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

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Global Level Open Atlas – draft version

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HISTORY OF VERSIONS

VERSION	DATE	CHANGE (S)	SECTION
01	28/02/2022	First version submitted	
02	20/01/2023	As requested by the reviewers a chapter regarding methodology has been included (chapter 3).	Pag 5
		As requested by the reviewers the internal deliverable that was the result of Task 1.2 has been included as Annex.	Pag 7

1 Introduction

ENLIGHTENme platform has the aim to gather and systematize existing knowledge about the impact of lighting policies and innovative interventions, both indoors and outdoors, on people's health and wellbeing. This knowledge is available on the Urban Lighting and Health multiscale Platform, a WebGIS-based platform organized into three levels (worldwide ATLAS of best practices, city level Urban Lighting and health maps and district level 3D models of the target districts). This deliverable aims to describe and to provide the link to the first one: The Global level ENLIGHTENme Atlas representing existing knowledge about evidence and good practices on urban lighting for health and wellbeing is one of them.

This Urban Atlas contains a compendium of good practices on urban lighting for health and wellbeing policies. It makes information more accessible as it is developed based on a viewer which georeferences it. The Atlas is populated through scoping review of literature, policy and practice on light, health, and wellbeing that is carried out in T1.3. The review allows to map the existing literature through a database composed by knowledge from different disciplines, public policies, and study cases. It identifies key concepts, gaps in the research field and types or sources of evidence. The review process starts from projection inception to provide support for the multidisciplinary research process and helps to process findings into more generalizable lighting guidelines, policy briefs and the DSS in WP4, and to disseminate the results in WP6. The database provides clear criteria for choosing the districts and critical appraisal of lighting research, policy, and practice. The systemic review covers different fields of knowledge such as social sciences; medicine; bioscience; social policy and social care; mental health; health economics; urban planning, design and architecture; gerontology; safety, security and crime studies; lighting technology, lighting standards and lighting regulation.

In Task 1.2 the general architecture and the main components of the ENLIGHTENme Urban Lighting and Health multiscale Platform were defined and included the upkeep of the platform during the whole duration of the project to guarantee its operability and reliability. The identified user requirements have been the baseline for the ENLIGHTENme platform. This deliverable describes the functionality and structure of ATLAS and provides the link to the platform.

2 Description of Activities

As first task, the general architecture, and the main components of the ENLIGHTENme Urban Lighting and Health multiscale Platform that were defined in task T1.2 were reviewed. The user requirements identified in that task have been the baseline for the implementation of the ENLIGHTENme platform.

In Task 1.2 it was documented that regarding the Atlas the researchers show interest in different issues:

- To review projects and literature relevant to lighting, age, cities and health and should seek for policies and experiences on health and lighting.
- To make more understandable the relationship between light and health from the point of view of communities'wellbeing related to their perception of safety and security.

These researchers require regarding the content of the Atlas to have good practices categorised per type (indoor/outdoor lighting, target group, places, etc.) and to give specific information about them such as an abstract, photo, location, the link for technical info or contact info.

In the case of the ENLIGHTENme cities, the interest was related to briefly have an overall overview of different experiences related to the issues tackled by the project (for cooperation among cities, for comprehension…). They suggested the Atlas to have the following information: a catalogue of good practices and experiences in other cities - of possible tools and solutions, results of the studies, best practices, findings, and an overview of different scenarios on the project issue at the European level.

Other examples of similar platforms were also reviewed as inspiration: ENABLING[1], CIVICS[2], N4C[3] or NATURVATION[4] projects. This makes the information more accessible, understandable and manageable for the different agents involved in different domains.

The Atlas has been designed according with these requirements and will be further developed along the project lifetime. Notably the collection of the best practices gathered in T1.3.1 is an on-going task that will last until M40 with the aim of feeding the Atlas thus establishing a reference framework related with lighting and health.

3 Methodology

The methodology for the review has been structured in two phases:

- PHASE 1: Data Structure and web face design. This phase has been carried out in the first 12 months of the task to produce the draft version of the ATLAS.
- PHASE 2: In the second phase a systematic collection and assessment of entries will be carried out with the following methodology:
    - Project beneficiaries, advisors and some external collaborators will provide a specified number of entries based on their specific expertise in order to ensure that all disciplines within the objectives of the project are represented. This includes social and urban studies; architecture, health and ageing design and lighting design; chronobiology and life science light/health researchers; medical and genetic research; social and municipal policy on lighting, health and ageing. Contributors will provide a limited number of suggested entries in each of three categories: literatures, organizations and projects in their field. They are asked that each constitutes a key reference point or resource in their own disciplinary approach to ageing, health/well-being and lighting.

[1] https://atlasbestpractices.com
[2] https://civics.cc/es/#!/iniciativas
[3] https://www.nature4cities.eu/platform
[4] https://naturvation.eu/

- The proposed entries will feed the database designed in the first phase and nominated reviewers will look at entries from their discipline to assess their quality and importance, and to identify both biases and gaps in the selection. Further quality control will arise from feedback from users and discussion at our project General Assemblies and other events. We will also ask project partners and general users to provide feedback on useability and search facilities.

- The review will follow an iterative and open process, being developed over the full course of the project. There will be periodic solicitations of further contributions from both partners and outside experts.

4 Results

The visualization of the Atlas is displayed on an online web: https://projects.hei-tecnalia.com/ENLIGHTENME/ The objective of the Atlas is to collect, review and represent evidence on indoor and outdoor lighting impacts on health and wellbeing.

5 Deviations

Not applicable

6 Conclusions

The urban Atlas becomes a key toll for checking some examples of the existing knowledge regarding the impact of lighting innovative interventions, both indoors and outdoors, on people's health and wellbeing. The good practices are shown on an online web visor that can be found here: https://projects.hei-tecnalia.com/ENLIGHTENME/.

It replies the philosophy implicit in other examples throughout Europe, such as the platforms from H2020 programme such as ENABLING, CIVICS or N4C projects. This makes the information more accessible, understandable and manageable for the different agents involved in different domains.

Annex: Internal deliverable T1.2

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

Deliverable T1.2

Urban Lighting and Health multiscale Platform users' requirement definition

Lead beneficiary:

P12-TEC

The ENLIGHTENme project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 945238.

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1 Introduction

This report describes the work done in Task 1.2 with the definition of the architecture and the main components of ENLIGHTENme Urban Lighting and Health multiscale Platform. Particular attention has been dedicated to the user-friendliness of the interface to make the collected information available and easily usable and to the definition of the levels of interactions for the different actors involved (civil society, academy, enterprises, cities, etc). The identified user requirements are a baseline for the ENLIGHTENme platform, especially for the technical work package WP1 and WP5, the data related WP1 as well as the WP7 for the following open lab workshops

2 Description of Activities

2.1 User requirement elicitation

Task 1.2 "Urban lighting and health multiscale platform users' requirement definition", deals with the identification of the user requirements regarding the platform to be developed in WP1. It was decided to follow a top-down and bottom-up approach, where the requirements would be defined by the cities and research partners. The following activities were carried out:

- a questionnaire was developed to gather the knowledge of the various involved research and stakeholders in the project and identify relevant User Requirements.
- the questionnaire was forwarded to research partners and the three cities (COBO, TARTU, AMS, UNIBO, ISMMS, LSE and LUCI). The excel form gathered user preferences regarding the 3 different outputs of the platform: the ATLAS, the Urban lighting and health maps and the multiscale 3D model.
- The gathered results were analyzed for the three scales to identify end-user profiles (interest, backgrounds and technological levels), type of content and most interesting functionalities.

2.2 Platform architecture and functionalities

The user requirements identified in the previous step, together with the description of the DoA, have been translated into the architecture of the platform and the key functionalities. The platform comprises all the modules that are going to be deployed in the project as well as the connections and relations between them. Those modules or pieces in the architecture would be independent and should be designed to serve as a guideline for the implementation of the components to be fully compliant with all the functionalities defined for the platform.

There will be components for data acquisition as there will be different formats of input data, whose information should be included in the platform. The data storage component, equivalent to the persistence layer, will be able to keep the collected information both, alphanumeric and geometric, and make it available to be accessible via interoperability operations of transference. The data collected, transformed and the generated maps will be presented in the web tools to be developed, like ENLIGHTENme Atlas, provided by the functionalities so the user can explore that.

The main functionalities are extracted, as said, from the requirements identification and include operations for geographic data visualization, as well as metadata, working with map layers, filtering information, or time management tool to allow the analysis of the data indicators over time.

Link to other existent platforms is envisaged as a tool for the users to complement the information provided by ENLIGHTENme, as well as ENLINGHTENme information will be available for such external platforms to be used there.

2.3Mock-up

A mock-up has been created to receive the input of the partners regarding the visualization of the platform. The mock-up can be consulted here: Mock-up

3 User requirements

ENLIGHTENme platform has the aim to gather and systematize existing knowledge about the impact of lighting policies and innovative interventions, both indoors and outdoors, on people's health and wellbeing. This knowledge will be made available on the Urban Lighting and Health multiscale Platform, a WebGIS-based platform organized into three levels:

1. **ENLIGHTENme ATLAS** will visualize and georeference the existing knowledge about evidence and good practices on urban lighting for health and wellbeing. The ATLAS will be populated through a scoping review of literature, policy and practice on light, health and wellbeing that will be carried out in T1.3.
2. **City-level Urban Lighting and Health Maps** will be generated for the three ENLIGHTENme Cities (Bologna, Amsterdam and Tartu) to visualize the indicators and correlations regarding the domains identified in T1.4:
    - socio-economic determinants,
    - urban/lighting patterns,
    - lighting detection from satellite
    - and population health status and mental wellbeing

These maps will allow the ide3ntification of the shortlist of districts that will be used as the base for the selection of the target districts.

3. **District-level multiscale 3D urban model** will implement a 3D detailed representation of the 3 selected target districts (in WP3) where the innovative lighting interventions will be carried out, and building the basis for the DSS to be developed in WP4 as an urban lighting scenarios simulation tool.

The following sections describe the user requirement gathered regarding these three levels.

3.1 ATLAS

The objective of the ATLAS is to collect, review and represent evidence on indoor and outdoor lighting impacts on health and wellbeing. There are already some similar examples that the ENLIGHTENme platform could use as inspiration:

ENABLING project (https://www.enabling-project.com/) developed a Best Practices Atlas to collect best BBP (Bio-based Products and Processes) practices, from inside and outside Europe, to serve as an inspiration for partners in their value chain. The Atlas is an interactive web-based tool that allows finding information on the best practices identified easily (https://atlasbestpractices.com).

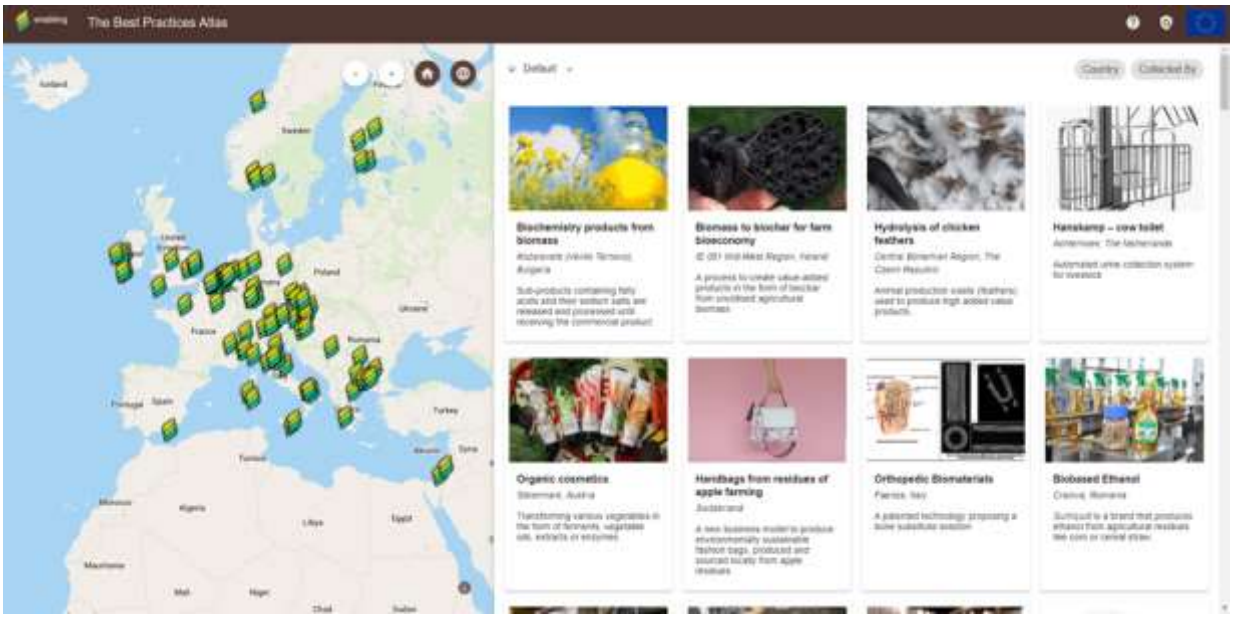


Figure 1: ENABLING Best Practices Atlas (source: https://atlasbestpractices.com).

CIVICS is a civic innovation map that is developed daily by citizens from across Ibero-America. This digital, self-mapping tool is geolocated in address book format, where users can find and add all the civic innovation happening in their cities (https://civics.cc/es/#!/iniciativas)

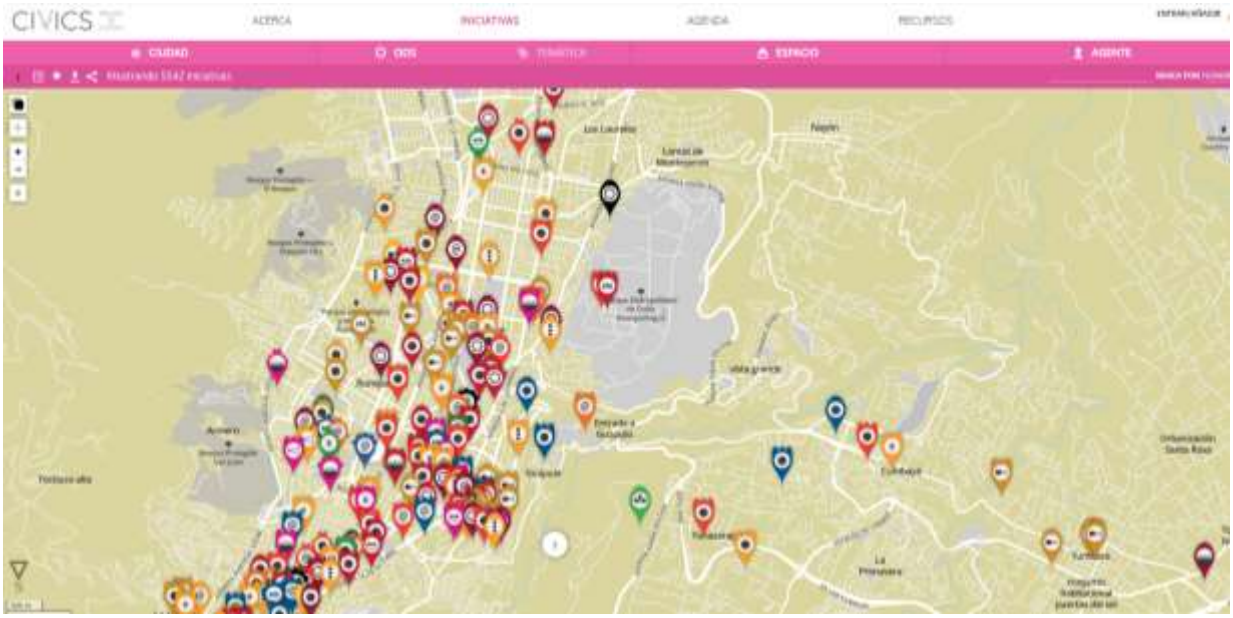


Figure 2: CIVIC platform (source: https://civics.cc/es/#!/iniciativas)

Regarding Nature-Based solutions (NBS) the N4C (https://www.nature4cities.eu/platform) and Naturvation (https://naturvation.eu/) created two different platforms to geolocalised pioneering initiatives and good practices.

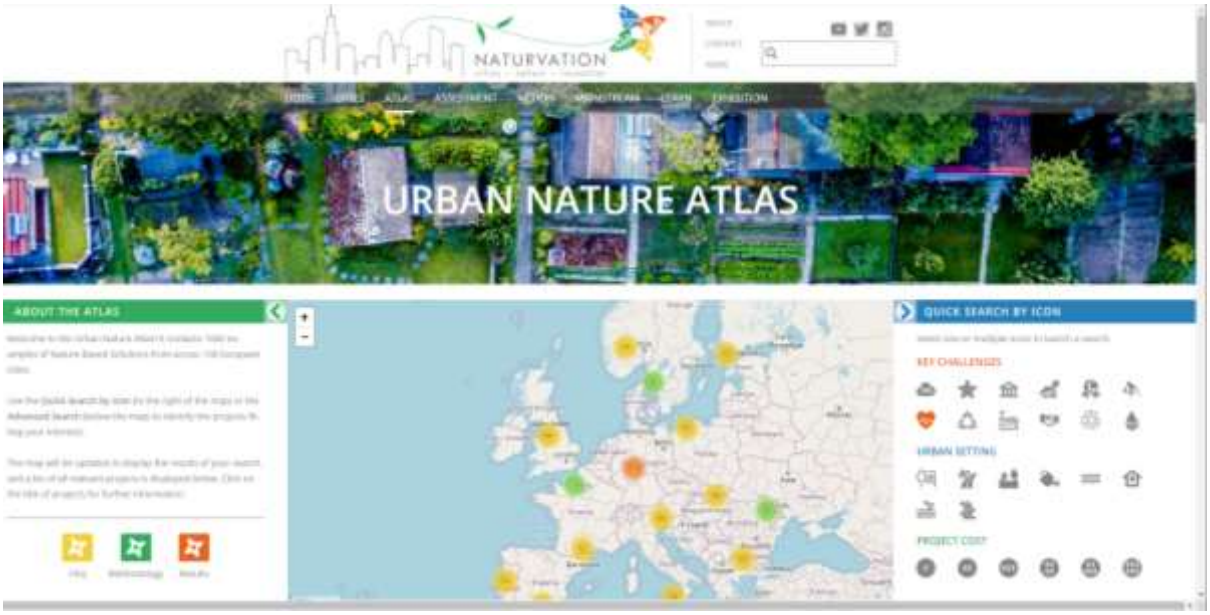


Figure 3: Naturvation platform (source https://naturvation.eu/atlas)

The following sections describe the user requirement collected for each level of the platform:

3.1.1 Interest

Through the questionnaire, the researchers have shown the following interest regarding the ATLAS:

- To review projects and literature relevant to lighting, age, cities, health. Resource for research and actions.
- To seek policies and experiences on health and lighting
- To understand the impact of light on the health and wellbeing of communities
- To understand the perception of safety and security, understand the impact of indoor and outdoor light on health and wellbeing, sustainability
- To visit exemplary installations when travelling

In the case of the cities, the main interest was to have at a glance an overall overview of different experiences related to the issues tackled by the project (for cooperation among cities, for comprehension…).

3.1.2 Type of content

The type of content required by researchers was the following:

- Highlighting good practices per type (indoor/ outdoor lighting, target group and places, etc.)
- Relevant research and discussion about limitations of existing studies
- Abstract, photo, location, the link for technical info, contact info

In the case of the cities the required content was the following:

- a catalogue of good practices and experiences in other cities - of possible tools and solutions
- Results of studies
- Best practices
- Findings
- An overview of different scenarios on the project issue at the European level

3.1.3 Technological level of the end-user

Researchers consider that the end-user should be a medium/advance user (e.g. know how to use the mobile for the interaction with QR codes), but cities consider that she should be an average smartphone or Internet user

3.1.4 Functionalities

In the following graphic, it can be seen the different proposed functionalities and the average interest by the users on a 0-5 scale.

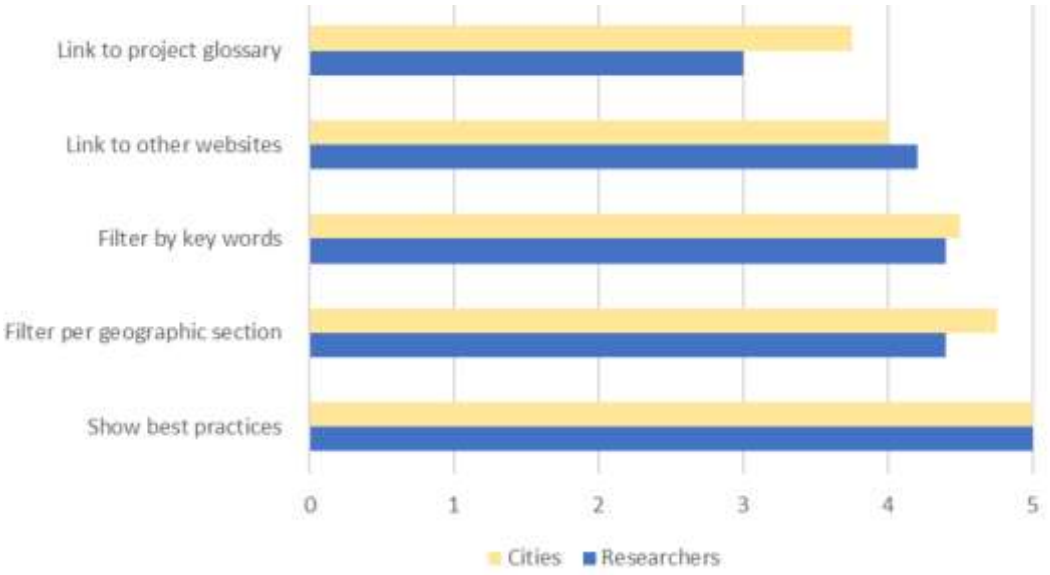


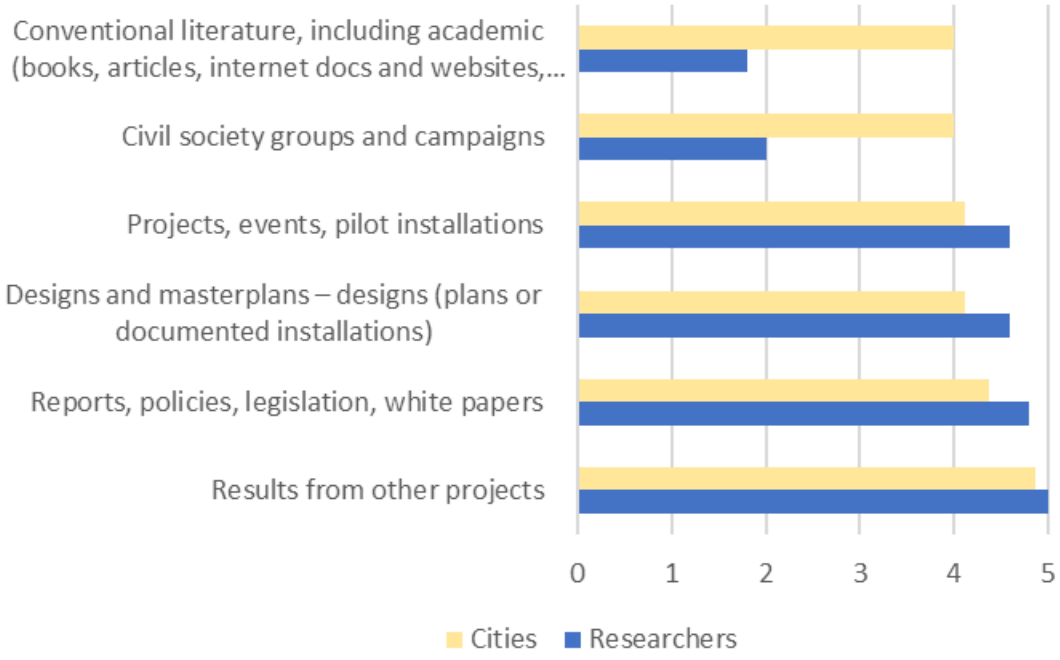
Figure 4: Interest of the users in the proposed functionalities

Other functionalities suggested by researchers were the following:

- search function using keywords/elements of the atlas
- filter function using keywords/elements of the Atlas
- download details of the best practices

3.1.5 Contents

In the following graphic, it can be seen the different proposed contents and the average interest by the users on a 0-5 scale.



Other content proposed by researchers that were considered very relevant:

- Urban plans dealing with health and light
- Commercial and market research

3.2 Urban lighting & health maps

The objective of this level is to visualize key indicators to identify correlations among lighting parameters, health/wellbeing data and measures of social and economic inequalities

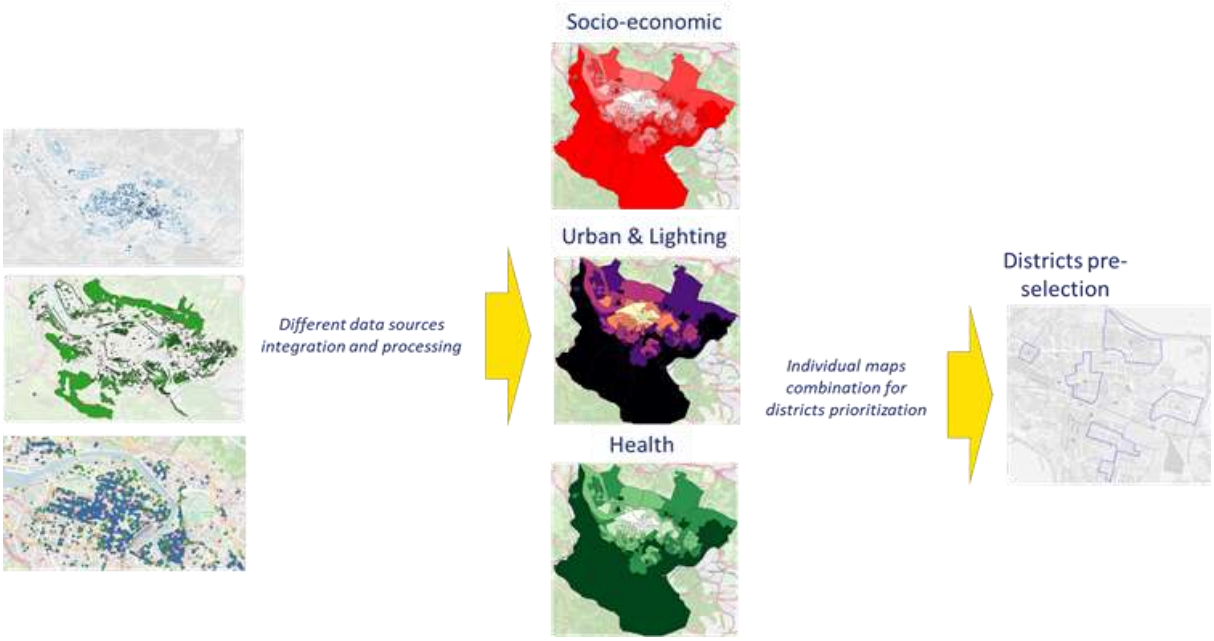


Figure 5: Urban lighting & health maps

3.2.1 Interest

The researchers show the following interest regarding the City maps:

- Easy access to economic, health, social, urban infrastructure/lighting data. This should allow for correlations between data if possible, as well as extracting specific and often geo-located data.
- seeking aggregate and disaggregate data on urban health, lighting and urban features (socio-economic, functional, physical, etc), which are not easily available elsewhere; to compare different districts

In the case of the cities the interest was the following:

- as work instrument to understand correlations and to plan the related interventions - as an example of work methodology to be applied to similar issues and cases
- To be aware of the current situation in the field and long-term planning - Policy improvement. Long term planning
- to have specific feedback on districts' scenarios in order, then, to plan tailor-made interventions
- to identify gaps and critical aspects to be considered at participatory processes level
- Raise awareness. Monitoring of environment

3.2.2 Type of content

The type of content required by researchers was the following:

- Easy access to economic, health, social, urban infrastructure/lighting data. This should allow for correlations between data if possible, as well as extracting specific and often geo-located data.
- new or relevant indicators and statistics that describe and correlate different aspects (health status, urban features, socio-demographic state)

In the case of the cities the required content was the following:

- to highlight correlations necessary to plan interventions- data/info correlations to analyse more in-depth problems and consequently to develop the feasible solutions
- Monitoring of the current situation in the city
- Results of interventions in public lighting
- to stress gaps and critical aspects emerging from correlations
- Impact of public lighting on health. Tips about healthy indoor lighting

3.2.3 Technological level of the end-user

For researchers, this level should be easy access to economic, health, social, urban infrastructure/lighting data. This should allow for correlations between data if possible, as well as extracting specific and often geo-located data and seeking aggregate and disaggregate data on urban health, lighting and urban features (socio-economic, functional, physical, etc), which are not easily available elsewhere; to compare different districts

For cities, it would be a working instrument to understand correlations and to plan the related interventions - as an example of work methodology to be applied to similar issues and cases and to be aware of the current situation in the field and long-term planning

3.3.3 Functionalities

In the following graphic it can be seen that the functionalities were of the maximum interest for both profiles:

Figure 6: Interest of the users in the proposed functionalities

Other functionalities suggested by researchers were the following:

- Ability to export easily to data processing software like SPSS, Atlas, etc for processing? And to Word for reports.
- download spatial data (shp)
- download statistics (also for different years)

3.3 3D model

The district-level multiscale 3D urban model will implement a 3D detailed representation of the selected target districts where the innovative lighting interventions will be carried out.

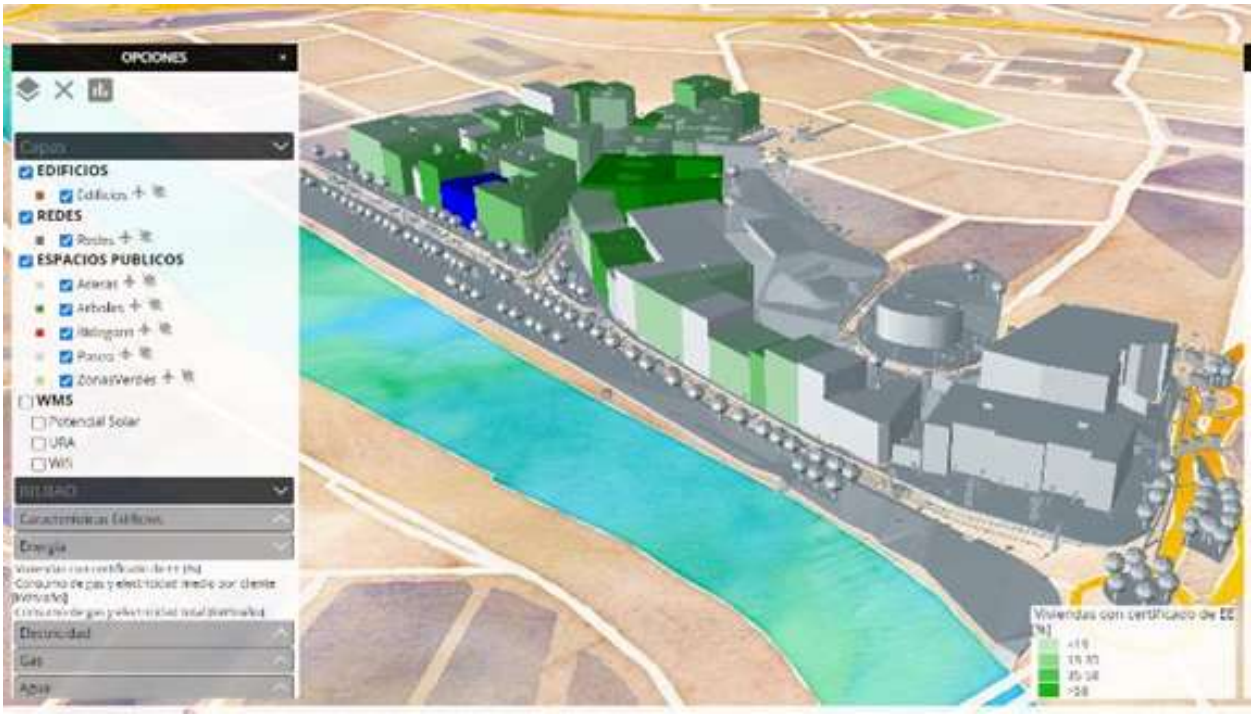


Figure 7: 3D urban models

3.3.1 Interest

The researchers show the following interest regarding the 3D models:

- This is mainly for ENLIGHTENme researchers but could be used by professional planners, and designers. Also, teachers and students for case study material. And paradigm for presenting this kind of detailed empirical material.
- to scale down information at the urban level;
- to forecast future scenarios changing the initial situation

In the case of the cities the interest was the following:

- work instrument to analyse the specific elements and indicators in the selected pilot areas
- Planning of specific measures for improvement of public lighting and creation of a healthy environment
- as an example of work methodology
- Information on specific use-cases
- to have feedback on the selected areas, and to have a prompt snapshot of the progress of project pilot actions
- Improvement of policies

- to have feedback on the selected areas, and to have a prompt snapshot on the progress of project pilot actions and urban lighting labs
- Rise awareness

3.3.2 Type of content

There was a concern about ethics and anonymity at this level of granularity among the researchers. But providing this can be secured, the interest from researchers was the following:

- complete technical survey of lighting, horizontal and vertical; survey of other relevant public realm furniture and infrastructure and features (including landscaping), mapping of amenities such as hospitals, schools, community centres, shops
- more precise data, statistics and indicators than in the maps

The content that was interesting from the Cities, were indicators and the visualization of all useful elements and details in the specific areas of intervention

3.3.3 Technological level

The researchers consider that the end-user of this level should be a medium/advance user (e.g. someone who know how to use the mobile for the interaction with QR codes), but the cities think that an average internet and smartphone user should be enough.

3.3.4 Functionalities

In the following graphic it can be seen that the functionalities were of the maximum interest for both profiles:

Figure 8: Interest of the users in the proposed functionalities

Other functionalities suggested by researchers were the following:

- download data and statistics
- possibility to change parameters and see the final result

4 Architecture and platform functionalities

4.1 Architecture

Next figure shows the definition of the architecture for the main components of the ENLIGTHENme platform:

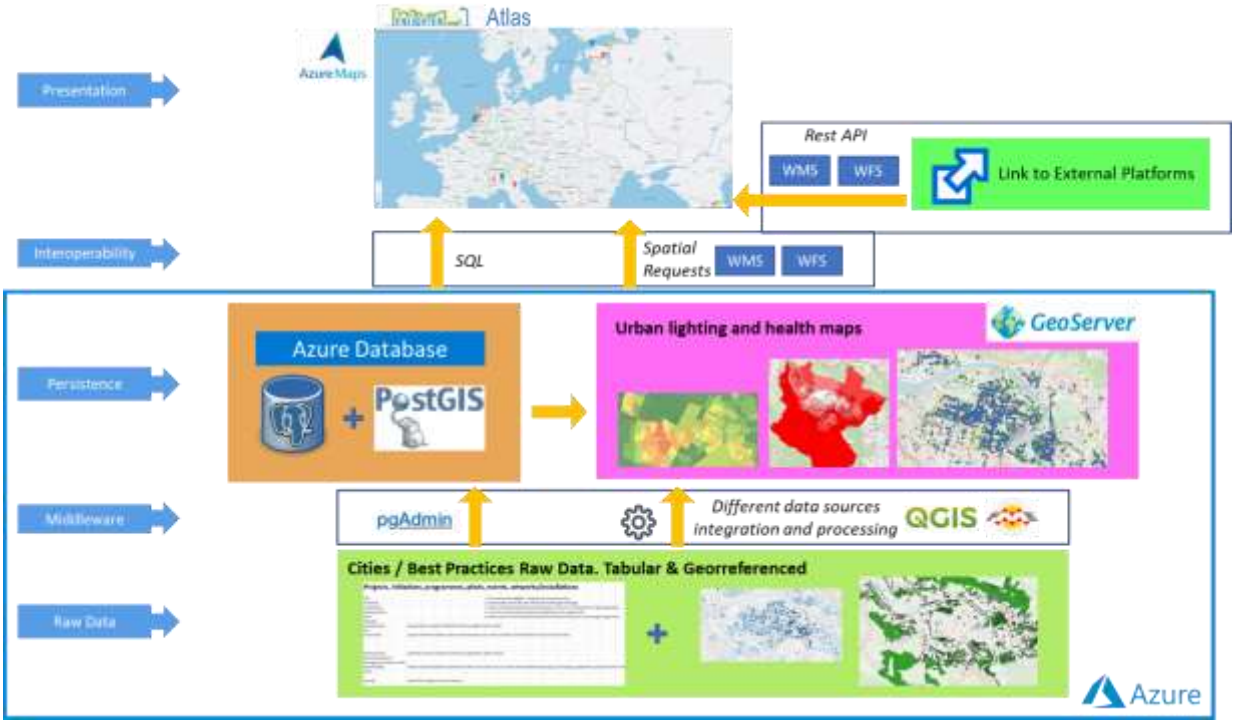


Figure 9: Architecture of the SHELTER platform

The architecture can be divided into three main parts: Data, Persistence, Interoperability and Presentation. From down to the top, the data layer encompasses all the raw data that is going to be gathered and calculated in the project related to cities, best practices, indicators. This data contains information with heterogeneous nature (geographically referenced, tabular, media content…) and should be treated to be stored using middleware processes developed for that, these could be database scripts or different geo-processes and data transformations using tools like QGIS or FME.

The data is going to be stored in Azure Database for PostgreSQL with PostGIS extension which enables geometry, geography, and raster spatial types and functions using SQL that is a standard language for storing, manipulating and retrieving data in databases. In addition to this, the database will be linked to a map server, Geoserver, which is an open-source server for sharing geospatial data. Geoserver allows interoperability as it implements OGC standard protocols like WMS / WFS / WMST that are going to be the most used. The cartography generated in this project will be linked between Geoserver and the database to allow the interaction and accessibility to both geographic and alphanumerical data.

As said, the data and cartography that is present in this project are going to be presented in the ENLIGHTENme Atlas that is a web viewer designed to allow the user its discovery and accessibility. The Atlas will work with information using interoperable services to communicate with the data stores through spatial requests, or SQL sentences. Besides, it is also possible to connect to other external Open Data Platforms via those interoperable services and use their information to be accessible from ENLIGHTENme platform.

4.2 Platform functionalities

Functionality	Basic map functionalities
ID	ENL-F1
Description	The ENLIGHTENme Atlas should have the basic functionalities: zoom in/out, pan or map style picker, fullscreen control, pitch, compass, scale bar
Functionality	**Layers Enable/Disable**
ID	ENL-F2
Description	The platform should be able to show a layer manager with a list of map layers (or table of contents- TOC) that can be enabled or disabled. The layer manager will have three sections: ▪ Cities and Best Practices ▪ ULH Maps ▪ Other Maps
Processes	This functionality can be done using checkboxes to enable/disable the layers. Those layers will be consumed directly reading KML, KMZ, GPX, GeoRSS, GML, GeoJSON, CSV (with spatial columns) or published and accessible via OGC Standard Web Services
Functionality	Inspect Features
ID	ENL-F3
Description	The platform should be able to retrieve the information related to one point when de user clicks on it and display this information on the map
Processes	Extract the feature related with the coordinates of the user click and then connect to the database, search and retrieve the information related to this feature. Finally, show this information on a popup, modal window or panel. This information could be: ▪ Description ▪ Coordinates ▪ Image ▪ Link to technical info ▪ Contact info

Functionality	Show Best Practices
ID	ENL-F4
Description	The platform should contain the information related to the best practices, to be accessible. Best practices will be geolocated and displayed on the map, together with a list of their related data. This information could be: ▪ Description ▪ Type ▪ Coordinates ▪ Image ▪ Link to technical info ▪ Contact info ▪ etc
Processes	There will be a layer with a general view of the map containing markers based on best practices locations. Also, there will be a side panel with the list of all best practices. This list should have a summary of each one. When the user selects one of them (both, from the map marker, or the list) the map will zoom in to this location, and the detailed information of this best practice will be displayed on the side panel. It will be possible to filter best practices based on any parameter. There will be implemented options to filter directly by common parameters like year, city or type, and also will offer the possibility to filter using any keyword.
Functionality	Filter symbols by property or search based on alphanumerical filters/keywords
ID	ENL-F5
Description	The platform should be able to perform searches based on properties or alphanumerical filters like keywords or topics
Inputs	Keyword to be filtered by
Outputs	Results filtered by the keyword
Processes	filter the case studies against specific features they can show (e.g. type: intervention, plan, strategy, communication; target groups: children, adults, older adults, etc).

Functionality	Visualization and filtering of indicators
ID	ENL-F6
Description	The platform should be able to visualize/ filter indicators, both geographic and graphs/charts.
Functionality	Link to project glossary
ID	ENL-F7
Description	The project glossary should be linked from the platform to be always accessible
Functionality	Download geospatial data
ID	ENL-F8
Description	The user should be able to download the geospatial data in shapefile format / csv /excel
Processes	The process will be done using a toolbox designed for that. The user will select the information to be downloaded from the information available and open access in the platform.
Functionality	Time Control
ID	ENL-F9
Description	The user should be able to see the evolution of the maps over time. From a reference start and end timestamp.
Inputs	Start – End Date
Processes	Using Frame-Based Animation Timer Control the user will be able to select a start and end date. The map will be automatically animated from these dates.
Functionality	Connection with other existing platforms
ID	ENL-F10
Description	It could be interesting to connect the project platform with additional existing components or platforms that can be relevant. Also, it would be done in the other direction: Use the results of ENLIGHTENme project to be used by these platforms.

4.3 Maintenance of the platform and connection with other platforms

The ENLIGHTENme platform will establish connections with other platforms of the ENLIGHTENme cities such as open data platforms, statistical websites, etc. The connection will be established by providing a web link to them. And also it would be possible to load some of this information in ENLIGHTENme Atlas if they are available via OGC serves. Also, the datasets of indicators and indexes visualized in the urban & lighting maps could be available in open data platforms of the cities.

This connection between the platforms does not require strong maintenance as it will work via web links. If the content of the data changes at one point in time, it will still be accessible for ENLIGHTENme platform as long as the link is still enabled.

5 User interface (Mock-up)

A mock-up with the user interface of the ATLAS has been developed and can be consulted in the following link: Mock-up

In the following sections, the different features of the mock-up are described:

5.1 Layer Manager

The layer manager contains the list of all layers that are available in the Atlas. From the layer manager, it will be possible to enable/disable layers in the map. Near each layer, there is a plane icon , to fly to the original extension of the layer.

Layer Manager will be divided into three sections: Cities, ULH Maps and Other Layers:

- In the first section, there would be two simple layers: Cities and Best Practices.
- In the ULH Maps section there would be a tree layer structure associated to the different KPIs calculated for each domain, like that:
    - One global KPI
    - One KPI for each domain
    - Individual KPI layers are particularized inside a specific domain.
- The Other Layers section will be the place to locate any other third-party layers that are published publicly through OGC services like WMS that could be of interest for the context of ENLIGHTENme project.

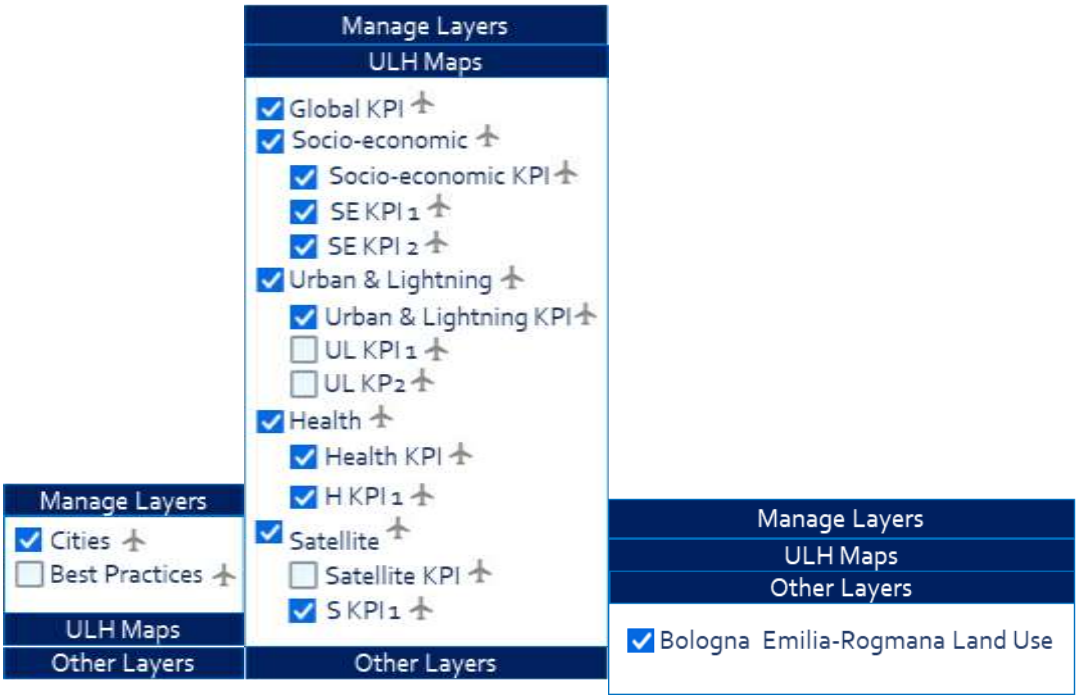


Figure 10: Layer Manager

5.2 Cities Presentation

This feature will provide a general view of the cities participating in ENLIGHTENme. As a presentation of the cities, point markers will be located on the map based on the coordinates of Tartu, Amsterdam and Bologna. Markers style should be equal for all the cities. This layer can be enabled/disabled using the LayerManager located at the top-left corner of the screen. When the user clicks on a city-marker, it will be shown in different formats, general or summarized information about the city in the project context (text, URL, images).

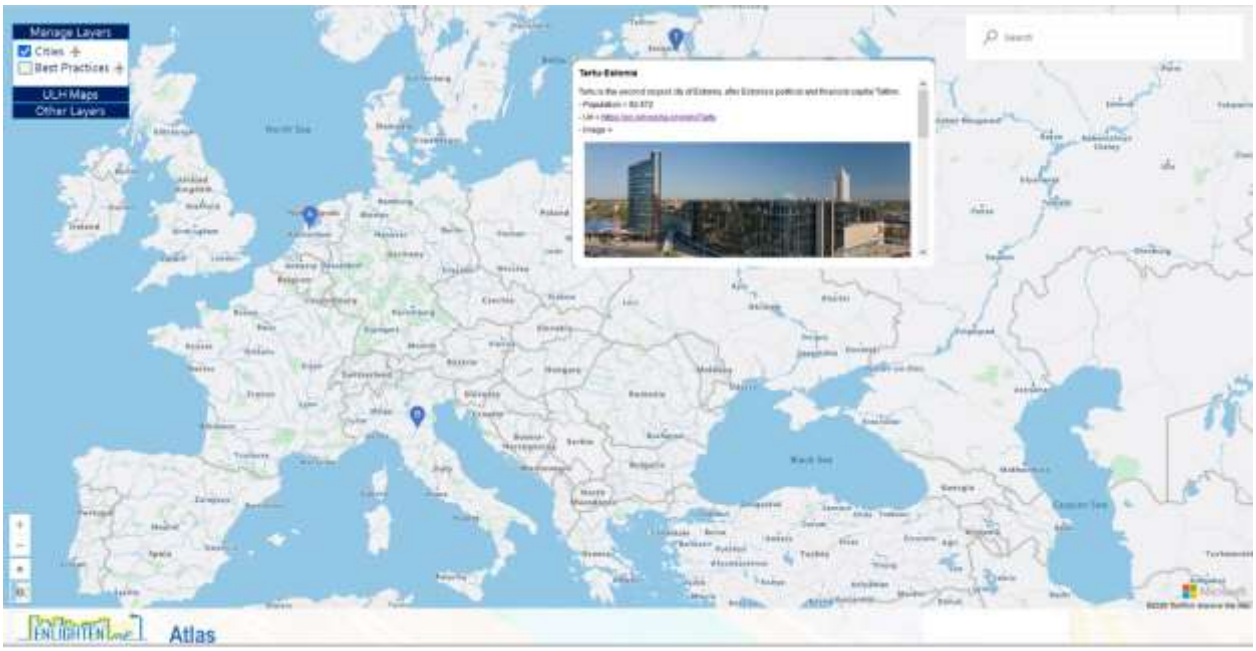


Figure 11 General View: Cities Layer

5.3 Best Practices

Best practices will be georeferenced and shown on a map. There will be different icons to differentiate the type of best practice. This differentiation could be defined for any parameter (not just type). This layer can be enabled/disabled using the LayerManager located at the top-left corner of the screen.

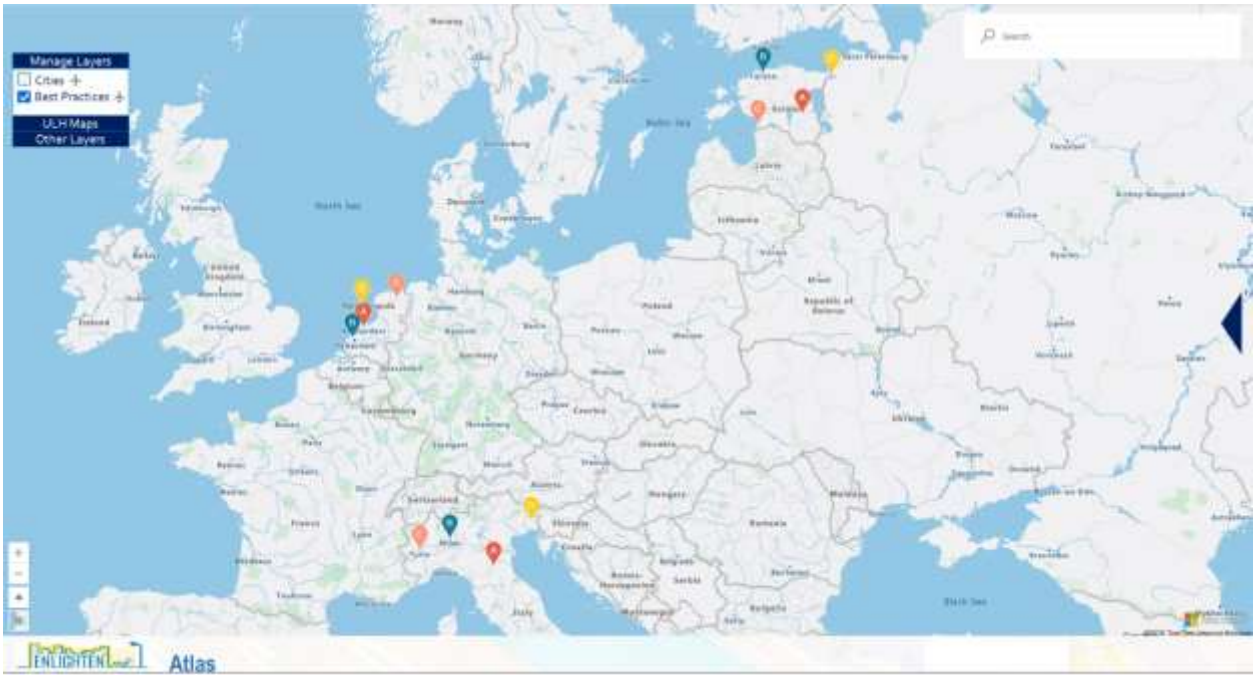


Figure 12: General View: Best Practices Layer

Clicking the arrow (right) will open a side panel containing a complete list of the best practice. For each one, it would be shown summarized info like name, type, summary description or image.

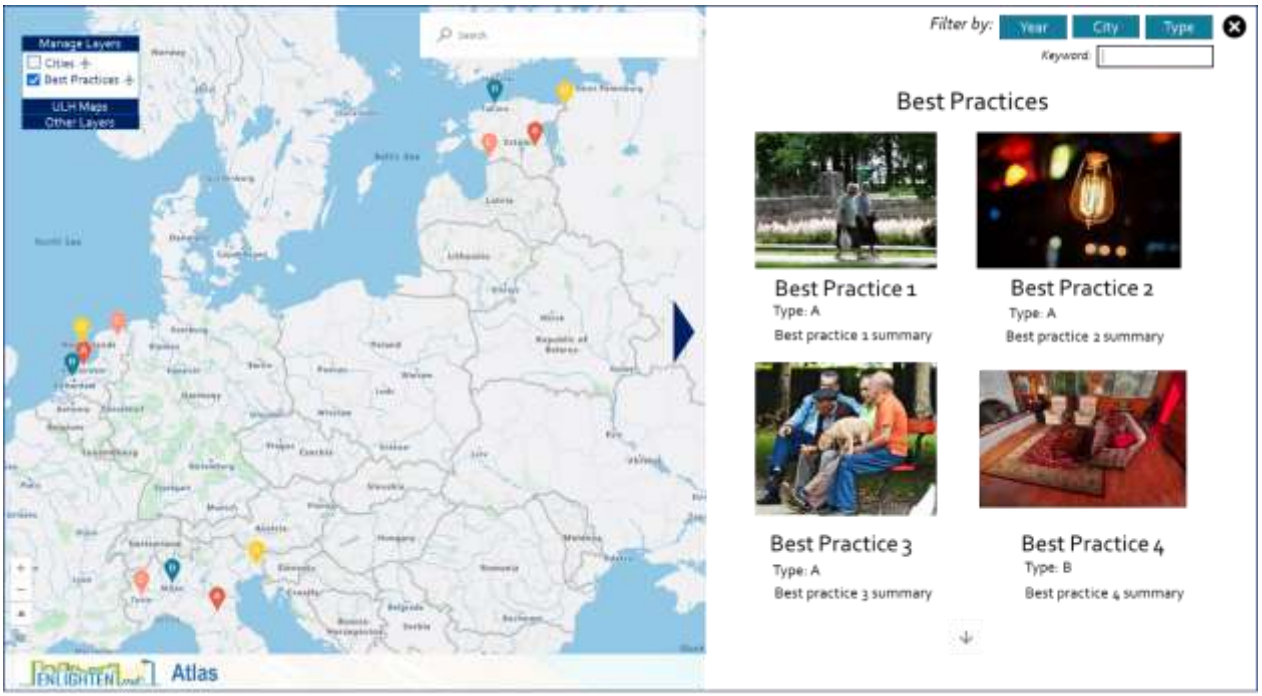


Figure 13: Best Practices Content view combined

The filter option, to search into Best Practices is located at the top of this panel. The idea here is to allow a direct filter using the most meaningful or commonly used parameters like year, city, or type and besides, it will be enabled a keyword textbox to search for any other term.

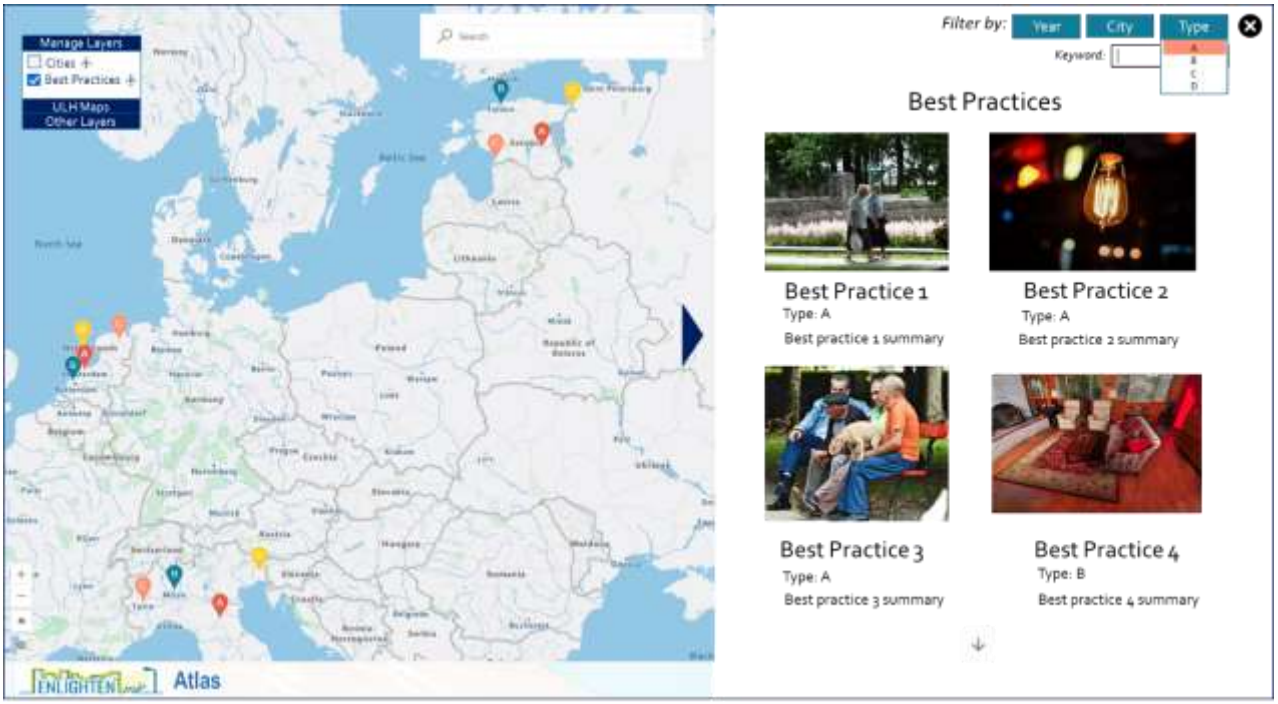


Figure 14: Selection of Type A

When filtering is executed, the map and the panel items will reflect the result. On the example, a Type A filter is selected, so the map icons will zoom in, and represent only the Best Practices

with associated type A and accordingly, the right panel will show only those. It will be implemented also the possibility of remove any activated filters .

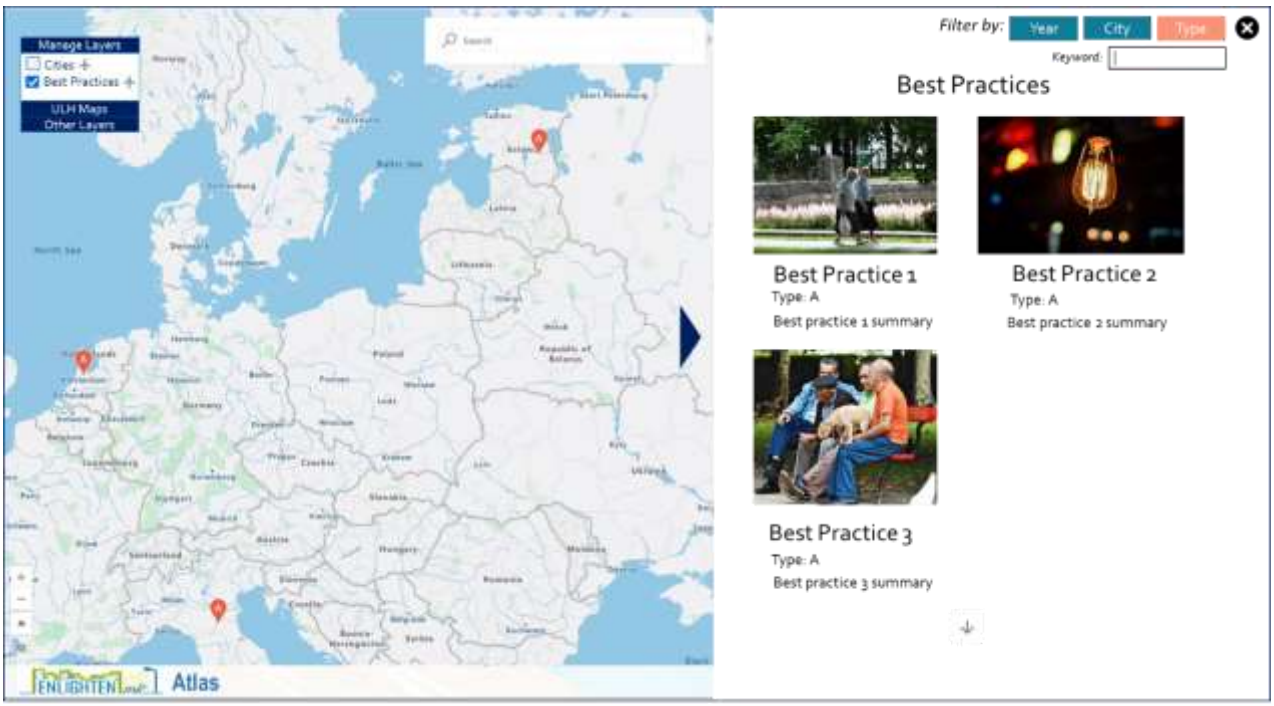


Figure 15: Best practices filtered by Type A

When the user clicks on one particular Best Practice (both, in the map marker or the right-side panel), the map will zoom in on the selected feature and the detailed information will be shown. It is also possible to clear the selection and come back to the list of Best Practices.

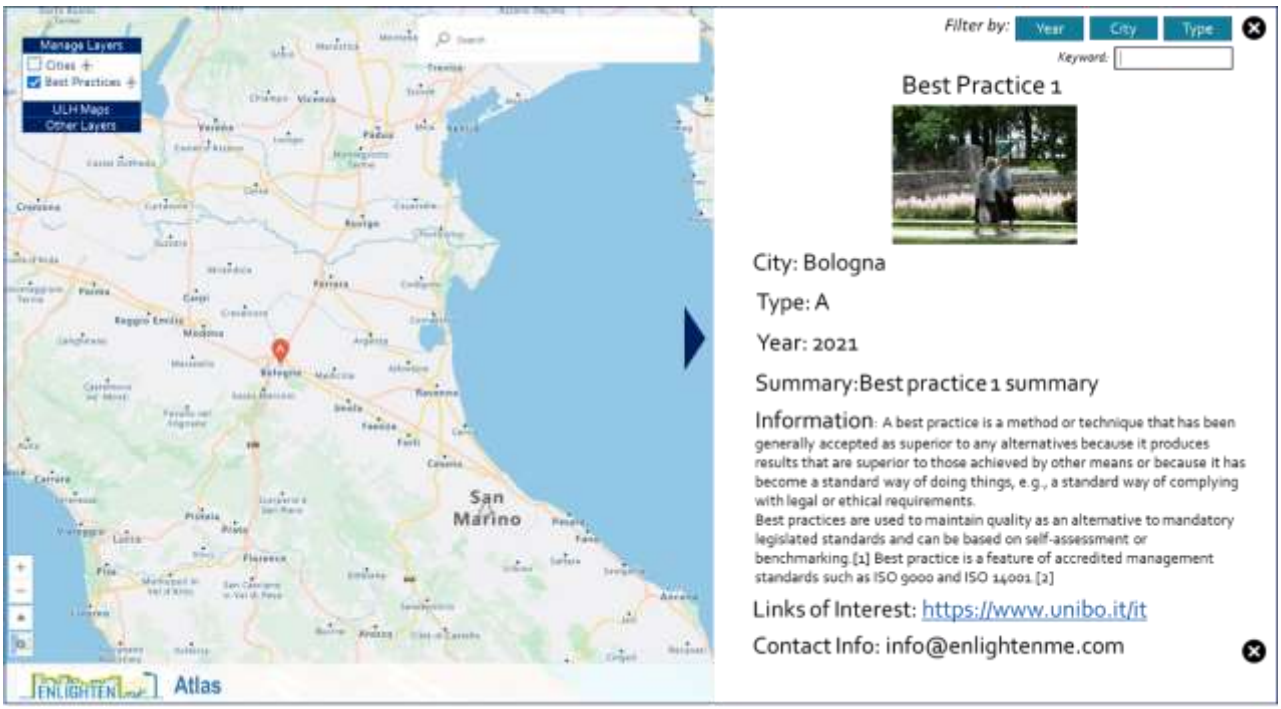


Figure 16: Detailed Best Practice

5.4 ULH Maps

Urban lightning and Health maps will be defined from city to district-scale (and if the information is available for census track o neighbourhood). All layers will be available and can be loaded in the map using the Layer Manager

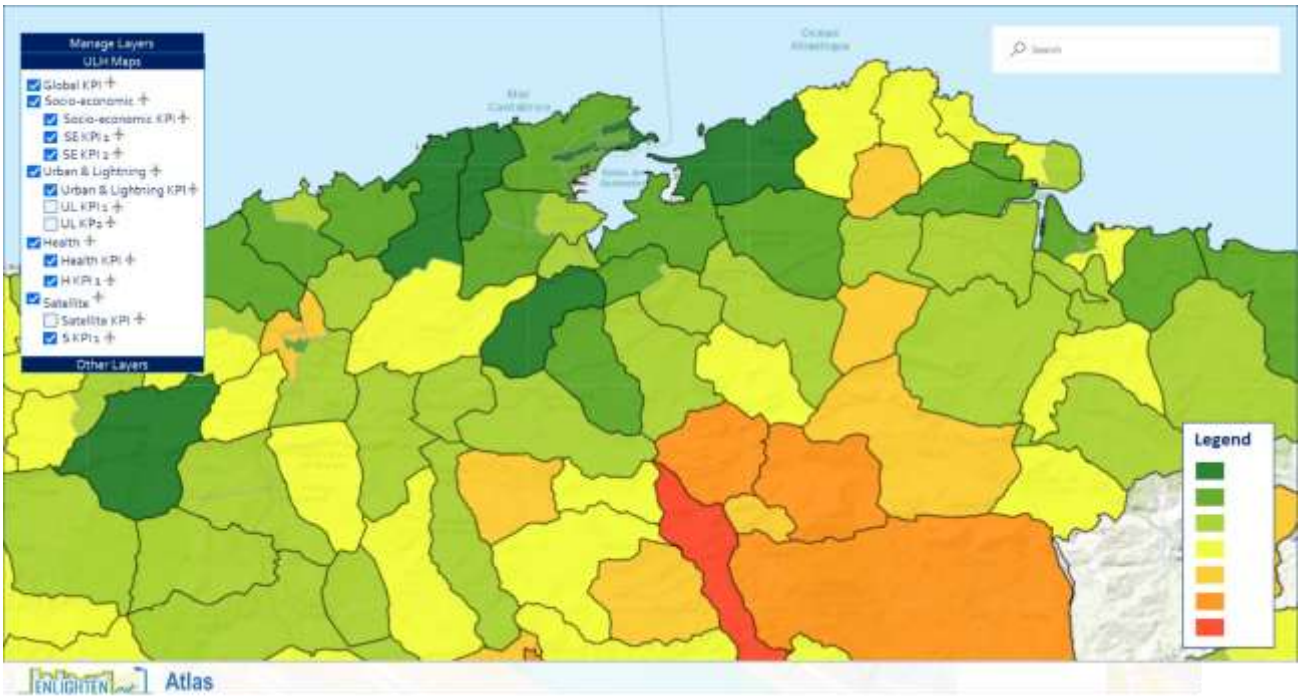


Figure 17: General view of ULH Maps

When the user clicks on one area it will be shown the information related to this feature.

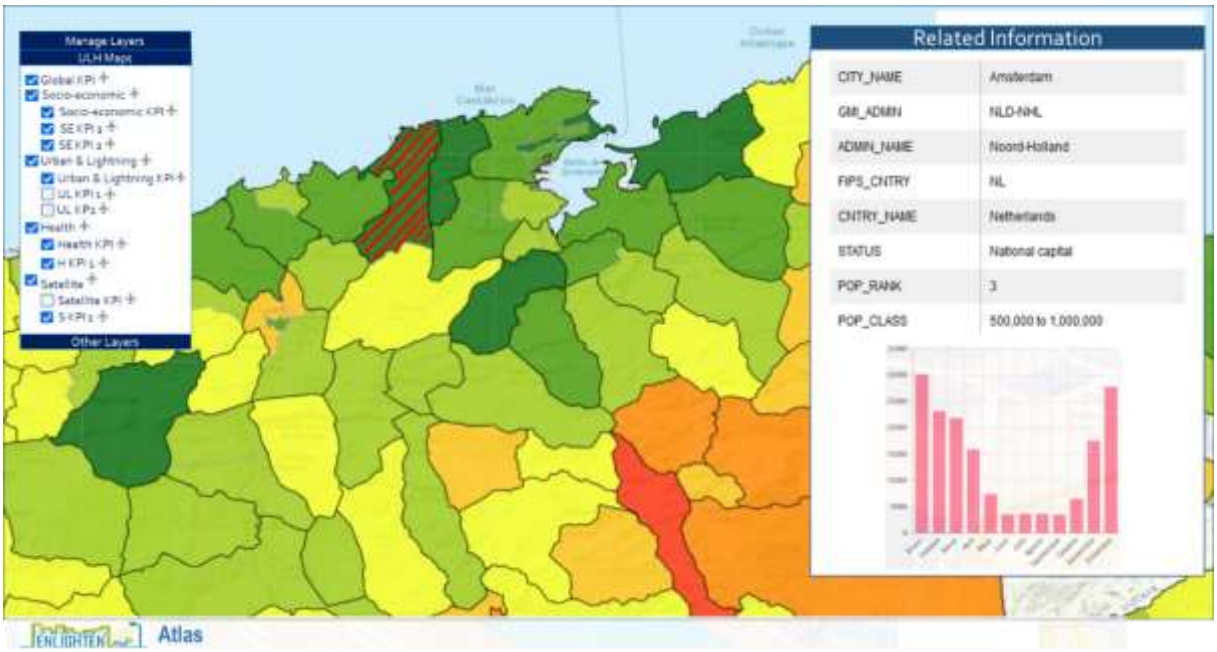


Figure 18: Related information of one feature when clicking on it

As information is going to be multiscale, it will be enabled a feature on the maps allowing to zoom in and see detailed information at a smaller scale.

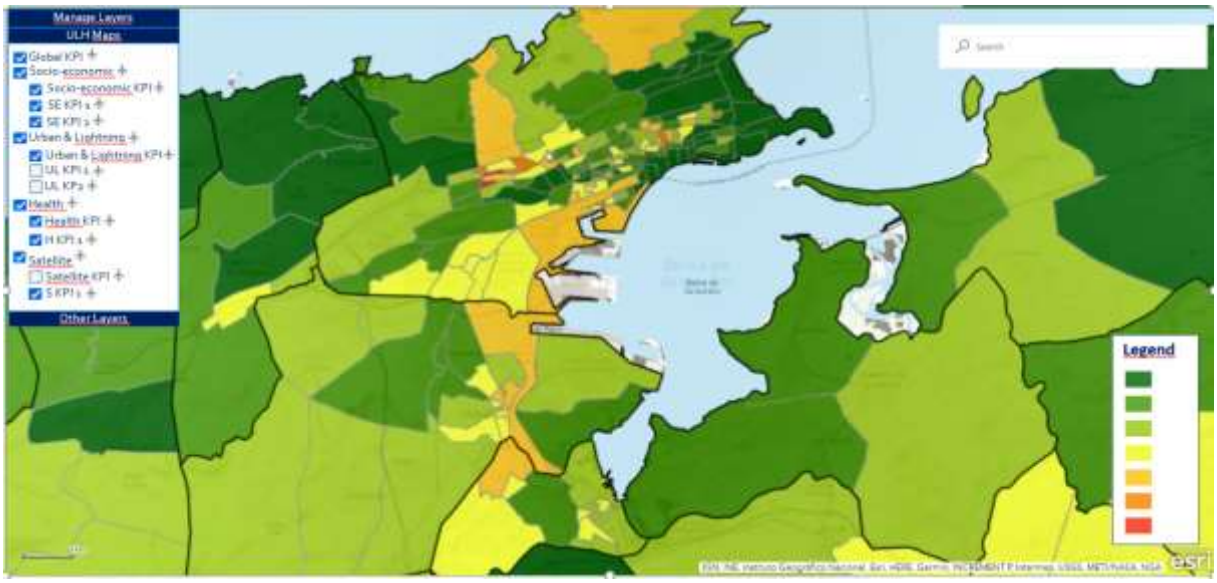


Figure 19: Zoom control to load multiscale information

One of the functionalities of the Atlas will be to visualize temporal data animations. It will be possible to see on the map how the information has changed over time. For doing this, it will be designed and implemented a control like time slider to allow the user to select the animation parameters like start and end date.

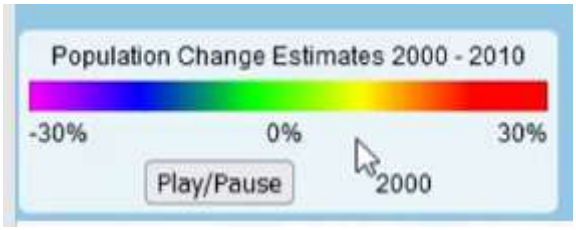


Figure 20: Time control example

5.5 Other Maps

If there is any geospatial information of interest for the project publicly available, though OGC Services like WMS, it will be also possible to be listed on the Layer Manager allowing to load it on the map using this service. This information will be located on a third party platform but we will be able to connect and show the layer on our map.

Figure 21: Example of load map via WMS from Bologna Open Data Portal.

6 Data gathering template