



Light Pollution Prevention in Slovenia and Croatia

STUŽ workshop on Light Pollution, November 1, 2022

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Competencies and activities

- Detailed overview on situation in Slovenia and parts of other countries
- Experience with rationalisation of problematic projects at the local level, including raising awareness of local authorities and the general public
- Head of municipal commission for the audit of public lighting
- Head of the Committee for Limiting the Negative Effects of Lighting at the Slovenian Lighting Society
- Member of the working group for amending the Decree on limiting values of light pollution at the Ministry of the Environment and Spatial Planning of the Republic of Slovenia
- Active participant at international discussions and events in the last few years
- *Main area of interest: road and street lighting in non-urban areas*



Primary motivation comes from here



Slovenia made a big progress with a light
pollution decree (2007)

but light pollution is still rising

Amendments (in process, pl. 2023) will bring
additional progress

but will probably again not be sufficient

Croatia adopted LP law (2019-2020), which
will bring progress

but is largely based on wrong starting points
and will not solve the problem sufficiently

Big advances were achieved with Slovenian **LP prevention decree**, which is mostly respected. Almost no gleaming tall buildings, bridges, extensive decorations ..., some excesses with billboards and sports facilities. Almost all road lighting replaced by ULOR = 0.

Road lighting is still systematically spreading to all populated locations and connections between them. Illumination is extensive and intense. Road lighting has become one of the key factors of severe environment and landscape degradation.

Road lighting - Involved legisl./recomm.

- **Rules on road design** (only a few sentences on lighting, but many types of road objects required to be illuminated)
- **Slovenian Lighting Society recommendations** (based on CIE recommendations, officially not valid any more; recommendations of this level could be the most important starting point)
- **Standard EN 13201** (too demanding, misleading, missing info)
- **Regulation on limit values for light pollution** (has effect, but not enough)
- **Spatial planning legislation** (only starting including LP, no direct effects so far; should be the key starting point)
- **Green public procurement regulation** (requires standard EN 13201 and recommends 4000 K)
- **Municipal lighting plans** (low quality, not comprehensive)

SLO decree (2007) content and effects

- Roads, public surfaces, airports, ports, railways, production facilities, office buildings, institutions, facades, cultural monuments, protection of endangered species, advertising facilities, sports fields, construction sites
 - Road lighting: ULOR = 0, 44,5 kWh/res./year
- Major advances, most of lighting in line with the Decree
- Advent of LED lighting led to failure of 44,5 kWh cap
- Harmonization by 2017: possible to have led to increased road lighting proliferation

A few km, surrounings of a small town



ULOR=0, but explosion of road/street lighting



Billboards – remaining unsolved



Cultural monuments – good practice

CRO law and rules (2019-20)

- Roads, bridges, billboards, construction sites, industrial facilities, sports fields, business and touristic facilities, observatories, natural water bodies
- Largely following CIE recommendations and standards
 - Lighting zones
 - Standard EN 13201
 - Windows of protected premises
- Dimming of lighting levels in the late night hours
- Limitations of the correlated colour temperature (CCT)
- „Landscape architectural“ lighting
- *No consumption limits*

CRO - Road/street lighting remains a problem



SLO decree – planned improvements

- Constraints on light colour (CCT)
- Mandatory dimming or switching off during late night hours
- Reduced allowed value of annual consumption (kWh and lm) per resident
- Road lighting outside settlements prohibited
- Removed exception $ULOR < 5\%$ for sports fields

Factors, preventing sufficient success

- Slovenia

- A lot of knowledge in the LP community, but ministry avoids communication; open discussion completely suppressed
- For political reasons ministry doesn't want to:
 - Restrict lighting within settlements
 - Restrict lighting on highways
 - Address the problems, caused by lighting standards (EN 13201) and recommendations
- Urban planning part of the ministry partly involved in the latest activities

- Croatia

- Well-developed law and regulations, but the content derives too much from the recommendations of the lighting profession
 - Zones, deriving from CIE recomm. are not effective in restricting locations of lighting
 - LP legislation even requires intensive lighting according to road light. norm EN 13201
- Lack of involvement of urban planning profession
- „Landscape architectural lighting“ as a separate topic is partly controversial

WHAT EXACTLY IS THE PROBLEM?

Artificial Light ~~at Night~~ (ALAN)

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Artificial Lighting

Not only light pollution and not only during the night (e.g. lighting poles, aesthetics, urbanisation)

More comprehensive approach needed



Not only
light pollution,
but also
landscape and settlement
degradation

GOALS AND MEASURES TO ACHIEVE THEM

1. Complete: Comprehensive control of side effects of outdoor lighting

- a. Limit light pollution and its negative impacts
- b. Preserve space; landscape, character of settlements, experience of space ...
- c. Minimise energy consumption
- d. Optimise financial expenditures

2. Narrow: Limit light pollution and its negative impacts


- a. Prevent impacts on the living world and ecosystems
- b. Prevent disturbances to humans (intrusive light, glare ...)
- c. Minimise sky glow
- d. Avoid changing of natural night where not necessary (any artificial light is a pollution!)

WHAT IS LIGHT POLLUTION?

~~Excessive or poor use of artificial outdoor light~~
~~Measurable negative impacts of artificial light~~
on starry sky, ecosystems, human health and
wellbeing, energy consumption,
visual degradation of natural and cultural
heritage ...

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Any ALAN that propagates in an outside space
is a pollutant, regardless of its usefulness,
source, period of use or the energy
expenditure associated with the emission



Default choice should be NOT to
illuminate,
rather than requiring that a reason
for non-use be provided.



Where are the limits?

Will we behave as ABSOLUTE
MASTERS of the Earth or will we take
ONLY WHAT WE REALLY NEED?



Who/what rules the world?



Light colour and intensity?

Light colour?





Illumination of a simple crossroad ...



... plus a school turnaround



... from another perspective

Light pollution



Landscape degradation



Not aesthetic

(6 m high, grey columns, no design)





What design for what location?




Decreased security/visibility

Public lighting is installed in
too many locations,
it is often
too intensive and too uniform
and covers a
too large area.

It is
not switched off or dimmed
when not needed any more.

In many cases
light colour is not environment friendly

Very often
placement and design of equip. are not ok.



Heavy illumination of transit roads
(regional roads, partly highways), under
the jurisdiction of national infrastructure
authorities, makes the main difference
with Austria, Germany, Slovakia...

There are no serious limitations in
illumination of local roads under the
jurisdiction of municipalities



Until 2000: <10 lights;
1st stage: SECURITY and partly comfort;
main 3 crossroads and centrum



Y. 2020: 105 lights;
2nd stage: COMFORT and partly security, where this makes sense; mainly pavements and parking on the main axis; exaggerated projects



Y. 2050: 500 lights;

3rd stage: EXTREME COMFORT, which turns into its opposite;
total illumination of all streets in all villages, negligible needs

End of a bypass road - village
2 km from a small town;
village turnoff-bridge-roundabout



Needed that much?

Typical roundabout on regional
(and connected) roads



Needed that much?

Local roundabout
in open field area



Really needed? Appropriate for this location?



Lighting needed/acceptable?



What should we do here?

Where are the limits?

Photo: Morski HR (Croatia)





In general, culture of using artificial light
in outdoor spaces is very low

Specifically, the road lighting is totally
dominated by very questionable
technical rules, without any contribution
of other professions, e.g. landscape
architects

The problem can be solved, but we need more comprehensive approaches, more knowledge and more decisive legislation!



Decree on limit values of light pollution (Slovenia, 2007):
<http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED4520>

The Law on Protection from Light Pollution (Croatia, 2019):
<https://www.zakon.hr/z/496/Zakon-o-za%C5%A1titi-od-svjetlosnog-one%C4%8Di%C5%A1%C4%87enja>

Regulations on lighting zones, permitted lighting values and methods of managing lighting systems (Croatia, 2020):
https://narodne-novine.nn.hr/clanci/sluzbeni/2020_11_128_2442.html