

## Light pollution: the best solutions for outdoor lighting

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**Is outdoor lighting doomed to forever be synonymous with light pollution?**  
**Read our top tips for reducing light pollution and discover our range of sustainable lighting solutions.**

### Light pollution: a major concern for outdoor lighting

From simple glare to skylight, **light pollution** obscures the view of the starry sky and disrupts biological rhythms, **ecosystems** and **biodiversity**.

A relatively new concept, it is only in the last decade that light pollution has truly become a **major concern** for public authorities and cities.

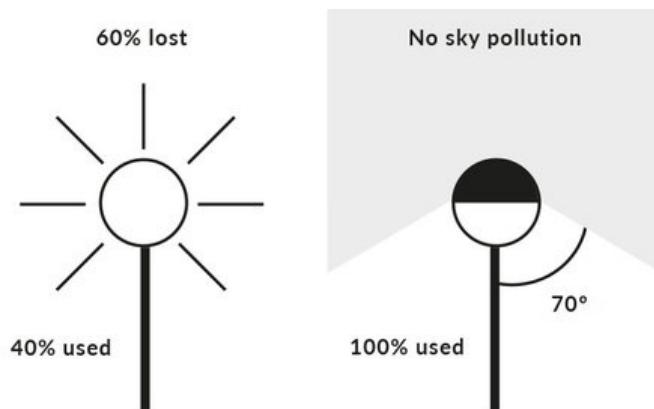
In response, projects such as **RICE** (Réserve internationale de ciel étoilé) have been put in place to counter the excessive use of urban lighting and help preserve the **natural beauty of the night sky**.

### Avoiding light pollution when lighting monuments

**Lighting monuments**, both natural and manmade, is one of the first things that comes to mind when talking about light pollution and outdoor lighting. More and more towns and cities have taken up the practice, especially since the rise of LED technology in the late '80s.

But how can lighting systems be improved to **reduce light pollution**? The answer lies in devising a **lighting master plan**, which ensures that it is used in the right place, at the right time, with the appropriate intensity and with optimal beauty:

- **By adapting the intensity to the monument's characteristics.** Good does not always mean bright; softer lighting often better highlights architectural details and minimises glare.
- **By orientating and focusing** the luminous flux. The ULOR ratio, which is the percentage of light flux emitted upwards, should be lower than 3% for practical lighting, and 20% for atmospheric lighting.
- **By choosing a programmable outdoor lighting solution** to prevent unnecessary waste. Lighting may be set according to the time of day or to human presence.



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*Appropriate and sustainable outdoor lighting minimises energy loss and light pollution.*

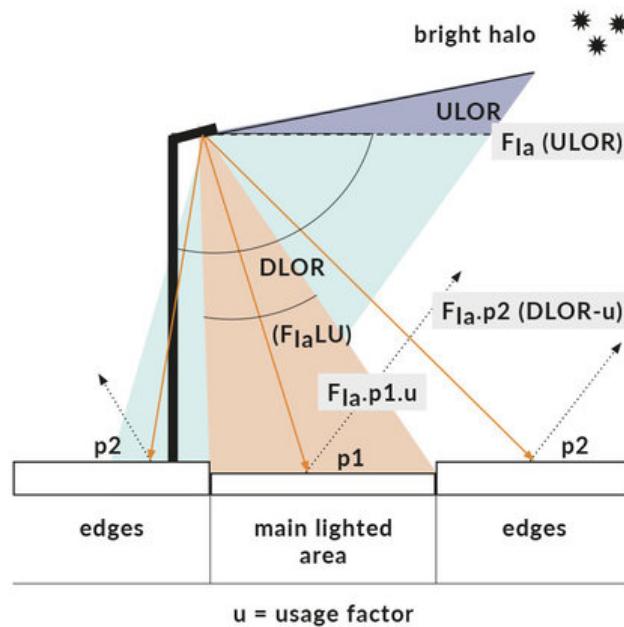
### Using smart LED outdoor lighting to minimise light pollution

**Systems that use intelligent LED technology** thus provide the clear answer to **modern urban environments'** need for sensible lighting that reduces light pollution. LED technology:

- **Enables dimming:** the luminous power of LEDs can be set from 0 to 100% in accordance with the time of day. This cuts light pollution and saves energy.
- **Combined with adapted optics** allows lighting to be orientated and focused. LEDs minimise the maximum potentially lost luminous flux (UPF) without causing any light trespass.

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### Calculation for maximum potentially lost flux UPF



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- With a high CRI ([colour rendering index](#)) makes for more **aesthetically pleasing** lighting.
- With lower **blue light** helps reduce the effects of skylight and improves star visibility in line with **recommended levels**. Blue light has a larger diffusion in the atmosphere than other colours and is more perceptible to the eye at night; LEDS offer the ability to pick a [colour temperature](#) that induces less light noise.

	Centre of RICE/PNC zone	RICE buffer zone PNC partnership zone	RICE Transition zone
ULOR	0% for practical lighting and 1% for atmospheric lighting	≤ 1% for practical lighting and 1% for atmospheric lighting	≤ 3% for atmospheric lighting and ≤ 1% ULOR for practical lighting (LED ≤ 3%)
Colour temperature and blue light percentage	≤ 2000K or ≤ 10% blue light	≤ 3000K or ≤ 20% blue light	≤ 3500K or ≤ 25% blue light

*The photometric characteristics recommended and enforced for lighting installed in RICE-certified areas, as the Parc National des Cévennes (PNC).*

LAMPS	MELATONIN PRODUCTION	STARRY SKY VISIBILITY

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	Emission percentage between 405-475 nm	Impact on melatonin production	Emission percentage between 475-530 nm	Impact on starry sky visibility
Low-pressure sodium	0%	Almost zero	0%	Almost zero
1800K amber LED	0,9%	Very low	0,3%	Very low
High-pressure sodium	5,2%	Acceptable	5,0%	Acceptable
Low blue-wavelength ceramic HMI	between 9 and 10%	Average	between 9 and 10%	Average
2700K LED	15,2%	High	2,2%	Low
Fluorescent	17,2%	High	9,5%	Average
iodure métallique	26,1%	Very high	7,9%	Average
LED 4000 K	18,3%	Very high	13,5%	High

*A presentation of RICE lighting: overview, solutions and implementation.*

## Light pollution: LEC champions sustainable development

On 8 October 2016, LEC took part in the 8th year of **Le Jour de la Nuit**. The aim of the event is to raise awareness of **light pollution** and the need to protect biodiversity. Many issues were tackled, including the question of **energy waste** and the **sensible use** of outdoor lighting.

Since the beginning, LEC has used advances in LED technology to offer increasingly **effective** and **eco-friendly** outdoor lighting solutions. That is our **vision of innovation**.

Want to know more?

Take a look at [LEC's products and projects.](#)