Recommendations for nature-friendly lighting of OCH

We recommend that OCH should not be lit. If this is not possible, OCH should be lit according to the requirements of the Decree on Limit Values due to Light Pollution of Environment (OG RS, No 81/2007; hereinafter: Decree) and the newest findings of biologists and environmentalists.

1. Façade luminance

The Decree requires that the average façade luminance be less than 1 cd/m^2. Experience shows that 0.2 cd/m^2 is sufficient in smaller towns.

2. Lighting with 0% emission into the sky

If possible, facades should be lit in such a way that no light shines into the sky.

3. The share of light that can miss the façade

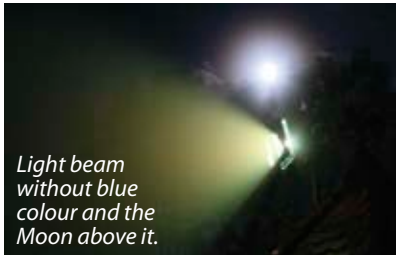
This is an extremely important factor and no more than 10% of light should miss the façade. Cost-effective technology of shielded reflectors developed within the LIFE+ Life at Night project can reduce the share of light that misses the façade to less than 2%. Shielding enables shading of the flight openings for bats and a narrower light beam attracts fewer insects.

4. Lamps directed upwards against the wall (»wall washing«)

Environmentally, this is the most debatable way of lighting, since a great amount of light is reflected into the sky.

5. Light spectrum

Due to its important blue-light component, white light (4000 K) strongly pollutes the sky and attracts insects. The following lamps should be used: amber LED or white LED with filter that blocks blue light under 500 nm. If possible, red light should be filtered above 650 nm since our eye can hardly detect wavelengths of red longer than that. If no filters are used, the colour temperature of light should not exceed 2700 K. Some laws governing the protection of night sky (Chile, Spain) have a criterion that all outdoor lighting should emit less than 15 % of light in wavelengths shorter than 500 nm.



Light beam without blue colour and the Moon above it.

6. What should not be lit?

If an object of cultural heritage is inhabited by a colony of bats, surfaces with flight openings are not allowed to be illuminated. In protected natural areas and in the areas of Natura 2000 sites, OCH should not be lit.

7. Lighting the environment surrounding OCH

Lamps with 0% emission into the sky should be used in order to reduce glare. Lamps should emit warm yellowish light of less than 2700 K.

8. Lighting should be switched off

Energy-efficient lighting of façades should also be switched off after 23.00 hours. In this way, people's health is preserved, as well as biodiversity and night sky.

9. Lighting of overhangs

Lit façades under overhangs attract insects which spiders feed on. Spider webs can be avoided by not lighting overhangs.

10. Ground-recessed lamps

In Slovenia, ground-recessed lamps are prohibited. They glare, dazzle and cause discomfort.

11. Consult nature and culture protection experts

Prior to renovation of lighting, please consult the institutions responsible for the preservation of natural and cultural heritage.

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LIFE AT NIGHT

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Slovenska nacionalna komisija za UNESCO
Slovenian National Commission for UNESCO

Nature-friendlier lighting of objects of cultural heritage (churches)

Recommendations

LIFE+ Life at Night project
In cooperation with the Slovene National Commission for UNESCO

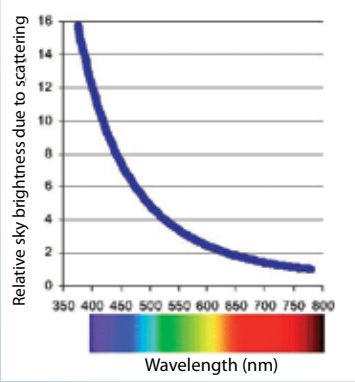
Light pollution is destroying the image of nature at night

We live on a planet where the astounding beauty and variety of nature inspire us and enrich our lives. UNESCO has declared the natural sky as "our common world heritage, which is part of the human environment".

The beauty of nature at night is disappearing. In Europe, light pollution has "washed out" the stars from the sky. The night sky over most beautiful national parks has become light polluted. In cloudy weather or with lying snow the environment receives up to ten times more illumination due to reflection.

White LED lamps are a threat to nature at night!

LED lamps are energy-efficient, since they consume less power. Unfortunately, most efficient white LED lamps (4000 K) also harm the environment more because they emit a great deal of blue and violet light.



Extremely violet colour scatters in the atmosphere 16 times more than extremely red, thus causing most light pollution. White LED lamps could be replaced with warmer LED lamps (2700 K) which are more pleasant at night. The majority of households use 2700 K or less for domestic lighting. The current standard in the lighting industry is 4000 K, which is very worrying!

The environmental influence of lighting on objects of cultural heritage (OCH)

In developed countries outdoor lighting of OCH causes from 5% to 20% of total light pollution. It is usually turned off after 23.00 or 24.00 hours.

The problem is that the majority of objects are lit from the ground up and often more than 80% of light misses the façade.

Lighting affects animals and people

Artificial light disturbs numerous animals and endangers biodiversity. Many animals are disturbed by light sources during migration; they get caught up in light beams and their usual circadian rhythm changes. Increased illumination of the environment gives an advantage to predators and causes imbalance between predators and prey. Artificial light suppresses nocturnal secretion of melatonin in humans and in animals. Melatonin is a strong antioxidant and protects from some types of cancer.

Lighting affects moths

As species, moths are one of the richest groups of insects. They are important indicators of environment preservation. There are over 3200 species in Slovenia. The biggest threats to moths are the disappearance of their habitats and light pollution. Light attracts insects, especially if it contains UV light. When caught in light beams, insects do not feed or reproduce and are more exposed to predators. This is confirmed by the results of the LIFE+ Life at Night project. At churches where experiments were carried out, up to six times fewer moths gathered round improved lighting as compared to overly strong, unfiltered original lighting. Yellow-white light attracts 40% fewer insects than blue-white.

Lighting affects bats

Lighting disturbs bats on their flight paths; it delays their emergence time from roosts and negatively affects the abundance of prey (insects). Lesser horseshoe bats are one of 28 species living in Slovenia. During the summer, they roost mostly in church attics and belfries. They prefer to inhabit unlit roosts with appropriate flight openings. They did not respond the same way at all the churches to the changed illumination included in the LIFE+ project. At some of them, bats emerged sooner with less intense illumination. In some cases, more bats emerged through shaded openings compared to the year when original illumination was installed.