

DESCRIPTION

As of today, City Operations Framework (COF) is a complete stack of technologies to support the development of a smart city strategy and operations allowing any city do set the grounds to map the city in a digital twin and support technological development of devices, data integration, citizens identification and applications to drive its digital transformation and energy transition roadmaps. The framework adopts standards, good practices and tools aligned with the recommendations and guidelines from Europe's strategy for digital and smart cities.

The full stack of the City Operations Framework developed allows a city to deploy the technological basis for an integrated smart city strategy that is controlled by the city governance, allowing multiple solution providers to use common resources like data aggregation, data interoperability, asset mapping and identification, citizen identification (login).

KEY REQUIREMENTS

Requirements for a city digital twin common database, standard asset data models and data formats for interexchange, common login, engagement portal.

OTHER COMMENTS - OPEN CONSIDERATIONS

The framework is based on unifying layers:

- **City Digital Twin**, where the city is mapped in a central database according to good practices and standards (CMDB + smart data models).
- **Pilot Devices**, setting-up the interconnected physical and logical ecosystem of devices in the city to the connectivity layer and data production.
- **Raw data collection**, where data is collected in dataflows in normalized and harmonized formats (ngsi-lD).
- **Data Aggregation**, where dataflows, authorization and data validation and storage are performed. This is the core of data lake and the more complex layer integrating multiple technologies for data storage and analytics, and also a ORION context broker for data interexchange.
- **Services Layer**, integrating complex and city management solutions and applications.
- **User Access**, as the application ecosystem to support interaction with citizens with a common ID provider integrated to all apps and to social media applications. Portal for open-data and application prototyping using framework capabilities.

The framework is implemented globally:

- City Digital Twin, solution implemented with some assets data models under development.
- Pilot Devices data under development by partners to integrate ngsi-lD standard.
- Raw Data Collection and Aggregation developed and ready to receive data from devices.
- Services Layer in installation from partners
- User access with common ID for citizens implemented and ready

Next steps: Data models consolidation and data collection/validation mechanisms in pilot devices.



DESCRIPTION

The Wi-Fi-Data Acquisition Systems is equipped with a sensors network that measures multiple environmental variables, providing real-time information on ambient temperature, relative air humidity, atmospheric pressure, UV radiation, luminosity, solar irradiance, carbon dioxide and noise. The information collected by the Wi-Fi Data Acquisition Systems will be used to achieve two main goals: i) provide Évora citizens, and other stakeholders, with multiple variables from 10 different locations in order to increase awareness of local environmental conditions, while allowing local authorities to act, based on real-time data, in case some location is not complying with defined environmental specifications; and ii) support the operation of other POCITYF solutions, such as the Flexibility Control Algorithms, that will use the collected variables to predict weather conditions and associated renewable generation profiles.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

Context dependent

Already demonstrated in Lighthouse cities No

Cultural heritage compliance Yes

PERFORMANCE

Ability to measure several environmental variables

COST

To be defined

DIMENSION

Size: (W x H x D): 464 mm x 372 mm x 356 mm

Weight: 1.5 kg

TIME

Installation time: 2h

Working time: 24h/per day

SAFETY

GDPR compliant

SUSTAINABILITY

Supports environmental assessment

KEY REQUIREMENTS

It must be installed outdoors, flat and with a minimum size of 1mx1m, preferably on top of buildings. It must be facing south, with a stable Wi-Fi connection and no access to users.

ENVISAGED DEMONSTRATION IN POCITYF



LOCATION

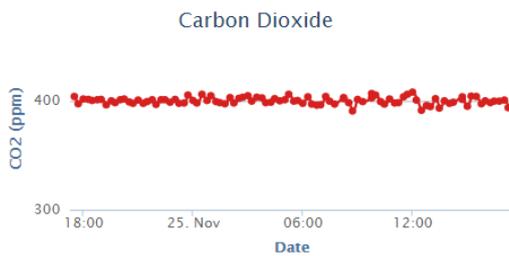
The Wi-Fi Data Acquisition Systems will be positioned in strategic locations in the city, providing a map of environmental and climatological variables.

TIMELINE

All Wi-Fi Data Acquisition Systems will operate for, at least, two years in Évora municipal buildings.

DETAILS

During POCITYF, the Wi-Fi Data Acquisition Systems will provide real-time data on the meteorological and environmental conditions to be integrated into the Data Lake.



TARGETED OUTPUT

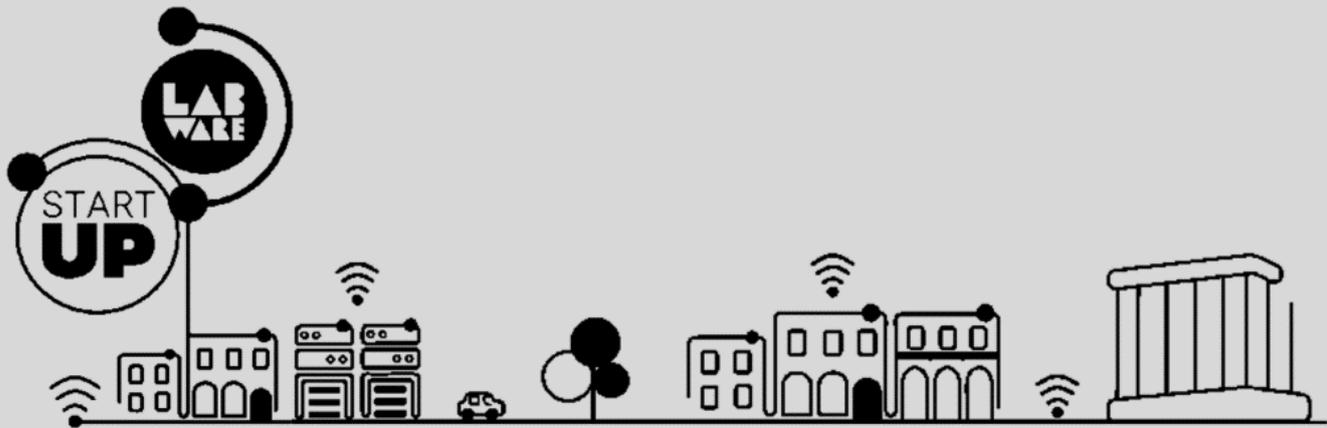
Provide the communities with real-time environmental (noise and carbon dioxide) and meteorological (ambient temperature, relative humidity, UV radiation, atmospheric pressure, solar irradiance) data regarding the perimeter to be observed.

IMPACT ON COMMUNITY

The information collected by the Wi-Fi Data Acquisition Systems will be used to achieve two main goals: i) provide Évora citizens, and other stakeholders, with multiple variables from 10 different locations in order to increase awareness of local environmental conditions, while allowing local authorities to act, based on real-time data, in case some location is not complying with defined environmental specifications; and ii) support the operation of other POCITYF solutions, such as the Flexibility Control Algorithms, that will use the collected variables to predict weather conditions and associated renewable generation profiles.

CULTURAL HERITAGE BUILDINGS COMPLIANT

Since Wi-Fi Data Acquisition Systems must be placed outside, selection of installation locations should be carried out respecting cultural heritage related rules. No negative impacts are expected in Évora.



DESCRIPTION

Deploy and promote a digital framework to support innovation by local entrepreneurs to design and develop software applications and data analytics integrated with the city's framework implemented in the scope of POCITYF.

Smart cloud for innovative startups delivers both computing power (Decsis Datacentre) and mentoring to entrepreneurs to support entrepreneurs to develop application or devices.

ENVISAGED DEMONSTRATION IN POCITYF

LOCATION

Demonstration expected in Evora city.

DETAILS

- A computing infrastructure is installed in Decsis Datacentre providing selected in open access and equality rules entrepreneurs free access to computing power and software resources, available for prototype development and testing:
- Computing power and internet access open CLOUD for Startups in the Évora's ecosystem.
- Sandbox environments for rapid prototyping: LAMP (Linux, Apache, MySQL, Python), LAMP (Linux, Apache, MongoDB, Python), LAPP (Linux, Apache, PostgreSQL, Python), MERN (MongoDB, Express(.js), React(.js), Node(.js))
- Low code development frameworks (examples: Outsystems, Appsmith)
- Project management tools and coding hub (git) for the city.

OTHER COMMENTS - OPEN CONSIDERATIONS

For application development integration with the following layers are available:

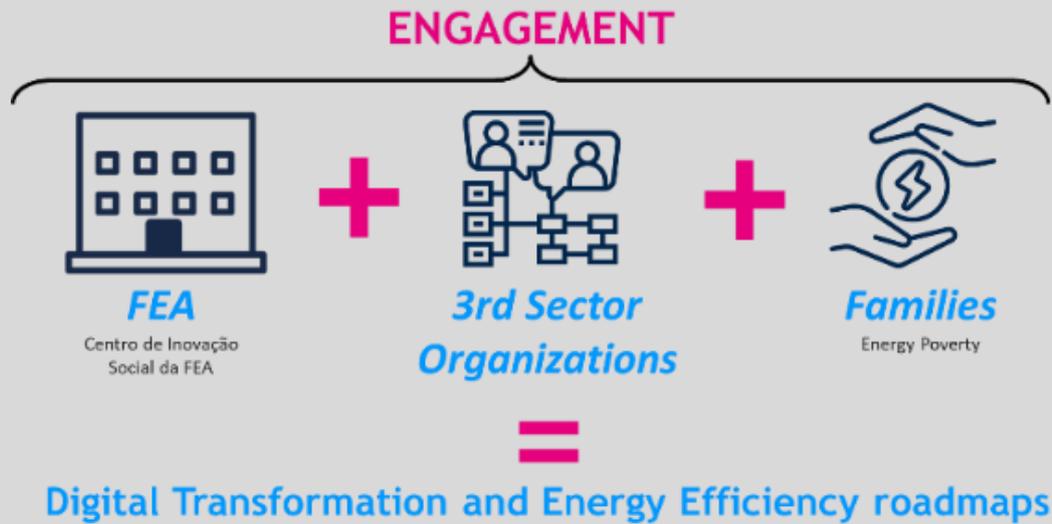
1. **City Digital Twin**, access to asset data models and asset catalogue available in the CMDB (example: identify asset using UUID, request data from asset, other tbd).
2. **Pilot Devices**, development of new devices to produce data to the data lake.
3. Raw data collection, not to use in this scope.
4. Data Aggregation, not to use in this scope.
5. **Services Layer**, deploy applications to use in the context of city management integrated with da.
6. **User Access**, access to data in open data portal, usage of common citizen ID, applications integration.

Support to entrepreneurs and innovation providing innovation programs, funding and internship programs, facilities and mentoring and academia interface:

- Entrepreneurial program supporting innovation contest and funding: <https://startup.alentejo.pt>.
- Internship program at Decsis to support individual entrepreneurs to develop prototyping solutions aligned with POCITYF solutions.
- Facilities and equipment to support low-income students to start an idea.
- Experts mentoring to support consulting to projects development.
- Project planning mentoring.

Current state: Computing infrastructure installed and active. Design of sandbox and software framework solutions under preparation. Entrepreneur support program designed and running <https://startup.alentejo.pt>.

Next steps: Define challenges to engage entrepreneurs and provide mentoring.



DESCRIPTION

Digital Transformation in Social Innovation in the scope of POCITYF aims at delivering to the 3rd sector in Évora's PEB a new strategy for using technology to promote business and operational efficiency and a transition to positive energy balance. These 3rd sector organizations develop support to social innovation entrepreneurial movement and active responses to societal challenges we face in the city's ecosystem with impact on citizens like energy poverty, digital-gap, social-exclusion, care, and health responses, and many more.

Digital Transformation in Social Innovation brings to 3rd sector of social innovation an opportunity to identify solutions that enables the digital transformation of their business and processes by identifying the problems and needs in each organization (digital and energy related) and designing solutions adapted to solve that problem and increase operational performance and efficiency. The process includes learning with stakeholders from 3rd sector organizations to problems identification, information collection and analysis to identify possible solutions, codesign and cocreate solutions adapted to specific needs and target audiences, experiment solutions in lab environment (whenever feasible).

KEY REQUIREMENTS

To develop a creative environment to identify, discuss and cocreate adoption of technology and energy transition solutions to organizations and families.

OTHER COMMENTS - OPEN CONSIDERATIONS

The process begins by discussing and identifying with these organizations their problems and challenges and building-up digital solutions and energy transition solutions that can be applied soon. This collaborative work provides a digital transformation and energy transition roadmap that can promote a positive contribution for the city. Also, to fight energy poverty and because these organizations work with less-favoured families, identification of possible candidates to P2P energy donations is supported and achieved in the work scope. This action engages an important set of organizations that support innovation in societal challenges that the city faces nowadays and promotes digital transformation (website, document management, process management, etc) and energy transition (P2P, PV generation, monitoring, PAYT, etc) in these organizations.

During the process of cocreation several tools are used:

- **Digital transformation** benchmark on digital transformation uses COTEC Theia framework and European guidelines on digital maturity assessment - <https://theia.cotec.pt/pt>
- **Energy transition** evaluation is based on energy performance evaluation for organization's infrastructures and POCITYF innovative solutions - tbd.
- **Energy poverty** reference guidelines both in Portugal <https://ligar.adene.pt/> and Europe Energy Poverty Advisory Hub <https://energy-poverty.ec.europa.eu/>
- **Map of social responses** in Alentejo Central <https://bussolasocial.alentejo.pt/>

Actions are developed in a collaborative environment with organizations integrated in Fundação Eugénio de Almeida Centro de Inovação Social <https://www.fea.pt/cis>

- Activity 1 - POCITYF engagement to 3rd sector organizations
- Activity 2 - Discovery process about organizations challenges and problems to solve, digital transformation assessment and energy efficiency.
- Activity 3 - Codesign solutions to increase maturity on digital transformation and on energy transition using POCITYF's solutions or other applicable to the scenario.
- Activity 4 - Capacitate 3rd sector teams on energy poverty framework and guidelines and select families to engage into P2P solution in POCITYF.
- Activity 5 - Deliver digital transformation and energy transition roadmap for involved organizations

Current status: Identification and the discussion with 3rd sector organizations has already been launched (activity 1) and further work is being prepared for activity 2 where the discovery process for challenges and problems is to be developed and solutions design to be started.

Next steps: Identify challenges and problems in each organization during discovery sessions - digital and energy related. Assessment on digital and energy maturity. Create a common framework for solutions design and adoption. Codesign solutions to improve digital transformation and energy efficiency adoption in the scope of POCITYF solutions. Identify and select energy poverty families in the scope of these organizations work to engage in P2P.



DESCRIPTION

Citizens' participation in city's challenges and problems is at a lower degree of responsibilities. Even though there is information and consultation in the city actions and citizens engagement is based on specific topics and not structural or seen by both sides as fundamental to the city's development of action plans or long-term strategies. If we look at the ladder of participation it comes to informing-consultation-placation degrees. If engagement is innovation-based topics or technology the citizens participation is more reduced, mainly because innovation is more challenging and riskier to discuss. Regarding energy transition and adoption in the city's strategy to CO2 emissions reduction none or lower participation and responsibilities are perceived. The strategy developed was inspired on Eichler and Schwarz social innovation definition and uses a methodology inspired on Design-Thinking principles. This methodology is divided on three sequential phases: Discover, Explore-Investigate and Co-Creation-Prototyping and pretend to learn and build storytelling together with organizations through working groups and a set of several activities chained together over a short period of time. A pivot organization was identified to promote 3rd sector organizations contact and selection in the scope of Eugénio de Almeida Foundation Centre for Social Innovation that gathers in the city most of the organizations providing support for social challenges in the city context.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

Insert value here

Already demonstrated in Lighthouse cities Y/N

Cultural heritage compliance Y/N

PERFORMANCE

Insert value here

Insert value here

Insert value here

COST

Insert value here

Insert value here

Insert value here

DIMENSION

Insert value here

Insert value here

TIME

Insert value here

Insert value here

SAFETY

Insert value here

Insert value here

SUSTAINABILITY

Insert value here

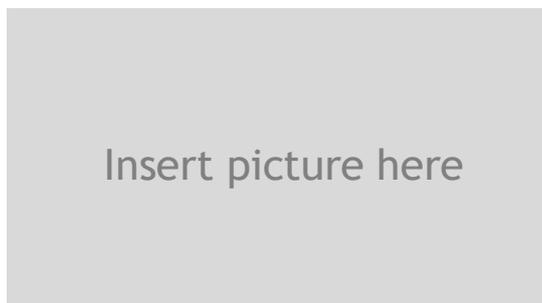
Insert value here

KEY REQUIREMENTS

Report the most important requirements for your solution (i.e. a PV system might require a rooftop with a certain slope etc...)

ENVISAGED DEMONSTRATION IN POCITYF

If applicable, here you can describe one or more real world use cases of your solution.

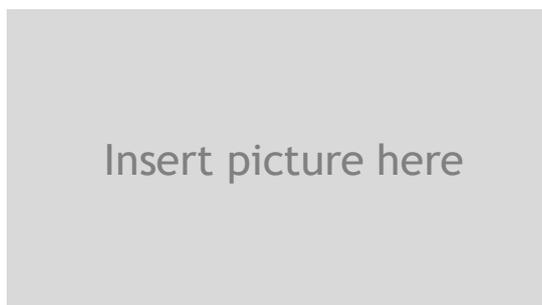


LOCATION

Insert text here and relative picture on the left (GIS coordinates)

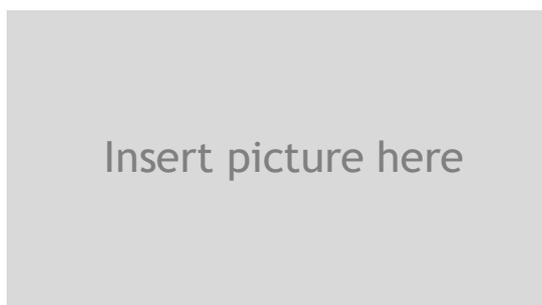
TIMELINE

Insert text here



DETAILS

Insert text here and relative picture on the left (description of the demonstration)



TARGETED OUTPUT

Insert text here and relative picture on the left. If you don't have pictures you can delete the grey box and merge the cells to give more room to the text.

Include all the expected results indicators and improvements that your solution challenges to introduce, with respect to the initial objectives and the relative values (qualitative or quantitative measures i.e. CO2 emission reduction, new service implemented, increased production, reduced consumption etc...).

IMPACT ON COMMUNITY

Refers to all the implications the installation of your solution could may cause to the citizenship. Some examples are: impact on the natural landscape, service interruption for the time needed to install the solution, etc...

CULTURAL HERITAGE BUILDINGS COMPLIANT

Please report, if relevant for your IE, to what extent the solution is in line with European/international regulations on historical building for the specific kind of intervention. For example, in case of solution oriented to improve energy performance in buildings, please indicate whether your solution is in line with UNI EN 16883:2017 - Conservation of cultural heritage - Guidelines for improving the energy performance of historic buildings. Please write accordingly a short description of your solution in these contexts. Specify if your solution fulfil some regulatory issues, if it has different types and it is scalable to meet the requirements in these kinds of buildings, and what types of issues related to particular specificities and/or characteristics it is able to address.

You can also add some pictures and real world examples, if applicable. Please remind that this aspect is very important for the purpose of the project.

OTHER COMMENTS - OPEN CONSIDERATIONS

The engagement process starts with the definition of a theme and selection of community leaders to build a storytelling about the topic and engage discussion with fellow citizens. Based on a well described story, timeline or solution/challenge description, citizens can start a fruitful contribution to the topic and participate responsibly on the city's future action plans. All the actions are developed in a hybrid, physical and virtual workshops, with open and closed thematic groups debating several topics of interest to the city and to POCITYF.

The steps to be performed are:

1. Team to engage discussion lead by a community citizen in partnership with municipality's technical stakeholders able to contribute to the technical discussion.
2. Storytelling based on the city's experience during a timeline related to the topic or specific solutions to cocreate within the city scope and development.
3. Design and development of workshops to discuss and enrich the topic, challenges, and solutions to cocreate. Discussion and enrichment based on citizen participation on the cocreation process. The workflow is based on the Barcelona published steps and DECIDIM.
4. Codesign and materialization of a prototype (digital or physical) that represents solutions to be tested in the experimentation lab.
5. Solutions experimentation in virtual lab or living lab in the city, together with citizens.
6. Report and results publishing

During the process of cocreation participant portal is used: Citizen's portal <https://citizens.evorlab.pt>

Current state: Engagement process defined and citizens portal online. First topics for discussion identified.

Next steps: Consolidate topics, identify community leaders for each one and engage discussion with citizens.

GAMIFICATION



DESCRIPTION

Gamification, or the act of making something game-like, is the craft of deriving fun and engaging elements found typically in games and thoughtfully applying them to real-world or productive activities. By adding game mechanics into nongame environments, like a website, mobile app, online community, learning management system, etc., you can engage and motivate people to achieve their goals. The goal of gamification is to engage with citizens, consumers, employees and partners to inspire, collaborate, share and interact. Some classic game elements are:



- Points** are used as visual identifiers of progress in sports, reward cards and video games
- Badges** display achievement, whether from service in the military or a gold star on school report card
- Leaderboards** are used across sports, sales teams, and in general life to present competitive placement

The Gamification Platform is a solution that gives the ability to add gamification elements in any web platform in order to enhance user engagement through a reward system. It allows citizens to participate in games that promote reduction of energy waste and other green practices and compete with other members of their community for rewards when completing the actions set by the game designers and exhibiting the desirable behaviour.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

100%

SOCIAL KPIS

- People Reached
- Number of citizens using POCITYF solutions
- Local community involvement in the implementation and planning phase
- Percentage of citizens' participation in online decision-making

ENERGY & ENVIRONMENTAL KPIS

- Energy savings
- Carbon Dioxide Emission Reduction
- Municipal Solid Waste

Already demonstrated in Lighthouse cities N

Cultural heritage compliance Y

COST

Per Gamified Application

Effort required in the Gamification Platform
0.5 person months (estimated)

Effort required in the Gamified Application
0.5-1 person months (estimated)

Annual effort for the moderation
3 person months (estimated)

PERFORMANCE

The Gamification Platform “gamifies” user actions in the connected applications or websites. The connection is established by including a few scripts in the gamified application. The main concepts are explained below:

- **Players:** all the citizens that will use the Gamification Platform and participate in games to get rewards

- **Gamemasters:** the users that will create games by defining what actions are gamified, the awards of the games and their rules
- **Game:** a set of Actions, Awards and Rules defined by a Gamemaster
- **Action:** an action such as clicking a button on a connected app
- **Points:** the simplest type of award; a player can earn points for completing an action
- **Awards:** a player can earn an award for reaching a threshold of points
- **Rule:** a rule set by the Gamemaster defining the necessary action to be done and the corresponding reward

DIMENSION

TIME

City of district level

2 weeks for the connection to an application or website

1 month for the games design

SAFETY

SUSTAINABILITY

GDPR compliant

N/A

KEY REQUIREMENTS

- A web platform or a mobile application is required for the connection with the Gamification Platform.
- The desirable actions must first be identified in order to be gamified and connected to rewards.

ENVISAGED DEMONSTRATION IN POCITYF

The Gamification Platform will be used for fostering the interaction with energy users in the different types of building at the different energy blocks, creating tailored strategies for disseminating information focusing on decreasing energy waste and increasing energy efficiency, promoting challenges and competition based on communities to leverage the impact on energy reduction strategies without compromising comfort levels.

LOCATION

Residential use: The Gamification Platform will be applied in the PEB1 and PEB2, to promote behavioural changes towards energy efficiency (energy savings around 15%), rewarding with tokens citizens that perform better. Moreover, through gamification, the tourist-oriented apps and cultural experiences' market will promote environmental friendly practices and sustainable tourism.

Commercial and industrial use: The Gamification Platform will be deployed in PACT and DECSIS facilities, striving for increases in energy efficiency and energy cost reductions of 7.5%, via end-users' behavioural changes. The platform will be used at the university, together with the campus consumption data, to boost the competition between different buildings and departments that will be explored, and, of course, between students.

Cultural use: Municipal old buildings of PEB1 will also be endowed with the gamification platform, to induce sustainable behavior changes in its users - especially buildings with HVAC and a significant number of tenants.

TIMELINE

September 2022 (M36)



DETAILS

The users will be able to see their earned rewards and how they compare against other users in the games they participate in.

The game designers will be able to see statistics about how the users engage with their platform and adjust their strategies as necessary or reuse successful strategies.

TARGETED OUTPUT

Promote the use of the platforms in the POCITYF ecosystem and through that to foster interaction with energy users in the different types of buildings at the different energy blocks, creating tailored strategies for disseminating information focusing on decreasing energy waste and increasing EE, promoting challenges and competition based on communities to leverage the impact on energy reduction strategies without compromising comfort levels.

IMPACT ON COMMUNITY

The platform will increase citizen engagement, foster the interaction between citizens and promote behavioural changes towards sustainable solutions.



DESCRIPTION

The Tourist APP will be implemented through a responsive website that works on, both, computers and mobile phones, addressing, therefore, the requirement established by CME and other entities of not requiring users to install new software on their machines. The Tourist APP will provide three main types of outputs to its users, namely: a) pre-established touristic circuits; b) list of monuments that can be included in each circuit; and c) creation of optimized circuits.

The monuments list can have static information (e.g., visiting hours, average visiting time, information about the monuments) or dynamic information (e.g., waiting time, occupancy rates). Regarding the pre-established circuits, this output presents a list with different circuits and shows the duration and difficulty of each one as well as the monuments included in each circuit. The creation of optimized circuits offers the visitors the possibility to create their own circuits, choosing the monuments that they want to visit, the start and end location and if the circuit is simple or optimized. If it is simple, the visiting sequence will consider the order that the tourist as selected the monuments to visit and the duration will not be optimized. On the other hand, in the case of the optimized circuit, an optimization algorithm will be applied to present the tourist a circuit considering the waiting time and the average visiting time on each monument and distance between monuments or the occupancy of each monument in order to maximize the tourist experience.

INDICATORS

POTENTIAL DEGREE OF USEFULNESS

Context dependent

Already demonstrated in Lighthouse cities No

Cultural heritage compliance Yes

PERFORMANCE

Predefined routes recommendations
Cultural routes optimisation

COST

To be defined

DIMENSION

Software solution that can be applied at city level

TIME

Real-time operation

SAFETY

GDPR compliant

SUSTAINABILITY

Promotes sustainable tourism

KEY REQUIREMENTS

In order to implement the Tourist APP the following data should be available:

- Real time number of visitors at each monument;
- Maximum capacity of each monument;
- Number of visitors waiting to enter at each monument;
- Average visiting time at each monument.

ENVISAGED DEMONSTRATION IN POCITYF

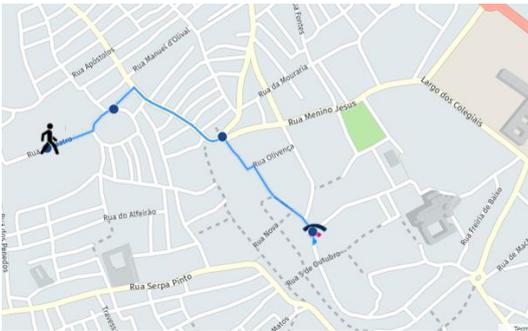


DETAILS

The Tourist APP presents users with a walk circuit from the point where they are to the monument they want to visit or the route they want to do. (Ex. Almada - UNINOVA to Évora - Casa Nobre e Ruínas da Rua de Burgos). The route presents the total distance and time and share some indications to walk through the route.

LOCATION

The Tourist APP considers the PEBs location as well as other monuments of EVORA city.



TARGET OUTPUT

Tourists, Heritage/monuments managers, municipality of Évora.

IMPACT ON COMMUNITY

The Tourist APP, that will be used directly by citizens and tourists, will increase the awareness of cultural buildings and important places of Evora city. With the use of the Tourist APP by citizens and tourists the cultural agents will be able to promote and publicise its monuments as well as promote hidden places in the city. Additionally, Tourist APP will improve the touristic experience and increase the number of visited monuments per tourist considering the respective preferences.

CULTURAL HERITAGE BUILDINGS COMPLIANT

The Tourist APP refers to a software solution with no negative impact on cultural heritage.

OTHER COMMENTS - OPEN CONSIDERATIONS

The Tourist APP aims to improve tourists' experience by reducing waiting times at monuments while reducing the number of visitors per monument.