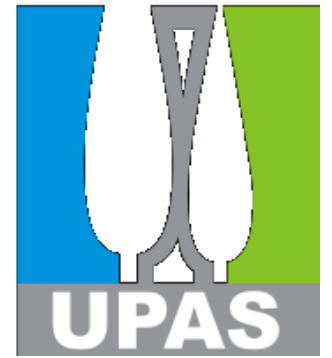




UDRUŽENJE
PEJZAŽNIH
ARHITEKATA
SRBIJE



Zelene i održive tehnologije za zeleniji grad

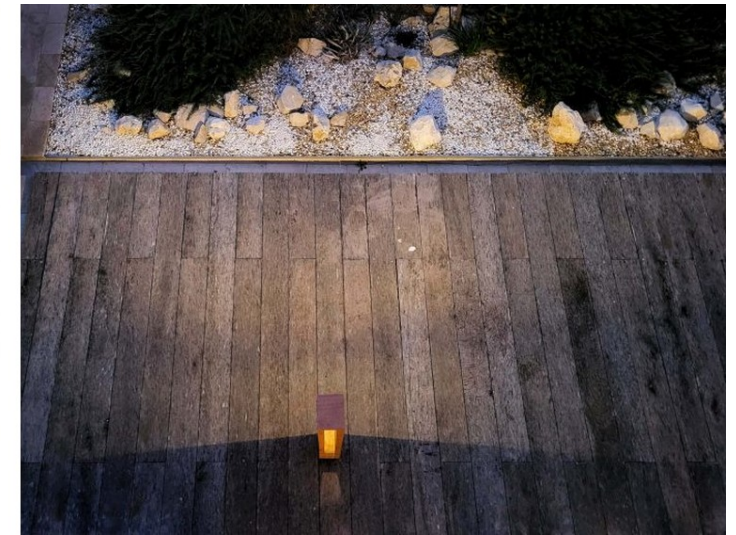
Naša zelena tehnologija. Portfolio

Pregled



SOLARNA JAVNA RASVETA

SOLARNA RASVETA ZA PEŠAKE



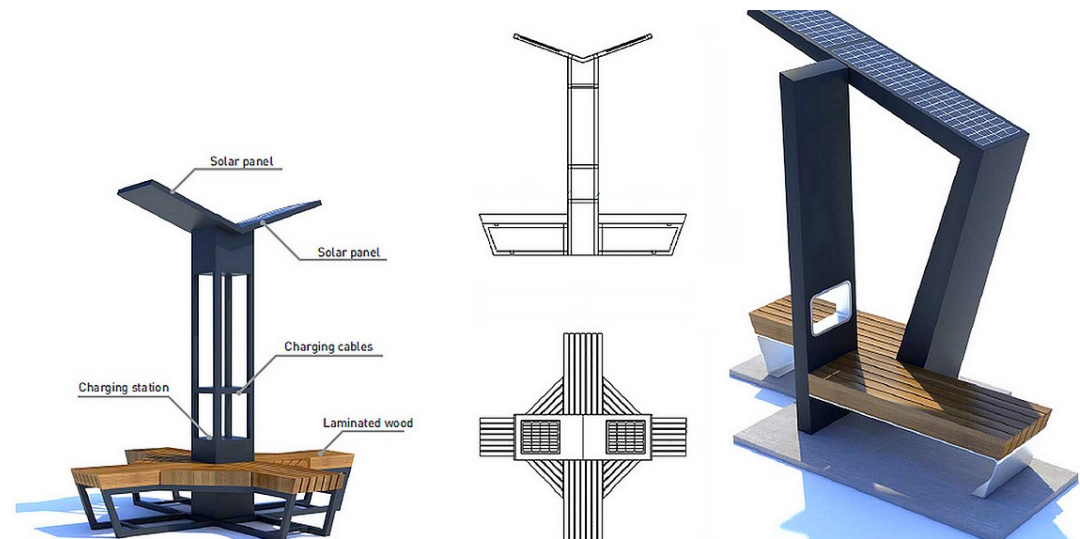
Naša zelena tehnologija. Portfolio

Pregled



SOLARNA JAVNA RAVETA

SOLARNA PAMETNA KLUPA



Naša zelena tehnologija. Portfolio Pregled



SOLARNA EV KROV

THERMO ISOLACIJA FARBA



ARCHITECTURAL **SOLAR** LIGHTING

NOWATT

BY FONROCHE **lighting**



THE TECHNOLOGICAL LEAPS OF SOLAR

Batteries

—
Use of LiFePO4 batteries 8000 cycles at 50 % DoD. Lifespan greater than 20 years of use.

LEDs

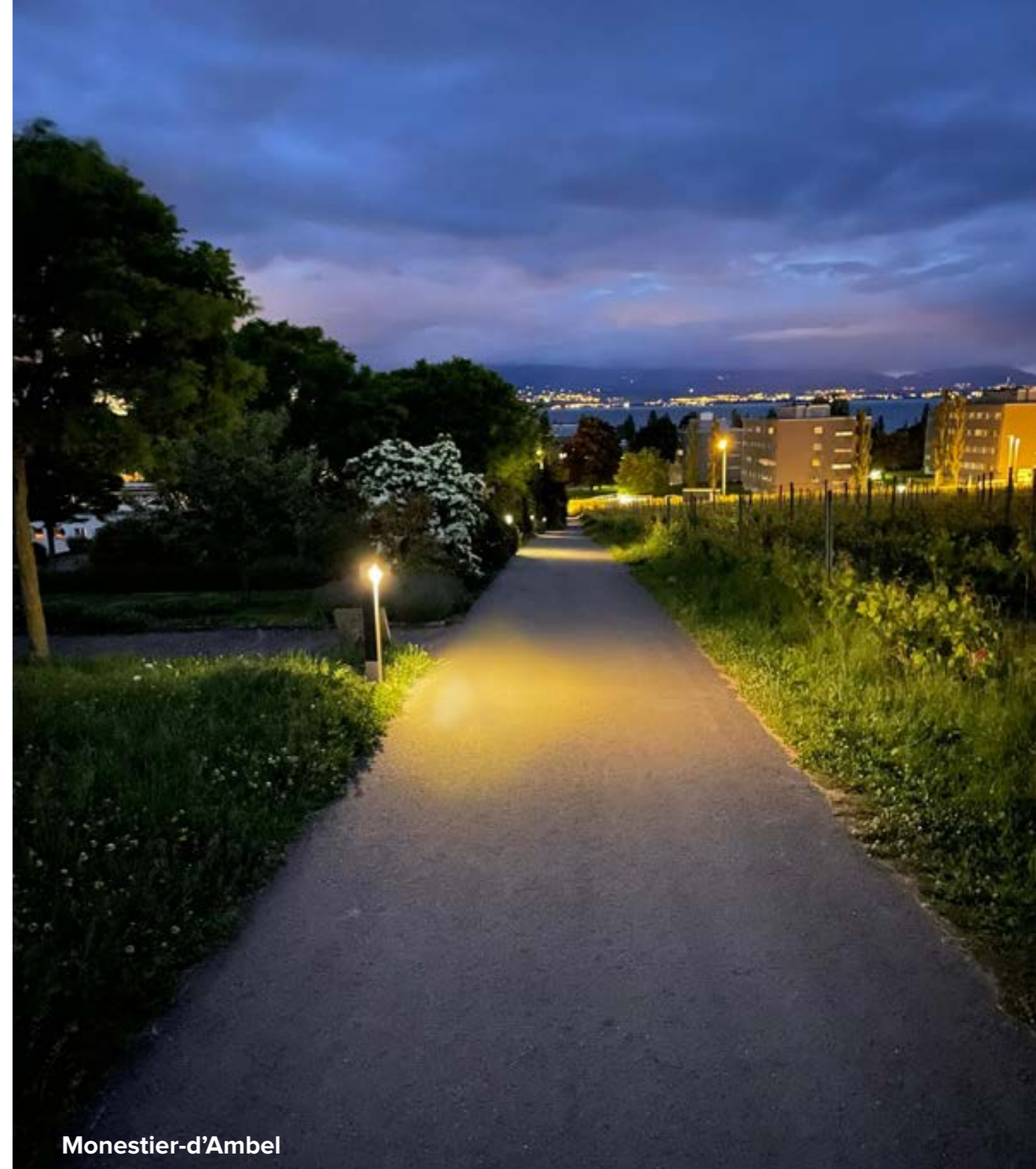
—
Latest generation of LEDs achieving an efficiency ratio of 185 lumens/Watt for a white 3000 K thanks to binning and our low intensity steering.

Solar cells

—
Use of Back Contact cells. Efficiency 24 %. 85 % of production still preserved after 25 years of use.

Components and softwares

—
Use of microprocessors, of MPPT and algorithms to optimize the energy production and the luminous flux.



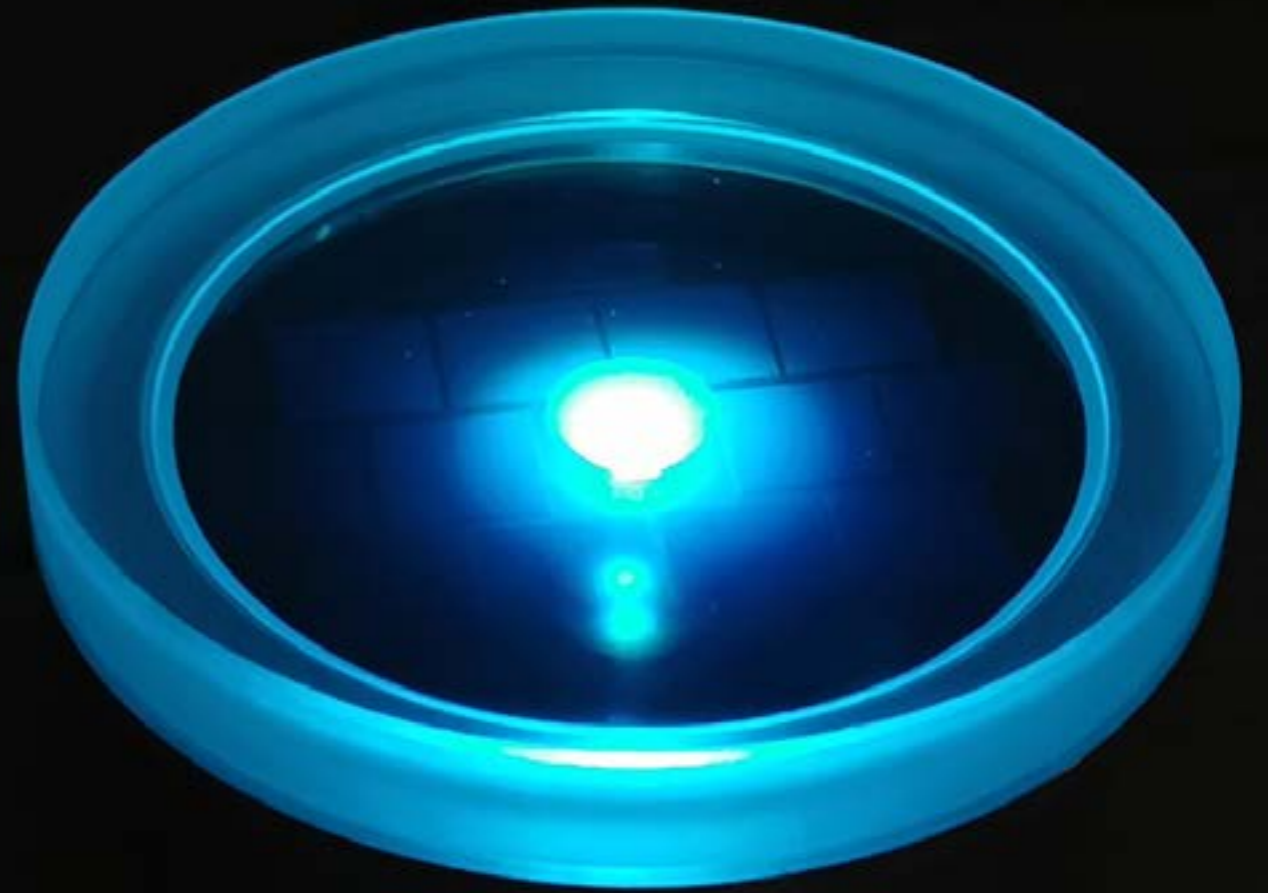
Monestier-d'Ambel

THE EFFICIENCY OF OUR SOLAR LIGHTING DEVICES IS BOOSTED BY THE EFFICENCY GAINS OF THEIR VARIOUS COMPONENTS.

Nowadays, solar lighting is a technically justified solution in many lighting projects, beyond installation and consumption savings and environmental impact...

Sustainable lighting that lasts all year long, even in winter.

MIKA STUD



MIKA STUD

Discover the new star of Nowatt Lighting: the Mika stud, solar luminous dot without wiring for facades.
A gentle light punctuation which is the result of a collaboration with designer Stéphane Masini.



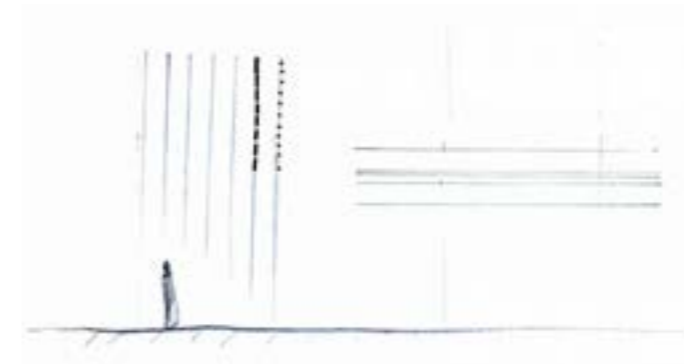
Mika Mini

Mika Max

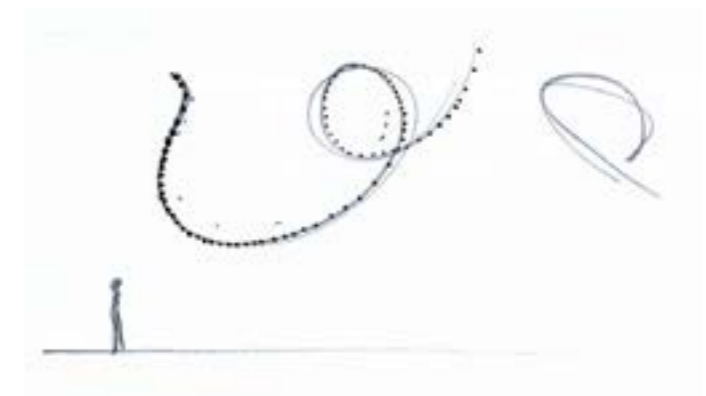
A SMART AND VERSATILE RANGE

The Mika stud is in two just-right sizes.
Choose a scenario designed by Nowatt Lighting.
Luminous dots drawing multicolored waves.
A breath of whites.
A sparkle in over a million colors ...

ULTRA PERSONALIZED APPLICATIONS



Straight light lines



Curved light lines,
patterne, writings



Orderly or random
light compositions

CRYSTAL STUD

The Crystal stud is the ideal marking solution for many types of applications. A cycle path, a public square, a pedestrian path...

A SIMPLE, MODULAR AND RESISTANT PRODUCT

The glass frame diffuses the light with elegance, and the Nowatt Lighting application allows to program 100 % tailor-made scenarios. Choose from a million colors, with dynamic light animations.

With 480 hours of autonomy, the Crystal stud offers reliable marking all year round, even in winter.

Enters the **DARK SKY**
philosophy



COMPLIANCE WITH THE DECREE OF DECEMBER 27, 2018

Crystal studs are marking products. Their luminous flux is less than 100 lumens. They are therefore excluded from the scope of the decree of December 27, 2018 relating to the prevention, reduction and limitation of light pollution.

A product that respects biodiversity.

Thau lagoon, ILEX

For this project, ILEX wanted to reconcile the time of man and that of fauna and flora by creating two distinct types of lighting. Thus, at the start of the evening, the 3000 K Crystal studs light up, sandblasted and screen-printed with footprints symbolizing the time of man. Later in the night, the amber Crystal studs take over. Sandblasted and screen-printed with flamingo legs as a nod to local birdlife, amber light has less impact on the environment.



CRYSTAL STUD

Clermont-Ferrand, Clermont-Ferrand Town Hall
The Luminous River is a project created with Crystal studs Mesh by Nowatt Lighting. The scenario has been tailor-made to create the effect of a stream while saving energy for optimal operation.



CRYSTAL STUD



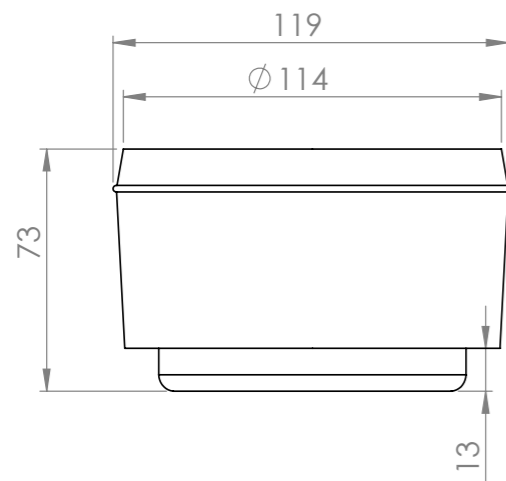
**La place des prêcheurs, Aix en Provence,
Atelier Jeol**

*For this Provencal square, the atelier Jeol chose to create
a lighting design with a water drop effect.*

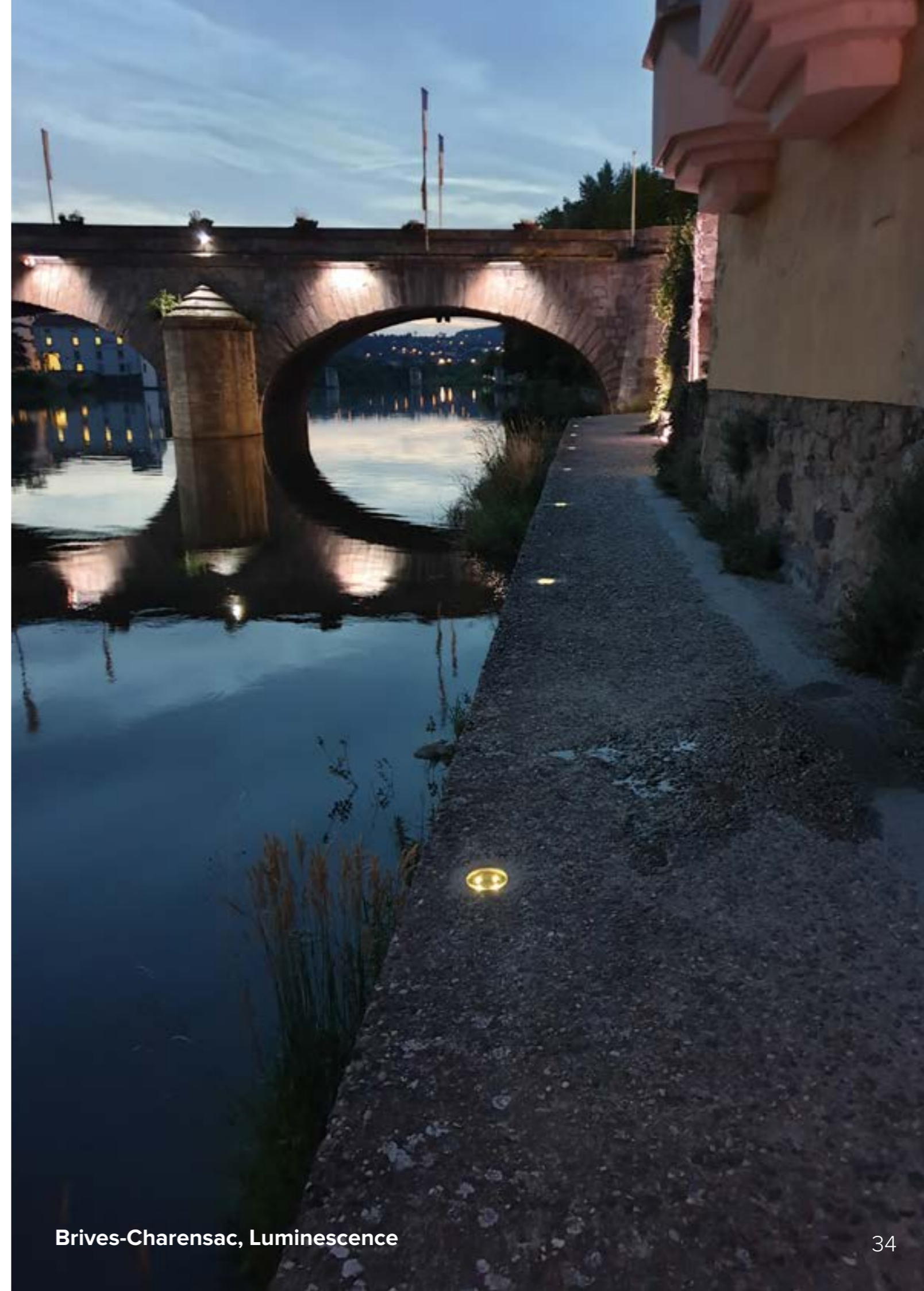
CRYSTAL STUD



CRYSTAL STUD



- Usage: Outdoor marking device connected with LEDs, with no cabling.
- Choice of LEDs color: amber, 3000 K, 4000 K, or RGBW.
- Structure: 15 mm thick tempered glass frame on aluminum tube.
- Battery LiFePO4 3.6 Ah.
- Solar panel Sunpower Back Contact.
- Operating temperatures: - 10° C / + 60° C.
- Resistance to compression (EN62262 - IK10): 3 tons (suitable for the passage of vehicles of 32 tons maximum).
- Weight: 1.25 kg.
- Dimensions: 119 x 72 mm.
- Class III - IP67 - IK10 - CE.
- Bluetooth connection for a remote control of the product via the Nowatt Lighting application: scenarios and operating time.



MESH COMMUNICATION

A MESH NETWORK FOR TAILOR-MADE SCENARIOS

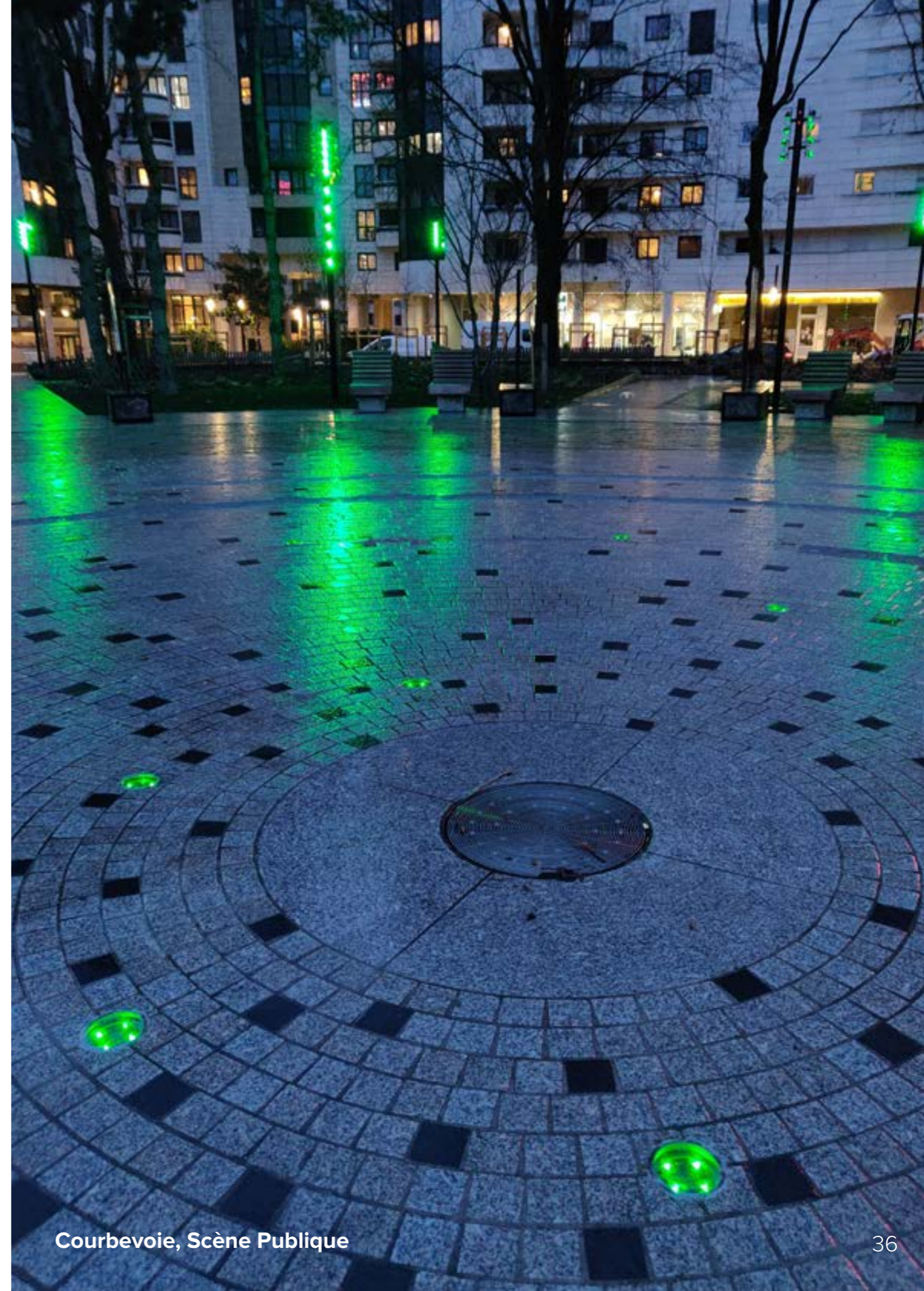
The Mesh references of Crystal studs and Mika studs make it possible to script the space with 100 % tailor-made light animations.

Each project has its specificities. The studs light up precisely at the desired time, whether at sunset or at a fixed time, and according to a defined schedule. The colors are defined and can change during the night at the level of the stud or the entire site.

CREATE **DYNAMIC LIGHT**
SCENARIOS ON THE **GROUND** WITH
CRYSTAL STUDS AND ON **FACADES**
WITH MIKA STUDS

FLEXIBLE SYNCHRONIZATION THANKS TO THE NOWATT LIGHTING GATEWAY

The Nowatt Lighting Gateway provides a control interface between the Crystal or Mika studs and a DMX system. Thus, the Nowatt Lighting studs can be controlled remotely, synchronized with each other and also with other wired lighting devices included in the project.



ONYX BOLLARD



ONYX BOLLARD

Designed by lighting designer Agathe Argod, the Onyx bollard is the ideal solution for lighting walkways without wiring work.



A SMART DESIGN

The design of the Onyx bollard has been studied to combine aesthetics and performance. Its vertical solar panels are discreetly located on the sides, thus easily receiving the rays of a sun low in the sky. This is why the Onyx bollard is effective even in northern countries and in winter. In addition, the solar cells are on either side of the bollard, so the device can be oriented in any direction regardless of North.



The 30/60° optic is perfectly suited to paths. The white temperature is adjustable between warm white and cool white.

ONYX BOLLARD



ONYX BOLLARD



ONYX BOLLARD



ONYX COLUMN



Quai de la roquette, Libourne, Coup d'éclat

ONYX COLUMN

With its diapason silhouette, the Onyx column shares the same elegant design as the Onyx bollard.

It also shares the same positioning of its solar panels on the sides of the device, allowing it to capture the sun's rays even in winter when the sun is low in the sky, and regardless of the orientation of the column with respect to the North.



Thanks to the large surface of the solar panels, the energy produced makes it possible to space the columns from 15 to 30 meters on a path. For more practicality and for optimal battery management, Onyx columns can operate with presence detection and with a light wave.



Lavoir de la fontaine Roudeyre, Libourne, Coup d'éclat

ONYX COLUMN

Quai de la roquette, Libourne, Coup d'éclat

"The nocturnal development of this promenade aims to make a transition from the urban night to a natural, friendly and welcoming shade. In fact, the luminous proposal radically aims not to enlighten. Simply to build a nocturnal identity for this wild walk, by the regular rhythm of a combined signage: regular and breathing on the ground, punctual and fixed at 3 m."

Florian Colin, Lighting Designer

ONYX
COLUMN

ONYX COLUMN



ONYX PROJECTOR





CHESEAUX SUR LAUSANNE

- Engineering office: Betelec.
- Installation: Romande Energie Services.
- Products: 6 Onyx Bollards.
- Photo credits: So Lighting sarl / Nathan Häusermann.
- Pages 41, 42.

FITNESS TRAIL, PORTO VECCHIO

- Project owner: Porto Vecchio town hall.
- Products: 1 Onyx Column.
- Crédits photos : Philippe Choisnet.
- Pages 55, 56.

SEA TPI, LA CIOTAT

- Project owner: SEA TPI.
- Landscaper: TEM Paysage.
- Products: 3 Onyx Columns, 12 Onyx Bollards, 12 Crystal Studs PLRE2-3.
- Photo credits: Lucas Saintot.
- Pages 57, 58.

PEPITE, MONS-EN-BAROEUL

- Lighting designer: Rozenn Lecouillard, Noctiluca.
- Products: 75 Onyx Power + Lumteam projector.
- Photo credits: Romain Manzini, Matthieu Moreau.
- Pages 72, 74, 75, 76, 78.

SNCF TRAIN STATION, LA CIOTAT

- Project owner: Gares et connexions.
- Products: 18 PLRE4.
- Photo credits: Lucas Saintot.
- Page 92.

CATALOGUE LAYOUT

- Marion Cambron.

SOLAR STREET LIGHTING

365 NIGHTS OF GUARANTEED LIGHTING



FONROCHE
lighting

SOLAR
IS THE NEW
STANDARD

B | B | A Int.

INNOVATION & GREEN TECH.

POWER 365 SOLAR TECHNOLOGY

SOLAR LIGHTING technology BY FONROCHE

Consisting of a highly efficient photovoltaic panel, a smart storage system and the latest LED lighting, the Smartlight is the most powerful solar street light available on the market. The **Power 365 solar technology** developed by Fonroche Lighting guarantees a level of reliability and competitiveness that is unrivalled on the market thanks to our high-performance components and a project approach specific to each environment.



5-years Warranty

30 Years SERVICE LIFE

Photovoltaic module

- Excellent light capture in all weathers.

20 Years SERVICE LIFE

LED light

- Lighting performance exceeding 190 Lm/W.
- From 40 to 80 nominal Watts.

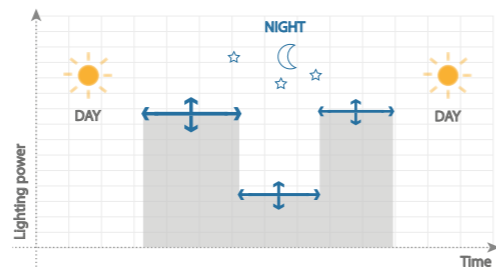
Pole and mounting arm

- Comply with the EN40 standard or any other local standard.

Smart storage and management system

- long lifespan (4,000 cycles).
- Easy to recycle.
- Resistance to extreme temperatures (From -40°C to + 70 °C).
- Programmable operating ranges:

12 Years SERVICE LIFE



FONROCHE Connect : remote communication tool



- Remote monitoring and diagnosis.
- Geolocation of each streetlights.
- Remote monitoring of one or multiple streetlights simultaneously.
- Long-range communication.



COLOMBIA - Roundabout, Alto Magdalena



USA - Residential area, River Landing



FRANCE - Parking lot in Privas

SUCCESSFULLY ACHIEVE YOUR SOLAR LIGHTING PROJECT THANKS TO OUR UNIQUE APPROACH

Each project is different. By taking into account the irradiance and weather conditions of each project, we can determine the size of our street light and its components to guarantee 365 nights of lighting.



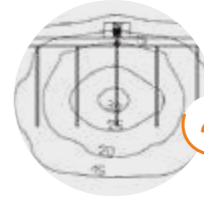
1 Identification of project requirements.



2 Solar and environmental study
COLLECTION of weather data from the site.
SIZING and simulation of a typical year



3 Bespoke photometric study
RESULTS 365 nights of guaranteed lighting per year.
ADJUSTMENT to create a bespoke project tailored to its location.



4 Precise installation for an optimised budget.

YOUR AREA, YOUR STYLE, OUR AMBIENCES

With lines that blend functionality and elegance, the lights in our SMARTLIGHT range are designed as a complete package and come in a variety of distinctive styles. In addition to providing solar-powered lighting, Fonroche Lighting can also help you choose the ambience that best suits your environment, reflecting your desire to take an innovative approach to street lighting.



WHY CHOOSE FONROCHE LIGHTING ?

World leader in solar street lighting



1 For the reliability and robustness of our products,

proven in thousands of projects worldwide.

2 For our unique expertise

design, innovation, manufacturing, logistics, training, etc.

3 Because we are the only ones,

to guarantee you **365 nights of lighting per year.**

OUR EXPERTISE:



The Power Room:

THE LARGEST BATTERY TEST CENTER FOR SOLAR-POWERED LIGHTING

500 m2 dedicated to battery testing and validation, allowing for simulation of all climates to ensure the reliability, resistance, and longevity of our systems.



«La Street»:

THE FIRST CENTER IN THE WORLD

Entirely dedicated to solar public lighting. Located in Agen, France.

Who are we?

Based in the Lot-et-Garonne region of south-west France, we design, develop, and manufacture autonomous solar-powered street lights to illuminate all types of infrastructure.

- 2011** YEAR OF FOUNDATION
- 200** EMPLOYEES
- €85 M** TURNOVER IN 2023
- 5** SUBSIDIARIES THROUGHOUT THE WORLD

HOUSING ESTATES



USA - residential area, River Landing



FRANCE - Housing estate, Viewuicq



FRENCH POLYNESIA - housing estate, UTUROA



FRANCE - housing estate, Estillac

HOUSING ESTATES

A dilapidated and unstable electricity network, energy-guzzling street lights, etc. Renovating the lighting in housing estates and residential areas is a key focus for local authorities, which are concerned about the well-being and safety of their users. By choosing Fonroche Lighting solutions, they can reduce their electricity bills, minimise their carbon footprint and, above all, ensure that their local area remains appealing.

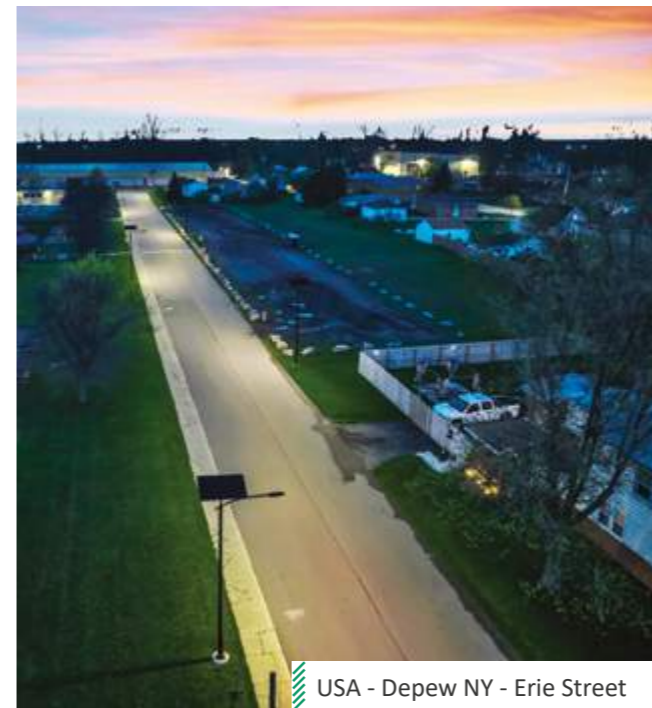
THE reference

Example of the Erie residential area in the village of Depew in New York, USA:

The Project:
Improving the safety of a pedestrian walkway.
Date: 2023 - 6 solar-powered street lights.

The key focuses:
This project is part of a wider agreement with the city aimed at reducing costs for taxpayers. Other solar lighting systems have also been installed.

"solar lighting, which is economically beneficial for us and ecologically beneficial for our region".
Kevin Peterson - Mayor of Depew



USA - Depew NY - Erie Street

Applications

- HOUSING ESTATES / ECO-NEIGHBOURHOODS.
- FOOTPATHS.
- RESIDENTIAL AREAS.
- ENTRANCES AND EXITS OF THE AREA.

The +

- A solution that is more competitive than conventional lighting.
- Ideal for renovations or eco-neighbourhoods.
- Eliminates civil engineering costs.
- Installation time is halved compared to conventional street lights.
- Fewer worksite-related disturbances.

- Between 10 and 15 lux on average.
- 0.25 uniformity.
- Use of the "Road 2" lens.



Housing estate	E	E min	Uniformity
	14 lx	3.5 lx	0.25

GREENWAYS



FRANCE - Chaingy, cycle lane

Solar lighting is the perfect solution for greenways and cycle paths, which are often difficult to light because of their long distances; it also means that these routes can be used for longer after dark whilst ensuring that cyclists and pedestrians remain safe.

Applications

- GREENWAYS.
- CYCLE TRACKS.
- FOOT PATHS.
- SOFT PATHS.

The +

- No civil engineering works.
- Lenses offering the ideal dispersion of light for optimal illumination.
- An eco-responsible solution adapted to a natural environment.



FRANCE - Menilles, greenway

- 7.5 lux on average.
- 0.20 uniformity.
- Use of the 'Road' lens.

Greenway	Ē	Ē min	Uniformity
	7.5 lx	1.5 lx	0.20



FRANCE - Périgueux, Greenway

PARKS & GARDENS



MOROCCO - Dar Bouazza Peninsula Park

Applications

- PARKS, GARDENS.
- SQUARES, PLAYGROUNDS.
- SMALL SPORTS FIELDS, MULTI-SPORTS GROUNDS.

The +

- Safety and peace of mind for pedestrians at nightfall.
- Respect for biodiversity thanks to a sustainable low-carbon solution.



CHILE - ParqueMet, Santiago de Chile



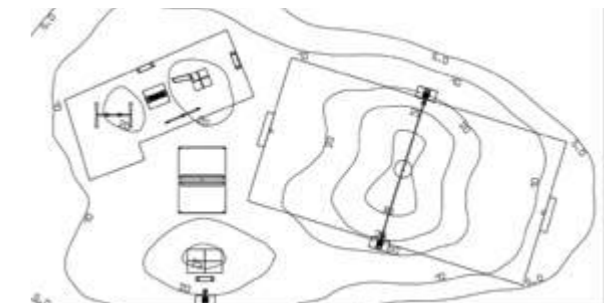
FRANCE - Multi-sports ground

Park and garden:

- 7.5 lux on average.
- 0.20 uniformity.
- Use of the 'Road 2' lens.

Multi-sports ground:

- 20 lux on average.
- 0.40 uniformity.
- Use of the 'Road 2' lens.



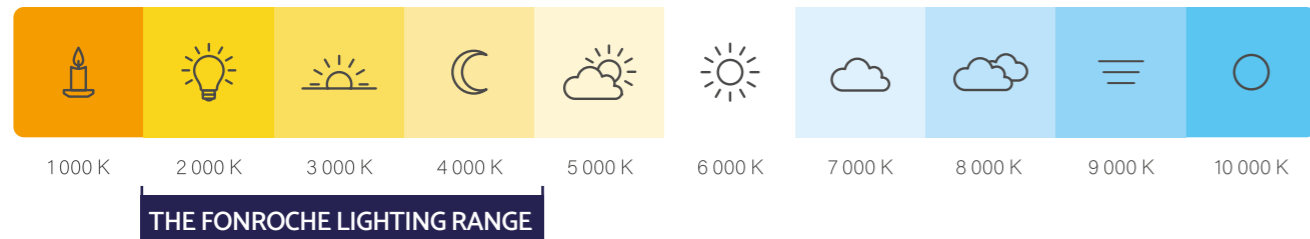
	Ē	Ē min	Uniformity
Park and garden	7.5 lx	1.5 lx	0.20
Multi-sports ground	20 lx	8 lx	0.40

GREENER AND FAIRER LIGHTING

WARMER LIGHTING THAT WORKS IN HARMONY WITH NATURE

Fonroche Lighting offers a wide range of colour temperatures and lenses with exceptional performance to suit every project and provide a tailor-made solution.

Measured in Kelvin (K) on a scale of 1,000 to 12,000, colour temperature refers to the chromaticity of the light emitted. Adapting the colour temperature of street lights helps to reduce light pollution by providing light that is more respectful of biodiversity and the night sky. The street lights in the Smartlight range offer a choice of colour temperatures to suit any location.



OUR GLOBAL APPROACH TO RESPECTING BIODIVERSITY

An adapted range of lenses

(with different light dispersions) that allow us to adapt the lighting output of our street lights to respect local biodiversity.

Adjustable light levels

Our street lights can be programmed to provide optimal brightness (dimming or even switching off the street light if necessary).

Control light output

To avoid loss of light (flux code CIE).

“Warmer” colour temperatures

Ranging from 2000K to 4000K to avoid disturbing photosensitive species.

An environmentally responsible approach

Our solution has been designed with the environment in mind: installation with limited impact on the soil, no CO2 emissions during use, no impact on biodiversity, a long service life and almost 100% of the product can be recycled.

PRESERVING THE NOCTURNAL ENVIRONMENT

With natural habitats deteriorating and disappearing as a result of artificial lighting, preserving and restoring ecosystems is now essential.

By adopting an approach that incorporates biodiversity conservation into land-use planning decisions, local authorities are trying to make the right choices. As part of this approach many areas around the world are regulated with a view to preserving the night-time environment and prevent light pollution.

A RANGE OF LENSES TO SUIT EVERY PROJECT

- 
Parking lot LENS
 Specialised for parking lots and open spaces
- 
Road LENS
 Specialised for roads <7m
- 
Road 2 LENS
 Roads >7m and parking lots for all types of application
- 
Asymmetric LENS
 Specialised for pedestrian crossings

LIGHTING EXPERTISE

All Fonroche Lighting street lights comply with the photometric standards of every country in the world, as well as their light pollution requirements.



Fonroche Lighting street lights are "DarkSky approved". Dark sky-friendly technologies are systems that aid in the mitigation of light pollution.

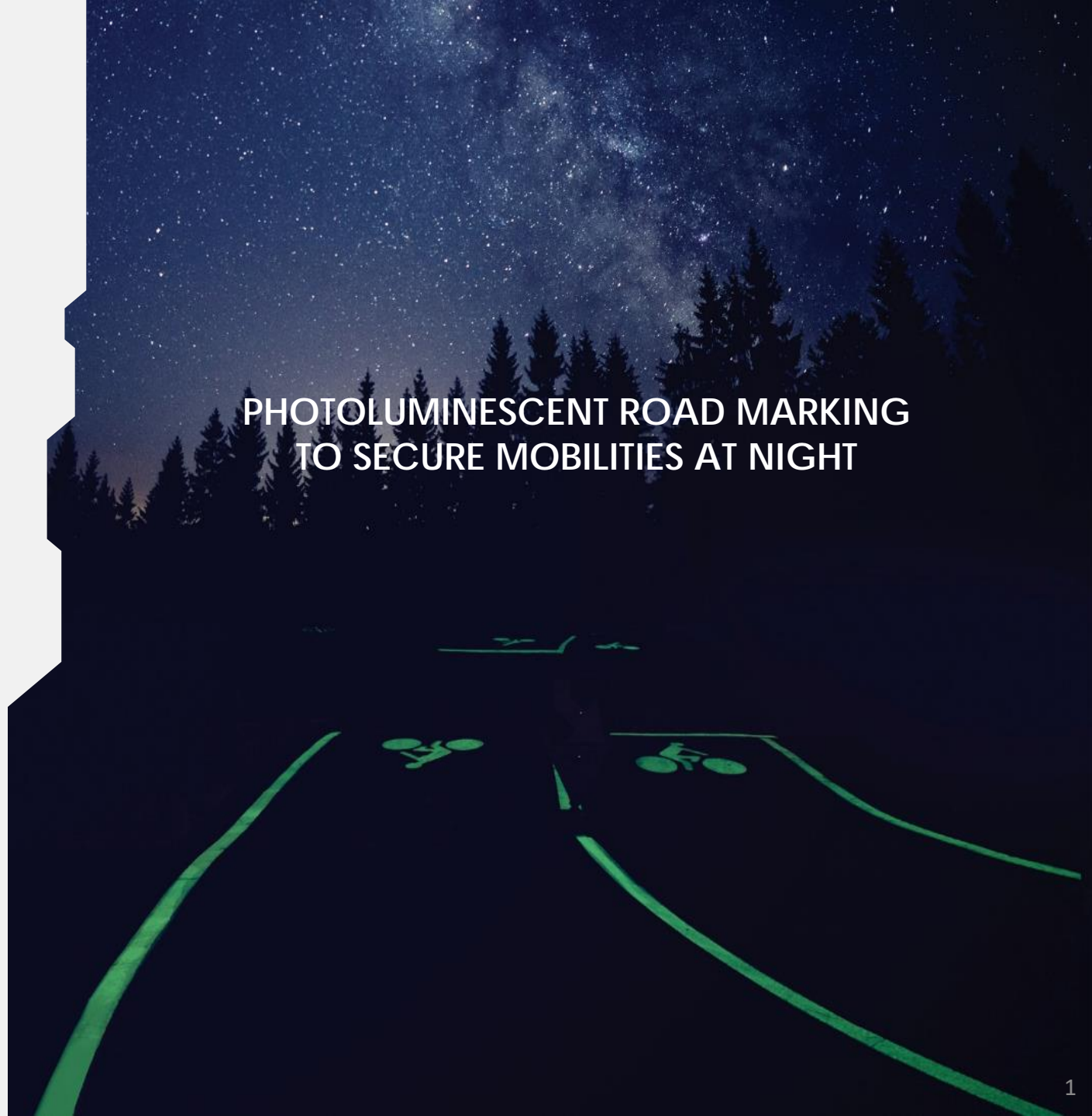
LuminoKrom[®]

Photoluminescent road marking

Created, patented and produced in France by



PHOTOLUMINESCENT ROAD MARKING
TO SECURE MOBILITIES AT NIGHT





Photoluminescence optimized for more sustainable infrastructure



Charges during the day



Shines up to 10 h in the dark
without electricity or CO₂
emissions

LuminoKrom[®]



A patented technical feat Highest luminescence levels

LuminoKrom® Almond Green = G Class
Application 800-900g/m²
10h of visibility

LuminoKrom® White = E Class
Application 800-900g/m²
6h of visibility

LUMINESCENCE CLASSES ISO 17398					Visibility duration* in the dark * Human bottom level of visibility 8mcd/m ²
Classification	Luminance (mcd/m ²) after x mn in the dark				
	2 mn	10 mn	30 mn	60 mn	
A Class	108	23	7	3	30 mn
B Class	210	50	15	7	1 hour
C Class	690	140	45	20	2,5 hours
D Class	1100	260	85	35	4 hours
E Class	1800	400	120	55	6 hours
F Class	2300	520	155	70	8 hours
G Class	3000	650	190	80	10 hours

Good to know:

- Light emission of luminescent paints is decreasing during the night and the limit of visibility outdoor is estimated at 8mcd/m².
- Only ISO 17398 international standard allows to differentiate offers in Public Purchase documents. Request the certificate from a Cofrac accredited laboratory

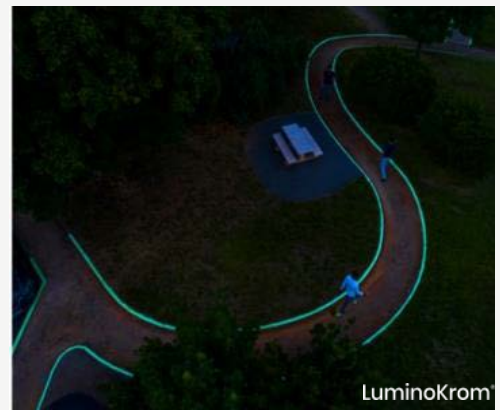
LuminoKrom[®]

Makes cyclists and pedestrian moves more secure

WARNS AND GUIDES
users in unlit areas



Pedestrians



Cyclists





GUIDING



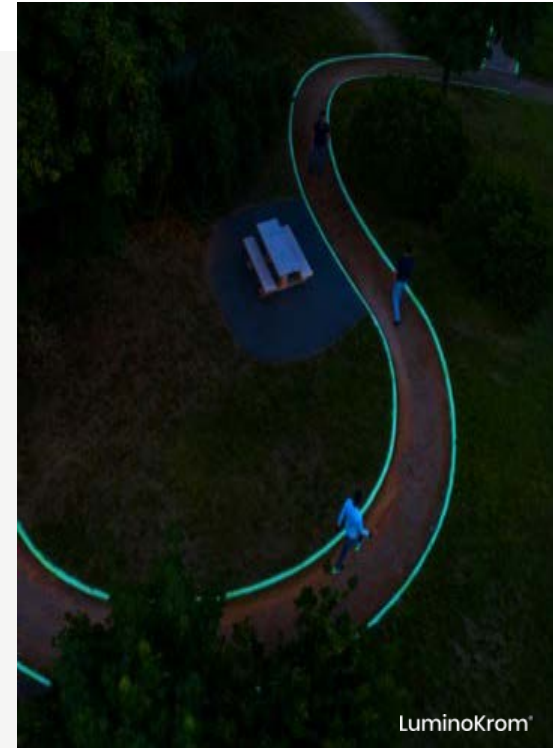
Pedestrian Bridge
Ruelle sur Touvre (16)



LuminoKrom[®]



Pedestrian path in a truck rest area
Chazey (01)



LuminoKrom[®]

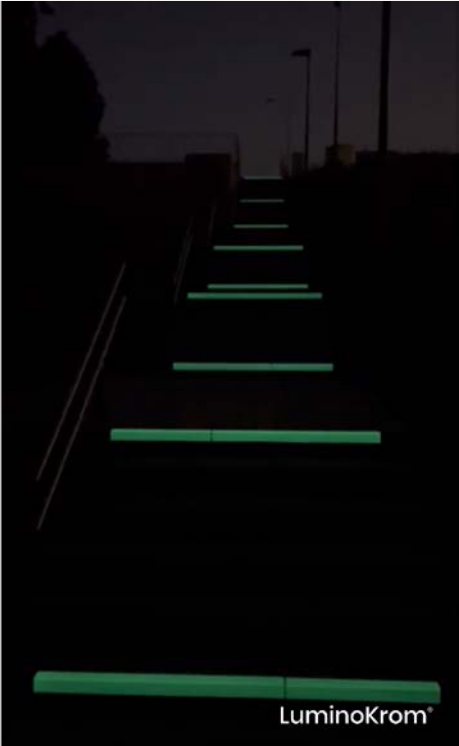


GUIDING

Prévost (Québec – Canada)



GUIDING



Outdoor and indoor stairs : preventing accident when the lights are off



GUIDING



Esvres sur Indre (37)

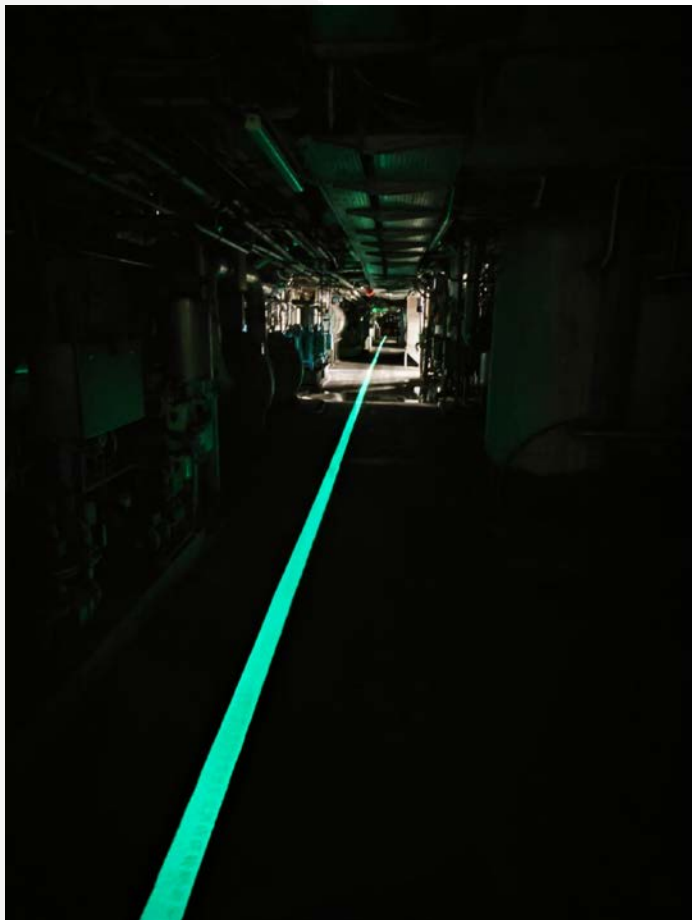


Rouen (76)



Interurban cycle paths

GUIDING



Indoor or outdoor safety guides in case of shutdowns



WARNING



LuminoKrom[®]

Pedestrian crossing
Carcans (33)



LuminoKrom[®]

Share the space
Brest (29)





WARNING



***Dangerous section: hairpin turns, hazardous edges, intersection
Carcans (33)***



WARNING



**Intersection
and barrier**
La Roche sur Yon (85)



Highlight the dangerous edge
Nancy (54)



LuminoKrom®



LuminoKrom®

LuminoKrom®



Making commercial signs visible with no electricity

LuminoKrom®

Environmental impact

The luminous signage with the least impact on the environment:

- No light pollution,
- No root destruction
- Life cycle analysis* :

*LuminoKrom[®] Paint Marking
compared with solar road studs*



* 1 km of cycle path equipped with axial painting T3- 6cm vs photovoltaic studs– ACV realised by Apesa in 2021

LuminoKrom[®]



**More information
Studies
Quotes & orders
Technical support**

See our references on
www.luminokrom.com

