Innovative policies for improving citizens' health and wellbeing addressing indoor and outdoor lighting

SC1-BHC-29-2020

Innovative actions for improving urban health and wellbeing - addressing environment, climate and socioeconomic factors

- Simona Tondelli

- Light Pollution 2021
- 15th May 2021

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

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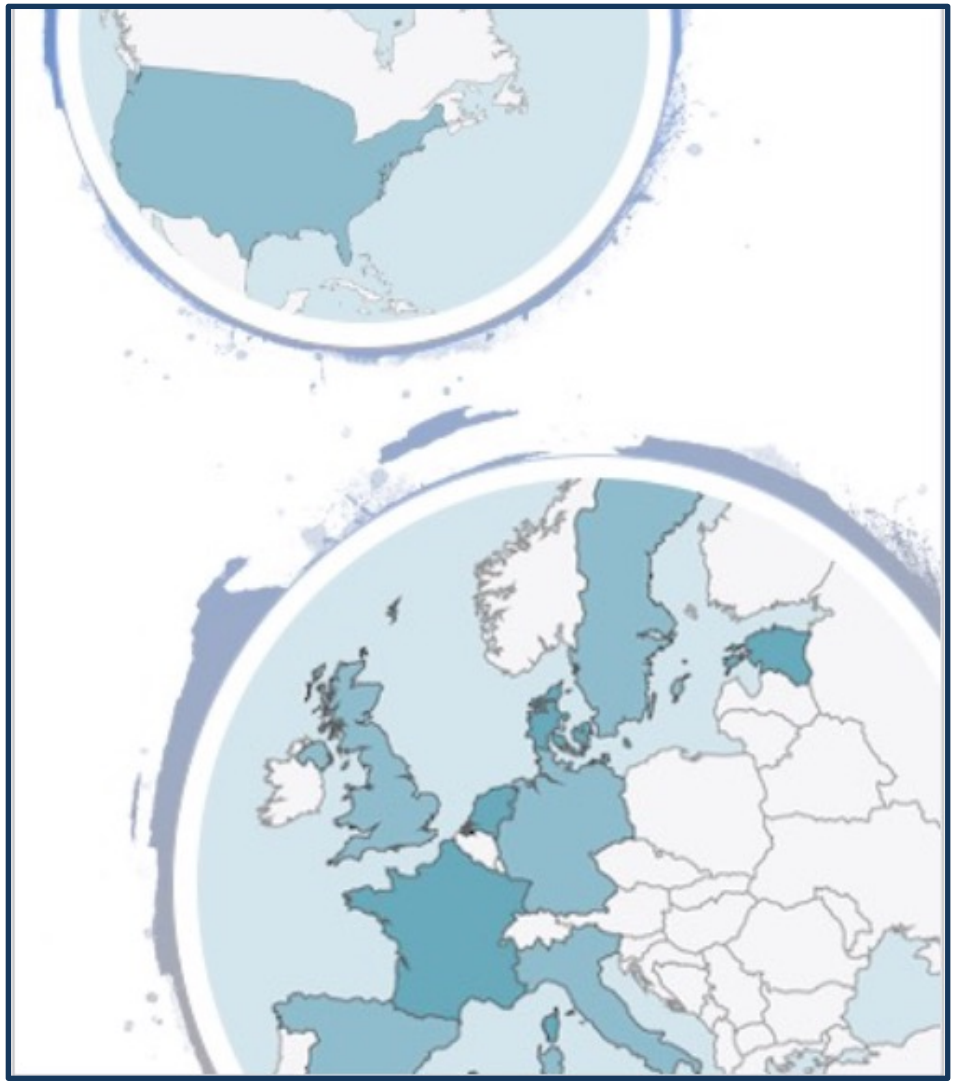
Main figures

- Starting date 1st March
- Duration: 48 months (until 28th February 2025)
- Funding: € 4,999,909.75
- 22 partners
- 9 EU Countries (Italy, Germany, Estonia, Netherlands, UK, France, Spain, Denmark, Sweden) + USA

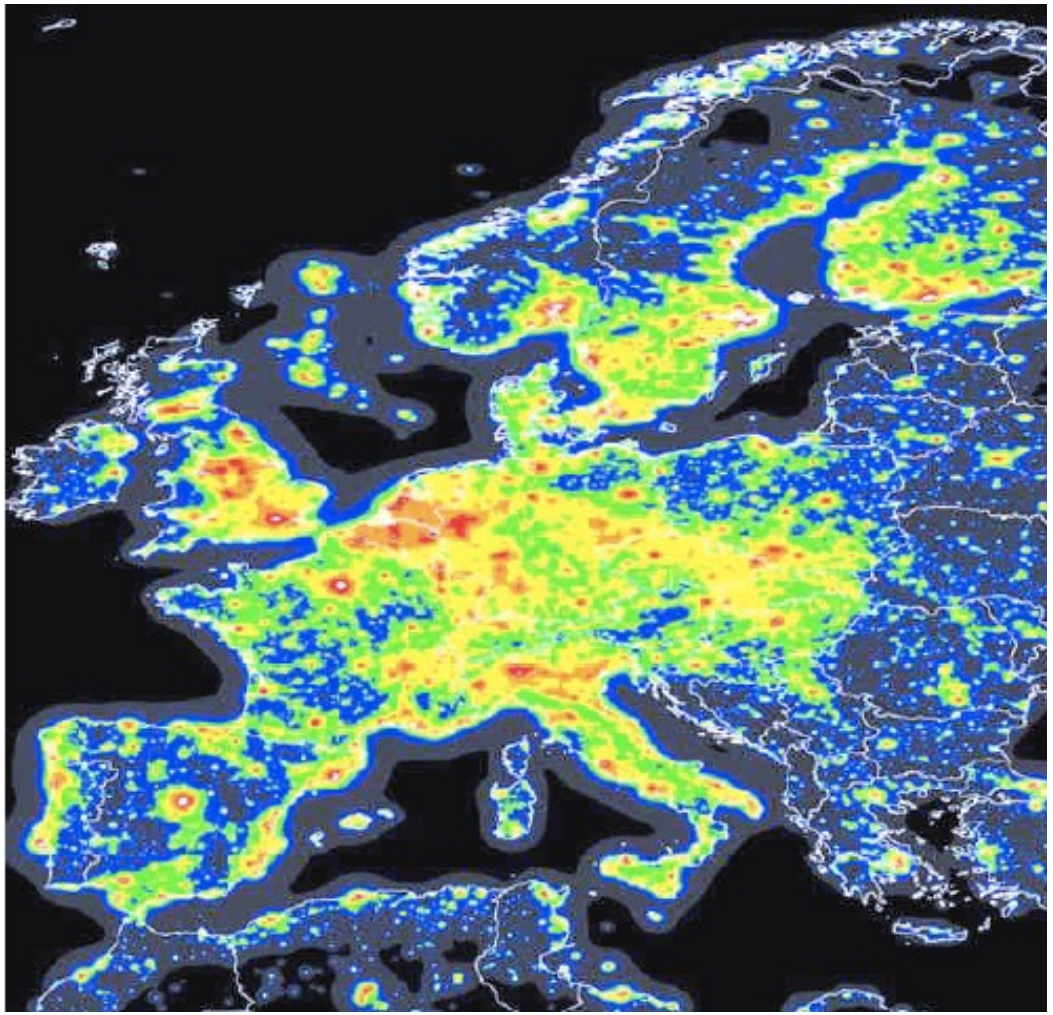


Why lighting?

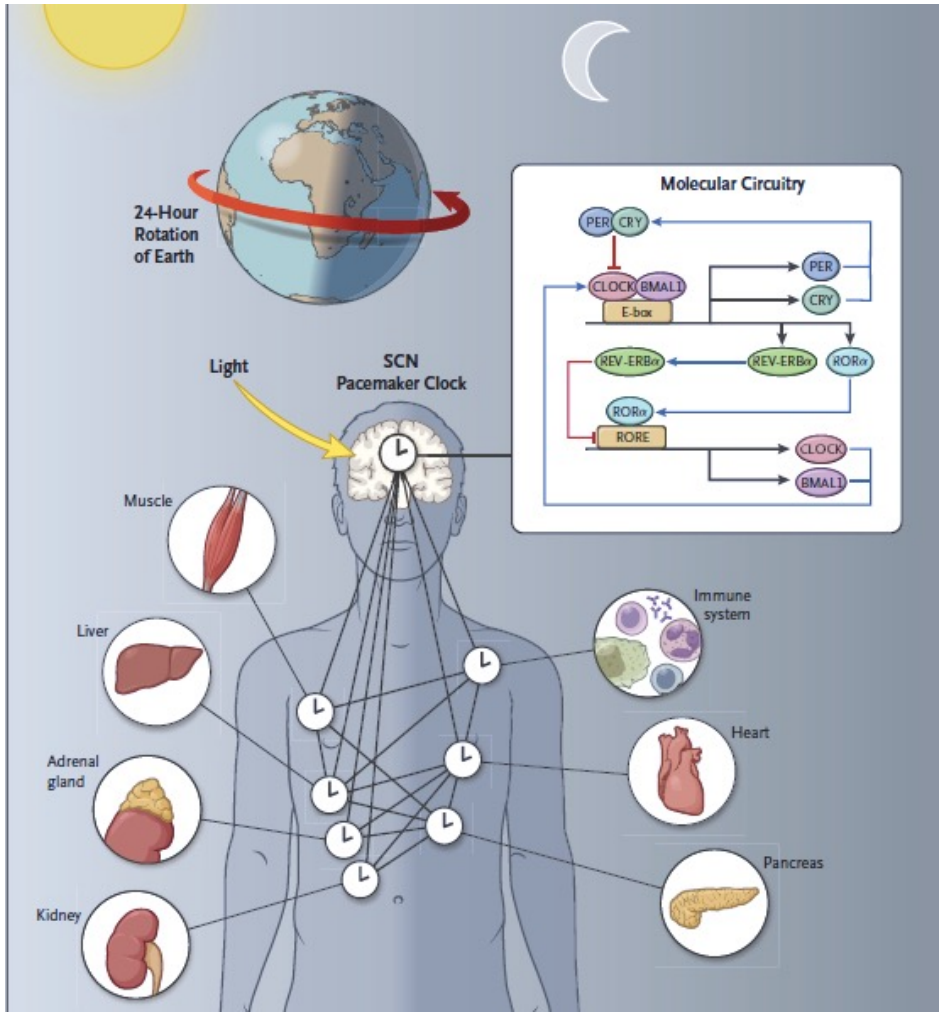
- Exponential increase of human exposure to electric light at night:
  - public outdoor illumination
  - artificial sky glow created by highly urbanized areas
  - exposure to light at the individual level (domestic lighting, light-emitting screens including computers, smartphones, etc).

- It is now firmly established that inappropriate and disruptive light exposure at night or too little time during the day, **profoundly affects people's circadian rhythm, health and wellbeing**, impacting on epigenetics and metabolism, predisposing to diseases including cancer, neurodegeneration and psychiatric morbidity, particularly affecting fragile subgroups like older adults.

- Target group: **older adults** (>65)
  - one fifth (19.7 %) of the total EU-28 population
  - The number is projected to reach 28.5 % in 2050



Health and wellbeing



Ravi Allada, M.D., and Joseph Bass, M.D.Ph.D. , 2021,
Circadian Mechanisms in Medicine. In: The new England journal of medicine

Place des Fetes, Paris. www.configuringlight.org

Objectives

- to improve **older adults' health and wellbeing** by addressing public policies related to indoor and outdoor lighting

SO.1 To collect, review and represent **global evidence** on indoor and outdoor lighting impacts

SO.2 To promote **knowledge exchange** in urban lighting policy research and healthy citizen behavior

SO.3 To **co-design lighting policies** within the Urban Lighting Labs

SO.4 To **assess and establish the impact** of urban lighting on circadian rhythms photoentrainment

SO.5 To provide **tools** to support the decision making process

SO.6 To **scale up and tailor** the proposed policies

SO.7 To enhance the **market uptake** of the proposed innovative approach

SO.8 To introduce **new skills** and expand the role of the Healthy City Manager in local administrations

Consortium

ENLIGHTEN me

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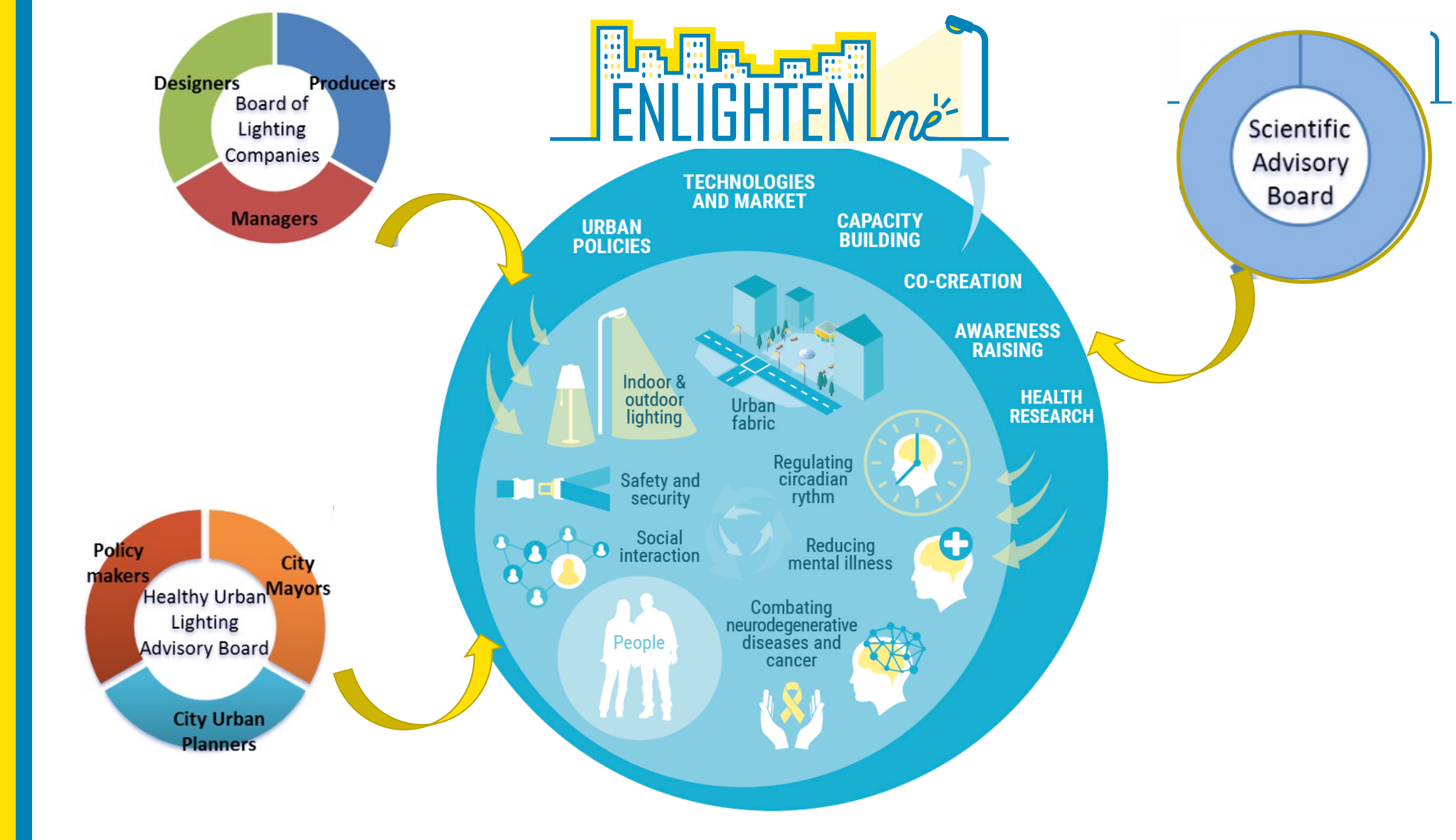
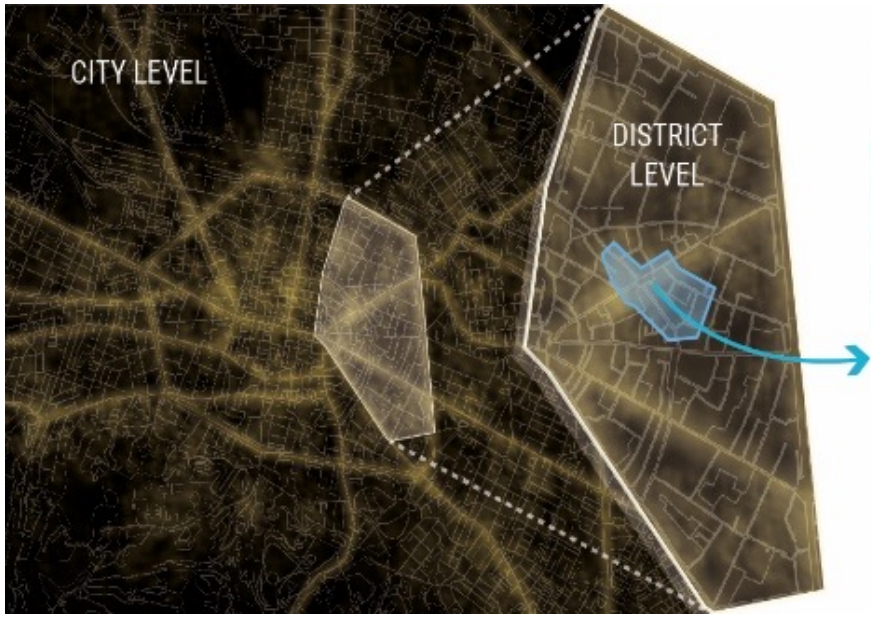
HEALTH CITY INSTITUTE
Improve quality of life in cities


Designers
Producers
Managers
Board of Lighting Companies
ENLIGHTEN me
Scientific Advisory Board
TECHNOLOGIES AND MARKET
URBAN POLICIES
CAPACITY BUILDING
CO-CREATION
AWARENESS RAISING
HEALTH RESEARCH
Indoor & outdoor lighting
Urban fabric
Safety and security
Regulating circadian rythm
Social interaction
Reducing mental illness
People
Combating neurodegenerative diseases and cancer
Policy makers
City Mayors
Healthy Urban Lighting Advisory Board
City Urban Planners

Knowledge building phase

- to **develop a GIS-based platform** for organizing **existing and new knowledge** developed by ENLIGHTENme, about the impact of lighting innovative interventions on people's health and wellbeing, with the following specific objectives:

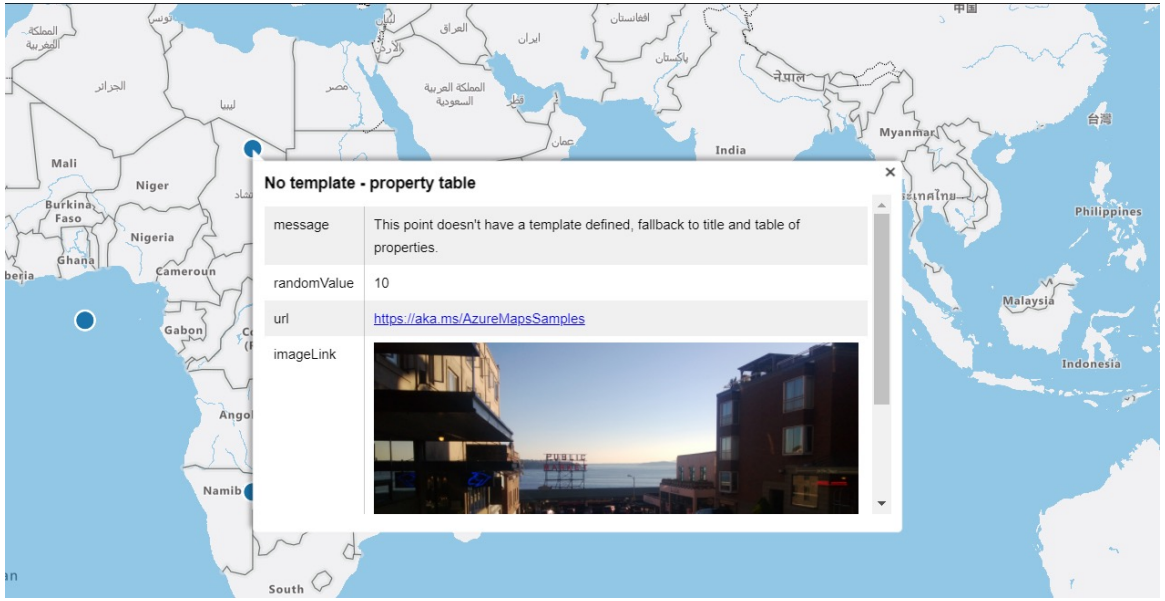
  - Building a **common operational language**
  - Represent existing knowledge about **evidence and good practices** on urban lighting in a georeferenced web atlas.
  - Creation of **urban lighting and health maps** at city level to explore incidence of **light exposure and select vulnerable areas** in 3 pilot cities
  - Generation of **3D urban models** of the selected districts as a basis for the evaluation of visual comfort and urban lighting scenario simulation



Knowledge building phase

ENLIGHTENme Atlas

- Represent existing knowledge about evidence and good practices on urban lighting for health and wellbeing in a Database
- Visualize existing knowledge in a georeferenced environment
- Query/Filter the collected information according to the scale, object, target groups, etc.,
- Complete the Atlas with new knowledge / information

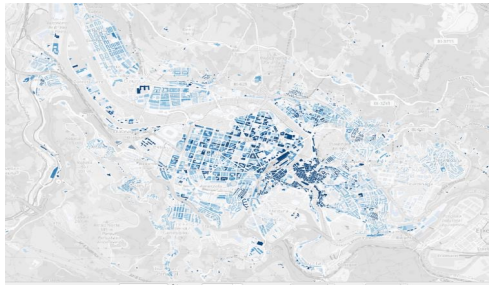


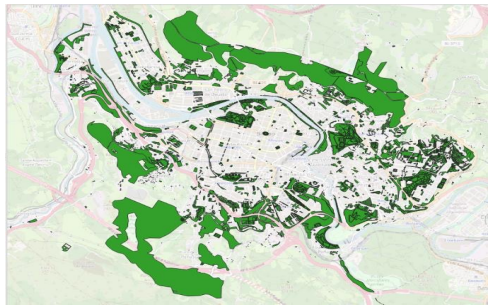
Example from Azure maps

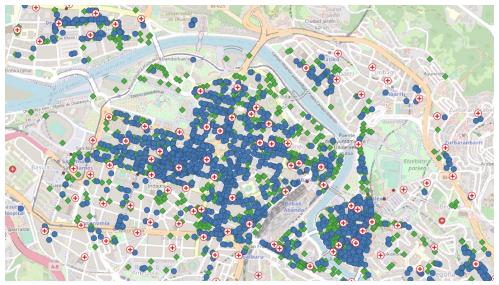
Knowledge building phase

Urban lighting and health maps

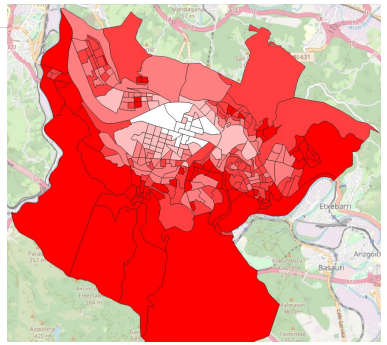
- Display Urban lighting and Health maps
- Complete the Atlas with the detailed grid for main indicators calculated for the 3 ENLIGHTENme cities



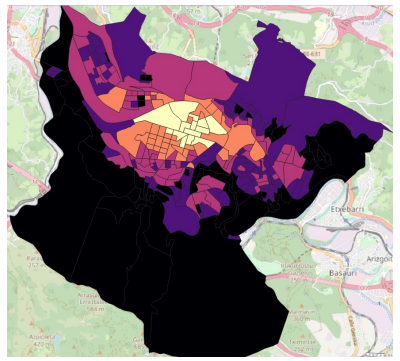




Different data sources integration and processing



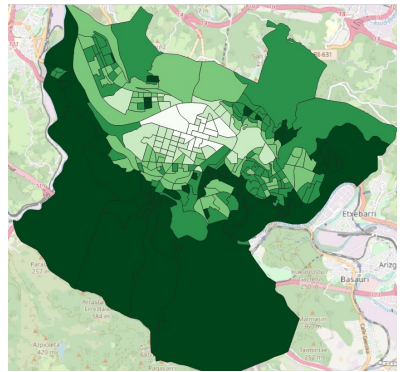
Socio-economic



Urban

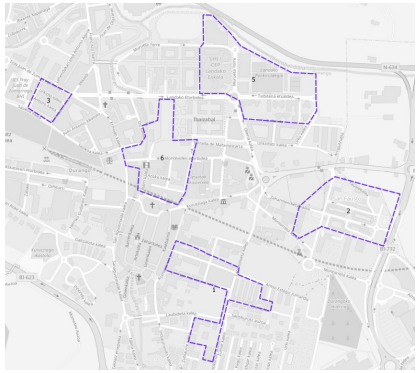
Lighting

Individual maps combination for districts prioritization



Health

Districts pre-selection



City of BOLOGNA
44°29'37" N
11°20'19" E

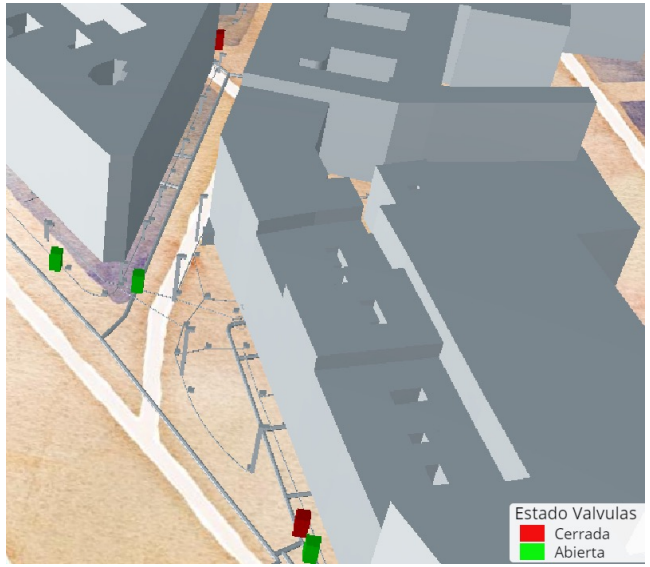
City of AMSTERDAM
52°22'26" N
4°53'22" E

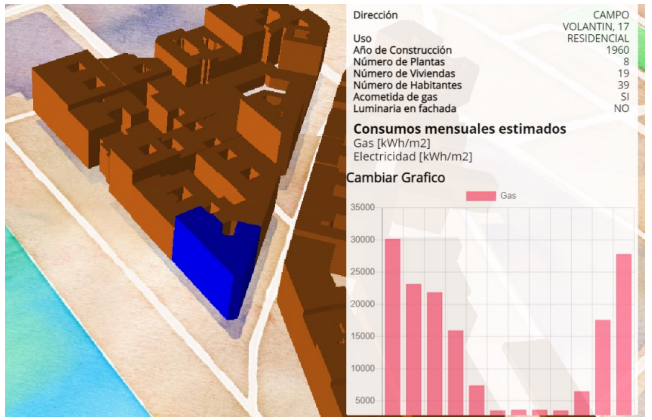
Tartu City of TARTU
58°22'50" N
26°43'30" E

Knowledge building phase

Multiscale 3D Urban model

- Visualize 3D model of the 3 districts
- Colored maps with main indicators calculated for buildings and urban spaces





Combining:
2D > Urban & Lighting maps results (district scale)
3D >Buildings & elements

Evidence building phase

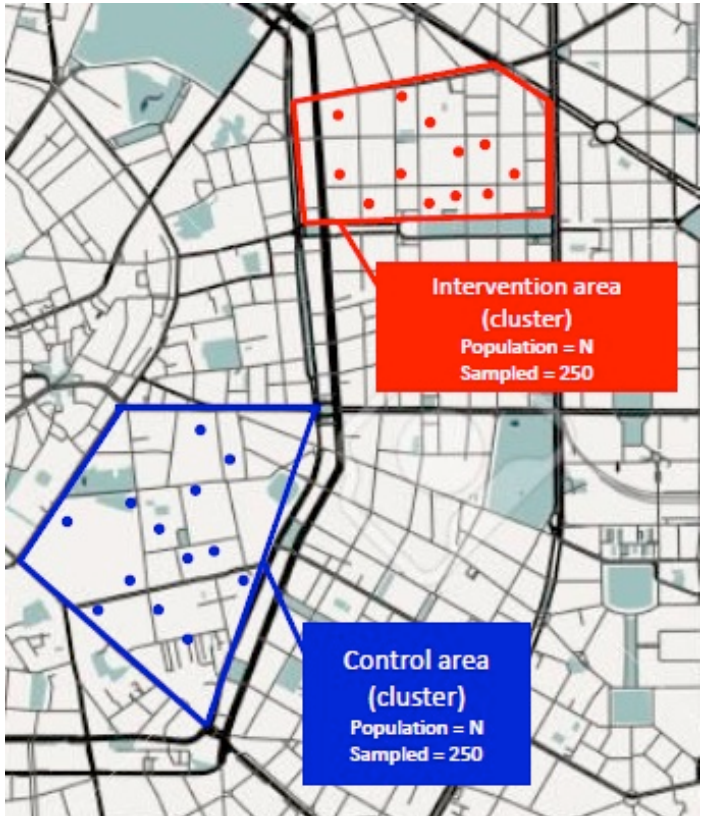
Co-created urban lighting interventions in the three ENLIGHTENme cities

- Co-design, implement and assess innovative lighting policies and interventions in one target district in each of the three ENLIGHTENme cities
  - Select districts for intervention
  - Provide social base for project by establishing **Urban Lighting Labs** to engage communities and cities. ULLs to generate qualitative data, provide laboratory to test lighting interventions, establish base for WP3 research
  - Conduct qualitative research and technical lighting measurement in districts before, during and after outdoor and indoor lighting interventions
  - **Co-design and implement** outdoor lighting installations and indoor lighting interventions

Evidence building phase

Population based lighting study on older adults

Assess the impact of outdoor and indoor lighting innovations on entrainment of **circadian rhythms**, sleep and personal light exposure, mental and physical health, and the **cost effectiveness** of the performed interventions



- a cohort of 500 participants for each city
  - 250 will be selected within the “pilot area” where the lighting innovations are implemented
  - 250 will be selected outside the pilot area (control population).
- a baseline and a follow-up study

- Causes of individual differences in health and wellbeing in baseline sample
- The effects of 1-year experimental change of lighting
- A cost effectiveness analysis of the performed interventions will be carried on.

Lighting policies and guidelines definition

- To develop and disseminate **policy guidance addressed to municipalities, lighting producers and managers and EU Commission**, in order to bring both public policies and the market to systematically take into account the health implications of decisions on urban lighting, to seek synergies, and avoid harmful health impacts, thus improving urban health and reduce health disparities in cities.

  - **Healthy Urban Lighting Good Practice Guidelines** (T4.3) addressed to municipalities and capable of direct incorporation into municipal infrastructure policy through such devices as Lighting Masterplans, smart city programmes, etc;
  - **ENLIGHTENme Decision Support System** (DSS), tailoring the Guidelines to the different local situations and thus supporting the municipalities in taking decisions in lighting interventions (T4.3);
  - **Policy briefs** series on Healthy Urban Lighting, to integrate health and wellbeing implications into lighting directives and guidance at EU level (T4.4).

ENLIGHTENme
16–17 December 2021
International Conference
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Call for abstracts
Submission open until 4th October 2021
www.enlightenme-project-conference.com
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