Interreg CENTRAL EUROPE

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DARKERSKY4CE

: on Light Pollution

the Area, Country

Version 1

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Project Title	DARKERSKY4CE - Strategic Transnational Approach to Reduce Light pollution in Central Europe
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Name of Project Partner Organisation	
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Purpose and Scope of the Report

This *Report on Light Pollution* is one of the six country-based reports (A.1, D1.1) that aim to collect, compare, elaborate, and homogenise available data on light pollution in Central Europe in order to identify the main sources of light pollution and their impact on the ecosystems of the areas under examination. Indeed, to date, there is not a standardised data collection practice. The two main types of data currently collected are sky brightness, i.e. magnitude per square second, and ALAN, i.e. Artificial Light At Night; however, these data are not collected or standardised in a common repository and can vary according to parameters such as time, geographical position, and light colour, i.e. main passband emission. Therefore, the DARKERSKY4CE country-based reports aim to understand the type of data needed to measure the magnitude of light pollution in order to quantify the ecosystem service value of dark skies in their supporting, regulating and recreational dimensions and in order to further enrich the analysis with qualitative data deriving from stakeholders' perceptions and needs. These data will be then used as the scientific basis for the development of the project's national strategy and pilot demo sites and for communication and information purposes. In particular, the six country-based reports will focus on the following areas: Northern Italy, Carinthia (Austria), the cross-border area of Nova Gorica (Slovenia), Kujawsko-Pomorskie Voivodeship (Poland), Somogy County (Hungary), and the non-urban surroundings of Leipzig (Germany).

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The section titled Purpose and Scope of the Report *is the same for all six country-based reports.*

> *If a section of the report is not applicable, please just leave it and write* ***N/A***

1. Characteristics of the Area

1.1 Geography

Examples: maps, extension of the area, etc.

1.2 Socio-Demographic Information

Examples: number of cities, population, area of the cities, area of the urbanised zones, area and share of the various land cover types, etc.

1.3 Infrastructures

Details such as road mileage by different categories, railway mileage, greenhouses, airports, logistics centres, shopping centres, military units, etc.

1.4 Research Entities Involved in Light Pollution Studies, Local and Regional Entities Dealing With Light Pollution Topics

Identify who is conducting research, for what purpose, the specific areas of their studies, and who deals with light pollution issues, e.g. municipalities, associations, etc. Useful info to identify stakeholders potentially interested in joining the DARKERSKY4CE Sentinel Alliance (D.1.3.1) and/or the WP2 Working Groups.

2. Sources of Light Pollution in the Area

2.1 Table with an Overview of the Main Sources of Light Pollution

YES/NO comparison table for the items described in section 2.2

Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO
Item	YES	NO

2.2 Today's Main Sources of Light Pollution

- *Cities*

Cities considered as a whole can be an important source of light pollution. Just think about the night images captured by the International Space Station (ISS).

- *Street lighting*
  Street lighting is useful, but also a great source of light pollution. What kind of lights are present in your area? Incandescent lights or LEDs?

- *Parking lots*
  Shopping centres, industrial lots and other parking lots are often overlit at night, even when completely empty.

- *Public lighting (lights that light up buildings and their surroundings, e.g. monuments, castles, public buildings, etc.+ emergency lights)*
  Public buildings, parks and monuments are often overlit at night and some emergency lights, suffice it to think about fire escapes and emergency stairs, are usually floodlit as well.

- *Airports, train stations, etc.*
  Transport stations are often overlit at night.

- *Private houses lighting*
  Private houses are often overlit at night and lacking any kind of timer sensor.

- *Factories and industrial lighting*
  Warehouse distribution hubs, gas and oil production, and more.

- *Sport centres (e.g. stadiums, ski slopes, stables, etc.)*
  Recreational sports lighting can be, but not always are, configured and designed to be effectively shielded to illuminate the field of play and minimise or eliminate glare and light trespass.

- *Advertising and display lighting*
  Electronic billboards, also known as electronic messaging centres (EMCs), can be up to ten times brighter at night than traditionally lit billboards. Light from EMCs can cause glare and be a dangerous distraction to drivers. In some cases, EMC light can be visible from long distances and may affect the breeding, foraging, and orientation behaviours of nocturnal wildlife.

- *Shopping centres and shopping streets*
  In every city, there are some shopping streets that keep the light on in the shop windows all night. Same goes for many shopping centres.

- *Greenhouses*
  Lighted greenhouses in densely populated areas are creating conditions of light trespass. Bright glows in unusual colours over greenhouses are sometimes considered a nuisance by neighbours.

- *Landscaping lighting*
  Outdoor lights are rarely on a timer, sensor, or just plain shut off when not in use.

For more information, you may check out the following link:
https://darksky.org/resources/what-is-light-pollution/causes/

2.3 The Country Level Evolution of Light Pollution in the Last Decades with Focus On the DARKERSKY4CE Pilot Demo Sites

Describe here, if available, the evolution, over time, of light pollution, focussing on the Pilot Demo Sites. This section may be useful to demonstrate the change over a longer period of time and in general to have a better picture of the light pollution history in the Pilot Site area.

3. Light Pollution and Atmospheric Monitoring

3.1 Light Pollution Monitoring Sites and Networks

Information on both permanent and temporary sites, including the ownership and the scope of the measurements conducted. Details on the devices used, frequency of measurements, time range, environment of measurement points, units of measurement, accepted measurement ranges, methods of presenting results, colour scales used, etc. Information on whether the data is shared via website, live feeds or on-demand, and whether the data is current or archival.

3.2 Atmospheric Monitoring Stations

Information on national and local networks, including measurements of cloud cover, suspended particulates, snow cover, air temperature, wind speed, and direction. Details on the devices used, frequency of measurements, time range, environment of measurement points, units of measurement, accepted measurement ranges, methods of presenting results, colour scales used, etc. Information on whether the data is shared via website, live feeds or on-demand, whether the data is current or archival, and whether the data can be useful to correctly understand the light pollution measurements.

4. The Impact of Light Pollution on Ecosystems

This section should characterise the situation in the specific area instead of being a general introduction of the topic.

4.1 The Effects of Light Pollution on the Ecosystems of the Area

- *Impacts on animal and plant species*
- *Determine and define the ecosystems (in particular, nocturnal ecosystems)*
- *Determine the species inhabiting these ecosystems*
- *Determine the impact of light pollution on these species (ex. nutrition, reproduction, behaviour, predation, communication, migration/orientation, food webs, evolution, species richness, etc.)*

4.2 Behavioural Changes

- *Disorientation threatening migration and survivability*
- *Reduced reproductive success*
- *Altered communication systems*

4.3 Adjusted Activity Pattern

- *Adjusted foraging strategies*
- *Mis-timed emergence*

4.4 Physiological Alterations

- *Altered hormone regulation*
- *Impaired development*
- *Molecular mutations*
- *Adverse effects on plant physiology*

4.5 Locations and Types of Protected Areas Near the Pilot Demo Sites

Examples: Natura 2000, Nature Park, National Park, etc.

- *Protected species/habitats*
- *Monitoring obligations*
- *Management objectives*

4.6 References

- *Find previous scientific research on the area and its ecosystems*
- *Find previous scientific research on the species inhabiting the area under study (even if related to another similar area)*