

Life at Night



A Project for Decreasing the Negative Impacts of Illuminating Cultural Heritage Sites and for Improving the Nature Conservation Status of Nocturnal Animals



What is light pollution?



Why should cultural heritage sites be illuminated properly?



What impact does artificial light have on animals?



What kind of project and solutions did we prepare?

What is light pollution?

Light pollution is the emission of light from artificial light sources that increases the natural illumination of the environment. Mainly during the last decades, outdoor lighting has been increasing rapidly. Experts estimate that in Europe there is approximately 1 new km² illuminated per day.

Humans need light of course, but excessive and inappropriate lighting can have a series of negative consequences. It unnecessarily increases energy consumption, disturbs natural processes, damages health in the long term and prevents astronomical observations.

However, with technical solutions it is possible to achieve a very efficient reduction of light pollution. It is necessary to install lighting that will only illuminate the areas where light is needed and only when it is needed.

Why should cultural heritage sites be illuminated appropriately?

Even though street lighting is a major contributor to light pollution, the lighting of cultural heritage sites represents a special problem. In these cases it is permitted to illuminate from the ground upwards because installing luminaires on historical buildings is often not appropriate. Because normal luminaires are not modified for this purpose, a large part of the light is often directed past the facade into the sky, where it is of no use to anyone. Inappropriate and excessive illumination disturbs the life of nocturnal animals and represents unnecessary costs for humans.

Slovenia is known as a country with many churches - and most of them are illuminated. They are large illuminated points in the landscape that attract insects from near and far, and the light also disturbs endangered species of bats in the attics of the church towers where they raise their pups.

Impact on bats

Bats are the only mammals with the ability to fly. They are only active at night, when they hunt for the insects that are their main source of food. In spring, the female bats gather in big nursery colonies in attics and church towers and raise their pups together. If the exits of their shelters are illuminated, they will not go hunting at dusk, but at a later time, shortening the time available for feeding. Less food for the females also means less food for their pups, which are entirely dependent on their mother's milk during the first weeks, resulting in slower growth. Undernourished pups from illuminated shelters also have less chances of surviving their first winter.

Impact on nocturnal insects

Insects are the class with the largest number of species on the planet and represent the majority of the planet's biodiversity. They are very important pollinators of plants and an irreplaceable link in the food chain.

Many species of insects are active at night and are attracted by light. Whenever they are disturbed by an artificial source of light during feeding and reproduction, they start circling around the luminaire before settling down and going to sleep. If this occurs for several successive nights, they cannot carry out their biological mission. When a new source of light appears, it can decimate the population of moths in one season, and they will vanish from the immediate vicinity in a few years.

Despite these issues, we believe that appropriate technical solutions could be used to bring the illumination of cultural heritage sites in line with the needs of nature.

The main goals of the project

- **to reduce the negative impact** caused by the illumination of churches, reduce the consumption of energy and improve the nature conservation status and biodiversity of nocturnal animals,
- **to prepare technical guidelines** for the energy efficient and nature-friendly illumination of cultural heritage,
- **to inform the public** about the issues caused by light pollution and to provide possible solutions.



Solutions

Project activities

- We shall develop **an innovative technical solution** - a new type of floodlights that will be adapted to the shape of the building and will decrease the unnecessary lighting of the sky.
- The new floodlights will be used to **replace the existing lighting for 21 Slovenian churches** and thus **decrease the electricity costs for their illumination by at least 30 %**.
- We shall monitor how various intensities and colours of light affect **bats and moths**.
- In cooperation with Unesco and based on these results, we shall develop **technical guidelines for the nature friendly and energy efficient illumination of cultural heritage** that will be widely useful for illuminating various types of buildings, not just churches.
- We shall carry out numerous **communication activities** and inform people about the issues of light pollution and the possible solutions. Among other things, we are planning:
 - a TV documentary
 - lectures all over Slovenia
 - consultations with the representatives of municipalities and the Roman-Catholic Church
 - radio reports
 - publications
 - a seminar for teachers
 - a competition for the best children's drawing
 - field workshops for children
 - events that will discuss the impact of light on nature

The main goals of the project

- Our goal for this project is to take the first step towards **the international standardisation of cultural heritage illumination**, which will be more energy efficient and less disturbing for nocturnal animals.
- The 21 churches that will be illuminated appropriately in the framework of the project shall serve as a **model for solving this issue** in Slovenia **in the future**.
- We are aware that long-term changes to people's activities are only possible if the thinking changes first. With an intensive and varied information campaign, we shall reach people of all ages and professions, including decision-makers, and thus contribute towards the **general awareness of light pollution**.





Partners

EUROMIX
Tehnološki park Ljubljana
Euromix Ltd.



Univerza v Ljubljani



University of Ljubljana
Biotechnical Faculty
Department of Biology



**Slovenian Association
for Bat Research
and Conservation**



**Society for the Conservation
and Study of Lepidoptera
in Slovenia**



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In cooperation with:

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