



# asti

forecAsting  
System  
for urban  
heaT Island  
effect

## “After-LIFE plan” (LIFE ASTI)

Action F.3 After – LIFE plan

Athens August 2022



The project Implementation of a forecAsting System for urban heat Island effect for the development of urban adaptation strategies - LIFE ASTI has received funding from the LIFE Programme of the European Union”.

[www.lifeasti.eu](http://www.lifeasti.eu)

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## **Executive Summary**

The LIFE ASTI project focuses on addressing the impact of Urban Heat Island (UHI) effect on human mortality, by developing and evaluating a pilot system of numerical models that will result to the short-term forecasting and future projection of the UHI phenomenon initially in two Mediterranean cities: Thessaloniki (Greece) and Rome (Italy). Also the city of Heraklion, the municipality of Pavlos Melas (Greece) and the city of Civitavecchia (Italy) were added as replication cities during the implementation of the project.

This document addresses the After – LIFE plan (action F.3), which is expected to secure the sustainability of the LIFE ASTI deliverables, the continuation of the communication and dissemination of the project results after its end and the high After- LIFE project exploitation.

# I The LIFE ASTI Project – An Overview

## i. Context

The UHI phenomenon has an impact on human health, which is going to intensify as the frequency and the duration of the heat wave episodes is expected to increase due to climate change. The rate of urbanisation has become alarming in recent years: almost 73% of Europe's population lives in cities, a figure which is expected to reach 80% by 2050. Extensive urbanisation is triggering significant changes to the composition of the atmosphere and the soil, resulting in the modification of the thermal climate and the temperature rise in urban areas, compared to neighbouring non-urban ones.

The modeling system, which was developed in the framework of the LIFE ASTI project, produces high-quality forecasting products, such as bioclimatic indicators, heating and cooling degree days, assessing the energy needs of buildings. In addition, it guides the Heat Health Warning System **was implemented** in both cities and aims at informing the competent authorities, the general population and the scientific community.



**Areas of Implementation:** Thessaloniki (Greece), Rome (Italy)

**Replication Cities:** Heraklion & Pavlos Melas (Greece),  
Civitavecchia (Italy)

**Budget:** 1,251,695 Euro (58.87% EC Co-Funded)

**Duration:** 48 Months

**Start Date:** 01/09/2018

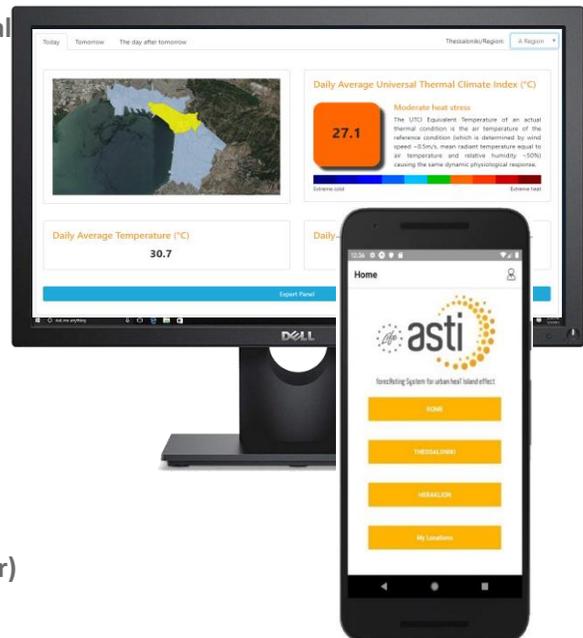
**End Date:** 31/08/2022

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**Useful Links:** <https://lifeasti.eu/> &

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## ii. Objectives

**LIFE ASTI** objectives promote the EU policies for “Climate Action” and also have a high impact in many fields of other EU policies. First of all, they contribute directly to the improvement of EU citizen’s quality of life, favoring this way the “Regional Policy” for regions and cities in the European Union. Secondly, they help to deliver “Research and Innovation” policy objectives, as one of the primary project’s targets is the open access dissemination of scientific results by sharing all available knowledge with regional/local authorities and the general public.

The specific objectives of LIFE ASTI project are:

- To **design, implement, pilot and validate a set of UHI forecasting systems** in **Thessaloniki and Rome**, based on **state-of-the-art numerical models**. These modeling systems will provide stakeholders with several UHI-related, high-resolution forecasting products, including thermal bioclimate indices, as well as Heating and Cooling Degree Days to estimate the energy demand of buildings. Furthermore, they will drive the Heat Health Warning Systems that will be developed and operationally tested in both cities, helping the local authorities to react appropriately to extreme events.
- To establish dissemination tools and allow **open access to UHI-related information and products** to the end-users with Information and Communication Technology (ICT) applications. These tools will help the concerned authorities and the general public to fill the knowledge gap on local climate vulnerabilities and risks
- To assess the impact of future **climate change scenarios** on **UHI** for the two selected cities.
- To **evaluate the impact** of promoting green activities (e.g., green roofs, ventilation areas, etc.) in urban areas to combat the UHI effect using the developed modeling systems for the two selected cities.
- To develop **good practice guides** and efficient **strategic plans** for mitigating future UHI effects in the involved cities, as well as in other EU urban areas which face the same UHI adverse impacts.
- To **raise awareness** and encourage authorities to apply the above urban adaptation strategies and mitigation initiatives. This will contribute and support the Signatories’ commitment to initiatives “Mayors Adapt” and “Covenant of Mayors”.
- To organize events to **promote, replicate and transfer** the designed modeling systems and the best urban adaptation strategies to other European cities that face the same climate issues arising from UHI effect. . As a results of the promotional actions, the cities of Heraklion in Crete, of Pavlos Melas in Central Macedonia and of Civitavecchia in the Lazio Region were areas where the LIFE ASTI forecasting platform was replicated during the implementation period of the project.

The above mentioned objectives lead to a substantial contribution to the overall aim of the **EU Adaptation Strategy** by developing policies for a better adaptation to UHI impacts, especially during summer heat waves, reducing the heat wave risk in metropolitan areas by introducing heat prevention services, and better-implementing energy efficiency guidelines in European cities.

It is worth noting that the two Mediterranean cities were chosen to give a representative geographical coverage, to reflect different environmental conditions and support one of the major EU policy priorities for joint forces and transnational cooperation.

The combination of socio-economic, environmental indicators, with additional more context-specific considerations allows the replicability and transfer of the results, knowledge and best practices. As a result, other urban as well as rural areas can adapt and implement this project in their local context and increase their resilience to heat waves and other climate-related impacts.

### **iii. Project Results**

The information provided by **LIFE ASTI** contains high resolution UHI-related forecasting products, including thermal bioclimatic indices and Heating/Cooling Degree Days (HDD/CDD) to estimate the energy demand of buildings, as well as heat health warnings in each involved city. This kind of information allows environmental protection, the prevention of heat-related deaths and sustainable urban development, in accordance with the LIFE Regulation (Regulation (EU) No. 1293/2013) and the objectives of EU Commission Communication EU Strategy on adaptation to climate change (COM/2013/0216). Furthermore, the distribution of the information mentioned above is provided through open access ICT tools anticipating the implementation of EU Directive 2003/4/EC on public access to environmental information

Therefore, the LIFE ASTI project resulted both in short term and in long term adaptation tools but also contributes significantly to the EU adaptation strategy.

#### **A. Short – Term Adaptation Tools**

- a. Pilot UHI forecasting systems in five cities (Thessaloniki, Rome, Heraklion, Pavlos Melas (municipality) and Civitavecchia) providing high-resolution (250 m) UHI-related products, including thermal bioclimate indices and Heating/Cooling Degree Days (HDD/CDD).
- b. Heat Health Warning systems providing differential alerts within each involved city and the potential effects on health at high spatiotemporal resolution (at district level for each city).
- c. A web-based open access portal and a mobile application to disseminate the above-mentioned forecasting products to authorities, stakeholders and the general public.
- d. A concrete replicability and transferability plan (LARG) that will support the potential of LIFE ASTI results to be utilized by authorities and stakeholders of other regions in Europe.

The integration of UHI and HHW forecasting alerts in extreme heat conditions, identifying UHI hotspots where the application of soft adaptation (e.g. air-conditioned rooms) measures are prioritized. The pilot application of the systems lead to the following in Thessaloniki, Rome and Heraklion (first replication city):

- increase of local/regional adaptation initiatives
- increase resilience to heat
- reduction of heat attributable deaths
- improved quality of life support

## **B. Long-term adaptation tools and contribution to EU adaptation strategy**

- a. Assessment of the impact of future climate change scenarios on UHI,
- b. Sensitivity studies for assessing the impact of adaptation strategies (e.g., green infrastructure)

These assessments led to the construction of:

- c. UHI Adaptation Actions Plans Portfolios for each city
- d. Good Practice Guidebook for combating UHI and increasing resilience to heat

The actions plans, and guides further contribute to the development of:

- Sustainable Energy and Climate Action Plans (SECAPs) under the new Covenant of Mayors (2030) in both cities
- Regional Adaptation Actions Plans in both cities
- Actions in the framework of 100 resilient cities initiative in Thessaloniki contributing this way to: **improved thermal bioclimate conditions in the areas applied**
- Actions in the framework **“Thessaloniki – Climate Neutral and Smart Cities by 2030”**

Additionally, communication and dissemination actions:

- raise awareness of the general public,
- increase knowledge, skills and competences of policy makers
- contribute to the research of the scientific community

The system has also been replicated and transferred to the municipalities of Pavlos Melas (Greece) and Civitavecchia (Italy) during the last months of the project. The pilot application of the systems and the long term adaptation tools for these municipalities will be evaluated during the AFTER LIFE period of the LIFE ASTI project.

### **i. Target audience and stakeholders**

**LIFE ASTI's** ultimate goal is to assure a diverse and integrated participation of audiences and stakeholders, that will not only provide to them with new knowledge and tools, but will also fuel the outcomes of the project with wider perspectives from different sectors contributing to its evolution and sustainability.

Therefore target groups and end users were carefully selected to represent the main interest groups that would benefit from but also are willing to valorise the results of the LIFE ASTI project.

With regard to the objectives of the after-LIFE period, which are the continued utilization and further development of project's tools and services and the dissemination of LIFE ASTI results after its closure, the following target groups are considered most important. Also, based on the engagement strategy designed for the project, these target groups were divided into two categories: stakeholders and main target audience.

## Stakeholders:

- Local/regional authorities & Health and Environmental authorities: policy-making entities (such as Decentralized Administration of Macedonia and Thrace, Major Development Agency Thessaloniki, Municipality of Thessaloniki, Municipality of Heraklion, Central Union of Greek Municipalities, ARPA Emilia Romagna, ARPA Lazio, ARPA Toscana, Comune di Roma, Ministero Salute, Regione Lazio) requesting new governance tools as a driver for combating UHI effect and its adverse impacts, especially during extreme heat wave events and new choices for effective adaptation plans and mitigation strategies. Within project's partnership there are two (2) such entities: a) **Municipality of Thessaloniki (MoT)** as the primary public stakeholder representing the local authority for the city of Thessaloniki (Greece) and b) **Department of Epidemiology of Azienda Sanitaria Locale Roma 1 (DEASL)**, the national center of the National Civil Protection Agency for prevention of health effects related to heat waves in Italy. Moreover, MoT and DEASL contributed directly to project's objectives at various levels, including consultation for determining their actual needs for credible UHI and heat health-related information and collaboration for developing **good practice guides and strategic adaptation and mitigation plans** that target not only their government regions, but also other provinces in Greece, Italy and other European countries. c) **Municipality of Athens** via its **Chief Heat Officer Eleni Myrivili** who participated and also made a presentation in LIFE ASTI'S Final Conference
- Media: such as the TV channels ERT3, TV100, Makedonia TV and the radio station FM100.
- Sectors of Civil Protection: such as Department of Civil Protection/Municipality of Thessaloniki, Directorate for Civil Protection/Region of Central Macedonia, Departments/Offices of Civil Protection of adjacent municipalities, e.g. Municipality of Kalamaria, Protezione Civile, Municipality of Pavlos Melas etc.
- Medical community, requesting more extensive data on UHI, thermal bioclimate and heat health warnings: city hospitals, Medical Association of Thessaloniki, Municipal Clinics, ACP, Azienda Sanitaria Locale Roma 1-6, CNR IFC.
- Municipal Open Care Centers for the Elderly.
- Tourism sector, interested in improvements in human comfort in the cities involved to attract more tourists: Hellenic Hoteliers Federation, Tourist Guides Association of Thessaloniki and Northern Greece, Greek Tourism Confederation, Federation of Hellenic Associations of Travel & Tourist Agencies, Italian Federation of Travel & Tourism Associations (FIAVET).
- Education Sector: Directorates of Secondary Education of Thessaloniki, Directorates of Elementary Education of Thessaloniki, private schools, Institutes of Vocational Training, Liceo Farnesina, Liceo Keplero Centrale.
- Energy Sector: interested in monitoring and optimizing electricity production via valorization of the outcomes of the project concerning Heating & Cooling Degree Days (HDD/CDD)
- EU Key Stakeholder: Climate-kic, Agency for Sustainable Mediterranean Cities and Territories, Regional Agency for Environment Protection in Emilia-Romagna, ICLEI Europe, Centre For Renewable Energy Sources and Saving (CRES), DLR-Earth Observation Centre, European Space Agency.

### **Main target audience:**

- Local NGOs: that promote public participation in several projects and integrate sustainable principles in their framework: Hellenic Rescue Team, Volunteers Samaritans, Rescuers and Lifeguards Corp, Doctors of the World / Médecins du Monde – Greece.
- Civil society: Environmental associations, alternative sports activities in the city, urban sustainable mobility, cultural and athletic associations.
- Student groups with emphasis on environmental actions.
- Concerned citizens who have formed civil movements to improve urban living conditions.
- Green projects in the city: Urwatair, Commons in Residency, Thessaloniki Allios.
- Scientific community requesting more data to identify and reduce environmental and health impacts: Researchers, universities, academia: CREA, Carlo Bo University, Urbino - DiSPeA Department, ISPRA, Università Roma 2, Università Roma 3, IBIMET CNR Climate Services, Foundation for Research and Technology Hellas (FORTH), National Observatory of Athens, TNO (Netherlands Organisation for Applied Scientific Research).
- General public, interested in easy to understand UHI and health protection information.
- Other (e.g. private sector: ECOTEN Urban Comfort, Serco Italia s.r.l., Servizi Territorio srl), VITO.

Appropriately-chosen Key Stakeholders were not only informed and actively involved but also their well-operating communication and dissemination networks were utilized to further contact and engage bigger part of the local communities. The following list includes such Key Stakeholders:

- All Civil Protection Agencies: Decentralized Administration of Macedonia and Thrace, Administrative Region of Central Macedonia, Municipality of Thessaloniki, Protezione Civile.
- Central Union of Greek Municipalities.
- Ministero Salute
- Comune di Roma
- Regione Lazio
- ASL Roma
- All cities' hospitals.
- Thessaloniki Municipal Clinics.
- Hellenic Hoteliers Federation
- CIVINET Greece-Cyprus, to link ASTI to urban sustainable mobility.
- Callisto, an environmental entity protecting wildlife with a very active network.
- AUTH environmental group, to target university students.
- "Initiative for Alexandrou Svolou neighbourhood", to target local civil movements.
- Greek Climbers of Thessaloniki, to target local sports and fitness groups.

A complete register including target audiences along with their contact details has already elaborated, with approximately 700 entities and will be utilized also during the AFTE LIFE period of the project. The

overall dissemination and communication activities of the project will be continued uninterrupted over the next five years. The project website and social media will be continuously updated throughout this period, while the notice boards will remain erected. The very successful networking activities, both with projects and selected events, will be supported, by the respective contact partners, and new opportunities for collaborations will be sought to boost the use of the projects outcomes in other contexts. Regarding also scientific dissemination, publications will continue and all partners will pursue relevant workshops/conferences.

**Main impacts of communication and dissemination activities:**

- **LIFE ASTI webpage:** 22.350 users and 45.625 visits on the web pages.
- **LIFE ASTI twitter:** 131 followers and more than 290 tweets published
- **LIFE ASTI YouTube:** 41 followers
- **LIFE ASTI facebook:** 272 followers
- LIFE ASTI **has reached more than 5.280 people** through the social media
- Dissemination of the project in **at least 65 different local media**
- Networking with **more than 45 European projects**
- **Around 190 people** have participated in the local seminars and local working tables
- **More than 700 persons** have attended the different events where the project has been presented

## II Assessment of LIFE ASTI

Overall **LIFE ASTI** has achieved the main objectives and activities planned. At the end of the project it is interesting to make a review of the successes of the project, the problems encountered, as well as to look to the future analysing opportunities and threads. The following table offers the results of the LIFE ASTI diagnosis at the end of the action, which is very useful to realize the potentialities and obstacles for replicating and transferring the project's outcomes.

### ii. SWOT analysis of LIFE ASTI project

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• Rich partnership that facilitates addressing the UHI phenomenon and the climate change adaptation</li> <li>• Utilization of state-of-the-art expertise of the partners</li> <li>• Spatial Resolution of the provided services</li> <li>• User friendly dissemination of information and easy to understand by non experts</li> <li>• Free mobile application for all</li> <li>• Exploitation and valorization of open data</li> <li>• Exploitation of FOSS technologies &amp; open standards</li> <li>• Open access, open innovation, open standards</li> <li>• Competitive advantage due to relative low product price (due to open data &amp; FOSS software)</li> <li>• High quality technical support and AFTER LIFE support</li> <li>• Effective &amp; wider knowledge dissemination, raising awareness</li> <li>• The diverse training courses offered have increased knowledge, a necessary step to promote action.</li> </ul>	<ul style="list-style-type: none"> <li>• Access to web services should not be taken for granted</li> <li>• Familiarity of local and regional authorities with ICT technologies should not be taken for granted</li> <li>• Models should be calibrated and tested for other regions</li> <li>• Due to COVID restrictions less people than initially planned were allowed to participate in the training sessions and local working tables</li> </ul>
Opportunities	Threads
<ul style="list-style-type: none"> <li>• Due to the global climate change crisis Cities and economic sectors are already aware and active on climate change issues and seek for solutions like LIFE ASTI</li> <li>• European Mission Climate-Neutral and Smart Cities</li> </ul>	<ul style="list-style-type: none"> <li>• Longlasting procedures of authorities for planning and implementing adaptation and mitigation strategies</li> <li>• Given the high demand for relative data and services, this market segment will attract several competitors in a very short time</li> <li>• Longlasting procedures of authorities for procurements</li> </ul>

#### iv. Lessons Learned

During the implementation of the project there were several learned (Figure 1) that can support further action on LIFE ASTI during also the LIFE ASTI period.



Figure 1 Lessons Learned for LIFE ASTI

**Project management and dissemination** actions has seen a large shift since the pandemic **COVID 19** hit. This necessitated our consortium to adopt project management and team communication tools that enabled the seamless and uninterrupted continuation and communication of the project.

Moreover, the COVID-19 pandemic has disrupted gatherings and added further travel restrictions, which led the consortium to adapting its communication and dissemination strategy respectively, in order to ensure the highest possible impact under the given circumstances.

Last but not least, the consortium had to reschedule and replan the training sessions and the local working tables, which where and still are critical parts of the capacity building of the project but also of the replicability and transferability action plan. Besides the when and where, also the means utilized for the implementation of these activities had to be adapted accordingly in order to provide quality and effective training and knowledge transfer, since the face-to-face interactions were not taken for granted.

### III Foreseen Activities for the After- LIFE

Main aim of the project team was that the principal outcomes of the project, the LIFE ASTI forecasting system, will be uptaken by the potential end-users. Therefore, a great deal of effort was devoted in preparing the ground for the After-LIFE period by the project end, so as to enable and to promote the replication of the solution with the minimum additional efforts during the After-LIFE period.

Project LIFE ASTI mainly addresses the EU policy priorities of “Climate Change Adaptation” and “Climate Change Mitigation” by empowering the capacity of local/regional authorities and stakeholders to combat the adverse impacts of Urban Heat Island (UHI) effect in metropolitan areas.

LIFE ASTI partnership recognized from the beginning of the project that the successful contribution to these EU priorities requires long-term implementation strategies and sustainable planning. Therefore, the implementation methodology of LIFE ASTI was built-up on the orientation of continuation and valorisation of project’s outcomes after the end of it. This includes activities that allow the continued utilization and further development of project’s tools and services and the dissemination of LIFE ASTI results after its closure.

More specifically, the following activities, related to project’s Actions, are scheduled to be carried out after the completion of the project:

1. **Maintenance, management, and monitoring of the operational modeling systems of UHI forecasting.**  
Related to Action C.2: Pilot operation of the UHI forecasting systems.  
Responsible partners: **AUTH**
2. **Maintenance, management, and monitoring of the operational heat health warning systems.**  
Related to Action C.6: Development and pilot operation of heat health warning systems  
Responsible partners: **DEASL**
3. **Evaluation and optimization of the operational modeling systems of UHI forecasting, as well as of the heat health warning systems.**  
Related to Action C.3: Evaluation, optimization, and validation of the pilot operational systems of UHI forecasting and Action C.6: Development and pilot operation of heat health warning systems  
Responsible partners: **AUTH, ISAC-CNR, and DEASL**
4. **Maintenance, update, and monitoring of project’s website, mobile application and social media channels.**  
Related to Action E.1: General audience communication and dissemination activities – Community engagement – Production of publicity material and Action E.4: Public relations  
Responsible partner **SYMPRAXIS** in close cooperation with **GET, AUTH, ISAC-CNR, MoT, and DEASL**
5. **Production and presentation of new scientific findings concerning the UHI effect based on the ongoing operational use of the forecasting systems.**

Related to Action E.2: Policy-makers and experts engagement and interaction activities - Responsible partners: **DEASL, AUTH, and ISAC-CNR. GET, MoT and SYMPRAXIS** will also contribute

6. **Maintenance of collaboration network and support for policy development.**

Related to Action C.5: Development of good practice guides and strategic adaptation and mitigation plans and Action C.8: Replicability and transferability as well as to all E Actions - Communication and dissemination Actions

Responsible partners: **All LIFE ASTI partners**

7. **Assessment and monitoring of the LIFE ASTI actions' impacts.**

Related to all D Actions - Monitoring of the impact of the project Actions

Responsible partners: **SYMPRAXIS, ISAC-CNR, and DEASL**

**i. Identification of Resources Needed for the Foreseen Activities**

**1-2. Maintenance, management, and monitoring of the operational modeling systems of UHI forecasting & Maintenance, management, and monitoring of the operational heat health warning systems**

The two first activities is primarily a responsibility of **AUTH** and **DEASL** respectively, who are responsible to maintain the models and keep them operational for at least the next 5 years.

Moreover, MoT and DEASL are responsible to valorise the everyday feedback of the UHI forecasting system and the heat health warning system into their strategic and operational plans.

**MoT**, according to its Strategic and Operational Plan for the years 2020 – 2023, has already incorporated these short-term adaptation tools to its operational planning, especially for contingency preparation and civil protection and will also include them in their Action Plan for achieving climate neutrality by 2030.

The Strategic and Operational Plan of the Municipality of Thessaloniki for the years 2020 – 2023 (SOP) is a Local Policy Instrument (LPI). These are the years that the current political administration governs the municipality. Local administrations in Greece are obliged to have an operational plan. This came into force in 2014. Hence, our first operational plan was about the period 2014-2019 (it was for 5 years) while our 2nd OP is about the years 2020-2023 (4 years).

This type of plans is developed inhouse, by the appropriate unit, in this case the Dpt. of Operational Planning and Monitoring of Development Programmes. The MoT's OP has 4 Pillars:

- Pillar 1: Environment and Quality of life
- Pillar 2: Society – Health – Education – Culture – Sports
- Pillar 3: Local Economy and Employment
- Pillar 4: Administrative Capacity and Internal Development of the Municipality of Thessaloniki (Figure below)

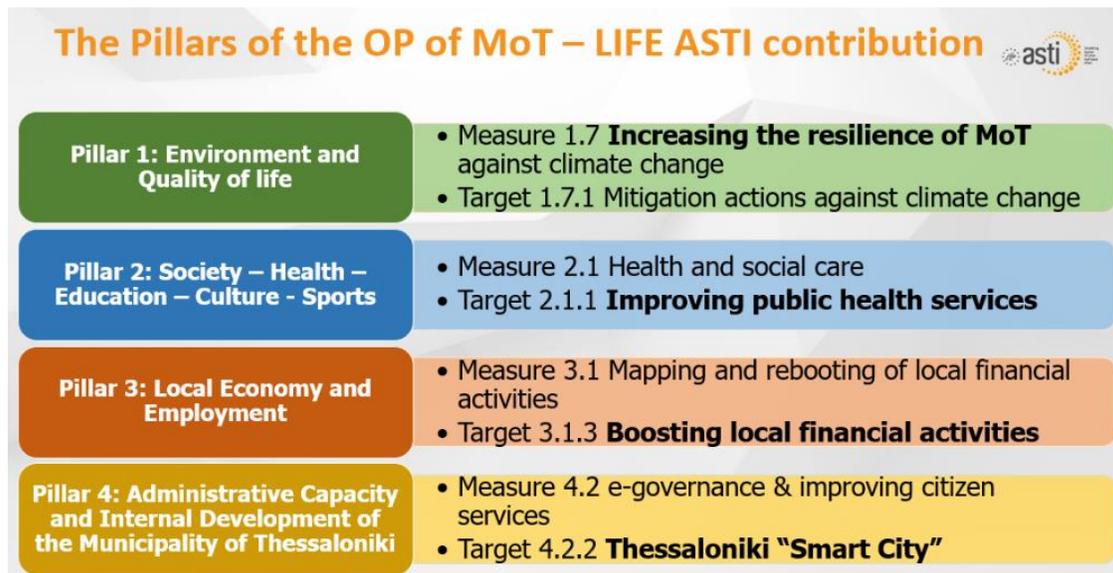


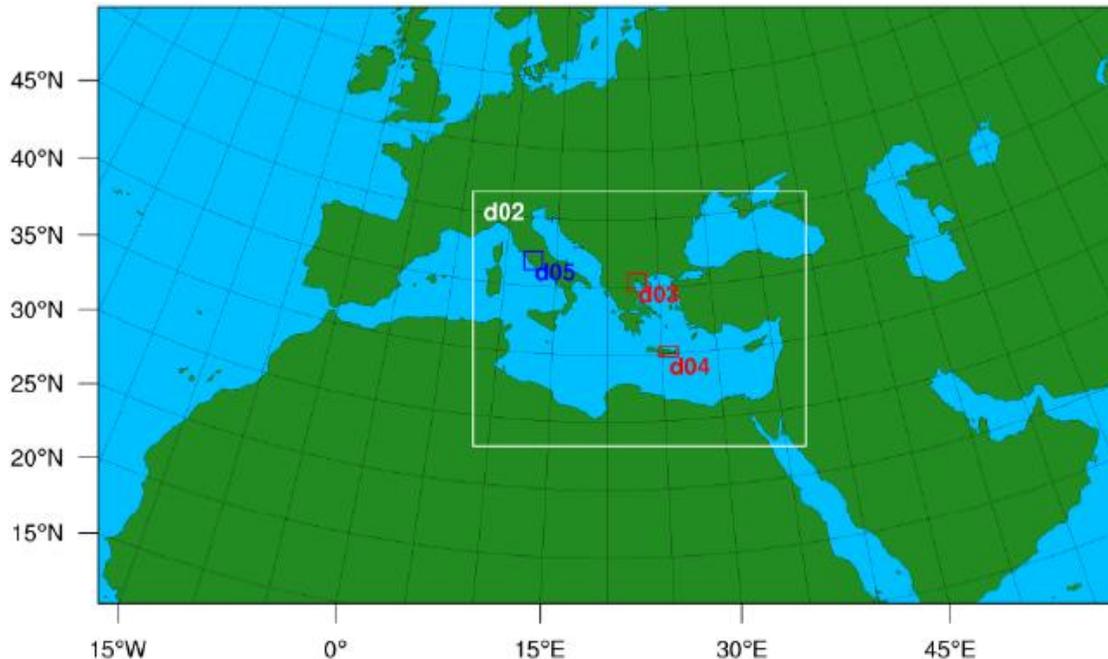
Figure 2: The LIFE ASTIS's contribution to the 4 Pillars of the OP of the Municipality of Thessaloniki

DEASL already operates a Heat Health Warning system over Rome, with the integrated (UHI-forecasting) component that was added during LIFE ASTI project. ISAC-CNR, and GET will also have a significant contribution by participating to the support and training of the staff of MoT, DEP LAZIO, Heraklion, Pavlos Melas and Civitavecchia through the organization of courses and seminars, similar to those that were organized in the framework of Action E.2.

It is important to emphasize that the whole implementation routine, including initialization of the models, operation, and post-processing procedures as well as management and visualization of the UHI forecasting products and heat health warnings, is fully automated and will be employed in the same – existing and purchased – computational and storage infrastructure as during the LIFE ASTI project. In this way, limited human effort is expected for monitoring, on a regular basis, the system operation.

Businesswise, it is in the interest of all partners to maintain the operational modeling systems of UHI forecasting and the operational heat health warning systems created during the project's duration for the 3 different domains. Each municipality that falls within these domain areas is a potential replicability case with minimum effort concerning at least the preparation of input data (AUTH) and then the modification of the operational system. Moreover, the scalable n-tier and modular modeling architecture ensures easy expandability of the system by expansion of the infrastructural computational and storage resources.

The financial needs of these tasks will be covered by own contribution of the organizations. Part of the cost could to be covered by future signed replicability contracts.



*Figure 3 Already Operating Domains for the LIFE ASTI UHI forecasting operational modeling systems and the operational heat health warning systems*

### **3. Evaluation and optimization of the operational modeling systems of UHI forecasting, as well as of the heat health warning systems**

The third activity is a responsibility of **AUTH, ISAC-CNR, and DEASL**. Newest model versions will be applied to the UHI forecasting systems, and the same methodology will be followed as in Action C.3 to evaluate and update the performance of the models. Up-to-date methods will also be used for the evaluation and optimization of the heat health warning system. Research staff from AUTH, DEASL and ISAC-CNR will undertake this activity. The financial needs will be covered by own contribution of the organizations. Part of the cost could to be covered by future signed replicability contracts.

### **4. Maintenance, update, and monitoring of project's website, mobile application and social media channels**

The fourth activity is primarily a responsibility of **SYMPRAXIS** who is responsible for the site and the communication strategy, in close cooperation with **GET** who is responsible for the mobile application. **AUTH, ISAC-CNR, MoT, SYMPRAXIS, and DEASL** will also contribute by providing potentially additional material and information. The UHI-forecasted products, the heat health warning alerts, the project's deliverables and dissemination material will be available on the LIFE ASTI website and will also be distributed to social media to address all project's target groups and stakeholders, as well as the new extended audience. The forecasting results will also be available on the mobile application. Possible financial needs for technical and human resource needs will be covered by own budget for all partners. For the web and mobile application cost, the adoption of the Google AdWords model could be considered in order to create a revenue that can cover the operational cost of both platforms.

#### **5. Production and presentation of new scientific findings concerning the UHI effect based on the ongoing operational use of the forecasting systems**

The fifth activity is primarily a responsibility of **DEASL, AUTH, and ISAC-CNR**, but **GET, MoT and SYMPRAXIS will also contribute**. As in Action E.2, the dissemination of this material will address targeted scientific conferences and journals. The data and outcomes of the project will be analyzed, utilizing the same LIFE ASTI computational infrastructure, in order to investigate the production of new scientific findings. The human resource, travel, and publications costs, as well as registration fees, will be covered by beneficiaries' own contribution.

#### **6. Maintenance of collaboration network and support for policy development**

The sixth activity is a responsibility of **all LIFE ASTI partners**. This ongoing activity includes the continuation of communication with authorities, stakeholders, other EU relevant projects and EU officials that have been targeted during LIFE ASTI as well as the approach of new through the dissemination of policy and best practice guides and through meetings and events where project's beneficiaries will participate. Related costs, such as utilities, travel expenses, etc. will be covered by own contribution of project's partners.

#### **7. Assessment and monitoring of the LIFE ASTI actions' impacts**

The seventh activity will be a responsibility of **SYMPRAXIS, ISAC-CNR, and DEASL**. The same methodological framework will be utilized to monitor the implementation of the above-described activities after the end of the project, to determine their effectiveness and potentially to revise the strategic goals and objectives. This activity includes the conduction of two Project Performance Reports 2 and 5 years after the completion of LIFE ASTI respectively. Human resources financial needs will be covered by own contribution of the involved partners.

Table 1 Table of Foreseen Activities

Foreseen Activities	Leading Partners	Other Partners	Related Actions	Actions	Sources of finance	Targets
1. Maintenance, management, and monitoring of the operational modeling systems of UHI forecasting	AUTH	DEASL, MoT, ISAC-CNR & GET	C2	<p>Maintain the computational infrastructure (AUTH)</p> <p>UHI forecasting models operating on daily basis (AUTH)</p> <p>LIFE ASTI Web Platform presenting correctly the daily results (GET)</p> <p>Mobile app presenting correctly the daily results (GET)</p> <p>Monitor the results and include them in their strategic and operational plans (DEASL &amp; MoT)</p> <p>Support and train the staff of Heraklion, Pavlos Melas and Civitavecchia through the organization of courses and seminars. (DEASL, AUTH, MoT, ISAC-CNR &amp; GET)</p> <p>Provide training to new replicability cities (DEASL, AUTH, MoT, ISAC-CNR &amp; GET)</p>	<p>Own budget for all partners.</p> <p>All partners related guarantee that will provide the human and technical resources.</p> <p>Part of the cost could to be covered by future replicability contracts signed.</p>	<p>To provide uninterruptedly the operational modeling systems of UHI forecasting for the cities of Thessaloniki, Rome, Heraklion, Pavlos Melas &amp; Civitavecchia for at least 5 years after the completion of the project.</p> <p>To sing a contract with these cities for the continuation of the service after these 5 years.</p>
2. Maintenance, management, and monitoring of the	DEASL	AUTH, MoT, ISAC-CNR & GET	C6	<p>Maintain the computational infrastructure (AUTH)</p>	<p>Own budget for all partners.</p> <p>All partners related guarantee that will</p>	<p>To provide uninterruptedly the operational heat health warning</p>

Foreseen Activities	Leading Partners	Other Partners	Related Actions	Actions	Sources of finance	Targets
operational heat health warning systems				<p>Heat Health Warning operating on daily basis (AUTH)</p> <p>LIFE ASTI Web Platform presenting correctly the daily results (GET)</p> <p>Mobile app presenting correctly the daily results (GET)</p> <p>Monitor the results and include them in their strategic and operational plans (DEASL &amp; MoT)</p> <p>Support and train the staff of Heraklion, Pavlos Melas and Civitavecchia through the organization of courses and seminars (DEASL, AUTH, MoT, ISAC-CNR &amp; GET)</p> <p>Provide training to new replicability cities (DEASL, AUTH, MoT, ISAC-CNR &amp; GET)</p>	<p>provide the human and technical resources. Part of the cost could be covered by future replicability contracts signed.</p>	<p>systems for the cities of Thessaloniki, Rome, Heraklion, Pavlos Melas &amp; Civitavecchia for at least 5 years after the completion of the project.</p> <p>To sing a contract with these cities for the continuation of the service after these 5 years.</p>
3. Evaluation and optimization of the operational modeling systems of UHI forecasting, as well as	AUTH	ISAC-CNR & DEASL	C3 & C6	<p>To follow and implement state of the art and up-to-date developments and methods for the evaluation and optimization of both the operational modeling systems of UHI and the heat health warning systems. The</p>	<p>Research staff from AUTH, DEASL and ISAC-CNR will undertake this activity on the same LIFE ASTI computational infrastructure, and the financial needs will be covered by own</p>	<p>To provide state-of the art, reliable and continuously improved services.</p>

Foreseen Activities	Leading Partners	Other Partners	Related Actions	Actions	Sources of finance	Targets
of the heat health warning systems				evaluation should take place every 2 years concluding to evaluation reports and recommended actions for the optimization of the models (AUTH, ISAC-CNR & DEASL).	contribution of the organizations	
<b>4. Maintenance, update, and monitoring of project's website, mobile application and social media channels</b>	SYMPRAXIS & GET	AUTH, ISAC-CNR, MoT & DEASL	E1 & E4	Maintain the project's website (SYMPRAXIS) Updating the website with recent and relevant material (SYMPRAXIS) Selected project material will be available through the website (SYMPRAXIS) Upon occasion selected project material will be distributed to social media to address all project's target groups and stakeholders, as well as the new extended audience (ALL) The forecasting results for all involved cities – including replicability cities - will also be available on the mobile application. (GET)	Possible financial needs for technical and human resource needs will be covered by own budget for all partners. All partners related guarantee that will provide the human and technical resources. Part of the cost could to be covered by future replicability contracts signed. The addition of advertisements could be considered in order to cover the operational cost of the web site.	Active and updated website for at least 5 years after the completion of the project. Active and operational mobile app for all cities involved, even during the AFTER LIFE period.

Foreseen Activities	Leading Partners	Other Partners	Related Actions	Actions	Sources of finance	Targets
5. <b>Production and presentation of new scientific findings concerning the UHI effect based on the ongoing operational use of the forecasting systems</b>	DEASL, AUTH & ISAC-CNR	GET, MoT & SYMPRAXIS	E2	<p>The data and outcomes of the project will be analyzed, using the same LIFE ASTI computational infrastructure, in order to investigate the production of new scientific findings. (DEASL, AUTH &amp; ISAC-CNR)</p> <p>Make publications and presentations based on the new scientific findings, if any. (ALL INVOLVED)</p>	The human resource, travel, and publications costs, as well as registration fees, will be covered by beneficiaries' own contribution.	Make 2 publications or presentations in conferences based on the new scientific findings, if any.

Foreseen Activities	Leading Partners	Other Partners	Related Actions	Actions	Sources of finance	Targets
6. Maintenance of collaboration network and support for policy development	All LIFE ASTI partners		C5 , C7 , E1, E2, E3 & E4	This ongoing activity includes the continuation of communication with authorities, stakeholders, other EU relevant projects and EU officials that have been targeted during LIFE ASTI as well as the approach of new through the dissemination of policy and best practice guides and through meetings and events where project's beneficiaries will participate. (ALL)	Related costs, such as utilities, travel expenses, etc. will be covered by own contribution of project's partners.	<p>For the cities of Heraklion, Pavlos Melas &amp; Civitavecchia to produce policy guides based on the outcomes of the project including also the policy guides produced for Rome and Thessaloniki.</p> <p>Policy development for the cities of Heraklion, Pavlos Melas &amp; Civitavecchia</p> <p>Include LIFE ASTI's outcomes into the Strategic &amp; Operational Plan in any involved city.</p> <p>Promote the Policies developed under LIFE ASTI for Replication to new replication cities with similar characteristics</p>

Foreseen Activities	Leading Partners	Other Partners	Related Actions	Actions	Sources of finance	Targets
7. <b>Assessment and monitoring of the LIFE ASTI actions' impacts</b>	SYMPRAXI, AUTH, DEASL	GET, MoT & ISAC-CNR	D1, D2 & D3	Conduction of two Project Performance Reports, 2 and 5 years after the completion of LIFE ASTI respectively. (SYPRAXIS, AUTH & DEASL)	Human resources and financial needs will be covered by own contribution of the involved partners.	Determine their effectiveness and potentially to revise the strategic project's goals and objectives

## ii. Other After-LIFE activities - Replication Activities

In addition to the foreseen After-LIFE actions, the following replication activities are also expected:

- 1) Submission of new proposals, related to LIFE ASTI, for funding from EU financial instruments (Horizon, LIFE, Interreg etc.) and national funds. In particular, scientific partners intend to include in future relevant proposals the expansion and upgrading of the LIFE ASTI outcomes so as to incorporate information for more UHI related indexes, more countries and/or higher analysis resolution. Partners involved: Potentially ALL depending on the proposal
- 2) Sign contracts with municipalities for the development of their forecasting System for urban heat Island effect for the development of urban adaptation strategies. Partners involved: ALL
- 3) Demonstration of the LIFEASTI platform and project's outcomes to events organized by the project partners, 3rd parties in the project and other countries. All partners will continue to promote the use of the outcomes to relevant occasions. Partners involved: ALL
- 4) Technology transfer to those that provide technical support and consulting services to municipalities for the development of their SECAPs (on demand). This could involve the knowledge transfer for all of the outcomes of the project, or just the knowledge transfer of individual components such is the platform, the policies and guidelines etc. The terms of transfer may be defined based on the interests of individual parties.
- 5) Technical assistance and training seminars to potential users of the LIFE ASTI forecasting System for urban heat Island effect (on demand).
- 6) UHI forecasting systems and Heat Health Warning Systems demonstration and training for higher education students.
- 7) Promotion of the LIFE ASTI forecasting System for urban heat Island as a business solution to the network of the consortium and investigate their willingness for uptake.



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System  
for urban  
heat Island  
effect



The project Implementation of a forecAsting System for urban heat Island effect for the development of urban adaptation strategies- LIFE ASTI has received funding from the LIFE Programme of the European Union”.

