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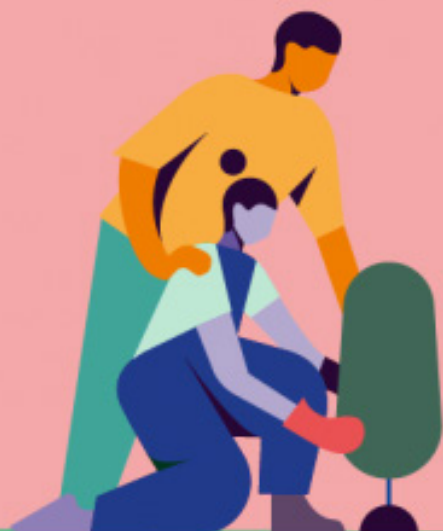


**LIFE URBANPROOF**  
CLIMATE PROOFING  
URBAN MUNICIPALITIES

# Layman's Report

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## BACKGROUND

Cities and towns, with their high population densities, their dependence on critical infrastructure and networks, their densely built structure, as well as with the presence of sensitive population groups, are extremely vulnerable to the impacts of climate change. The impacts of climate change on the urban environment and its citizens have consequences for public health, water availability and quality, energy consumption and essential infrastructure.

In fact they are ideally placed to be the key drivers in the implementation of adaptation measures, improving the overall resilience of local territories in policy fields. Although climate change projections are available at worldwide and regional level, there is not enough information for assessing climate change impacts at local level in order for the municipalities to develop urban adaptation strategies.

What is more, municipalities lack the necessary scientific and technical knowledge and expertise for carrying out such tasks and as a result, they are in need of the appropriate frameworks and tools to support them for better informed decision making.

The LIFE UrbanProof project proposes a holistic and highly automated approach for supporting municipalities to the adaptation process.

## THE PROJECT

The overall aim of the UrbanProof project is to increase the resilience of municipalities to climate change equipping them with a powerful tool for supporting better informed decision making on climate change adaptation planning.

## MAIN ACTIONS

Simulation of current and projection of future changes in climate

Climate change impact and adaptation assessment

Development of the **UrbanProof** toolkit for supporting better informed decision-making

Implementation of selected green and soft adaptation measures

Development of local climate change adaptation strategies

## ASSOCIATED BENEFICIARIES



**Areas of implementation:**

Cyprus, Greece, Italy

**Budget:** 1,854,000 € (60% EC Co-funding)

**Duration:** 55 months

**Start Date:** 01/10/2016

**End Date:** 30/04/2021

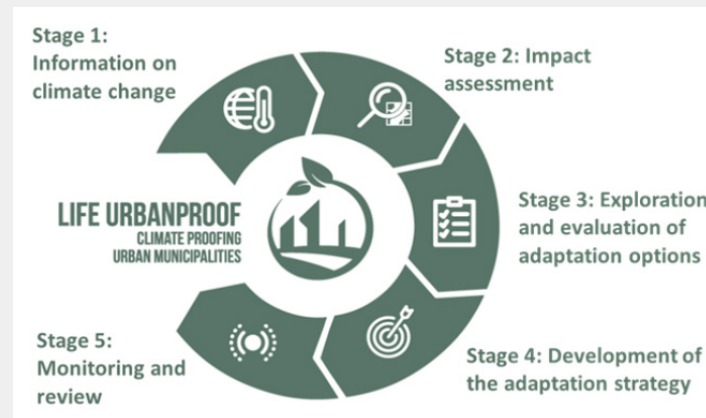
**Website:** <https://urbanproof.eu/>



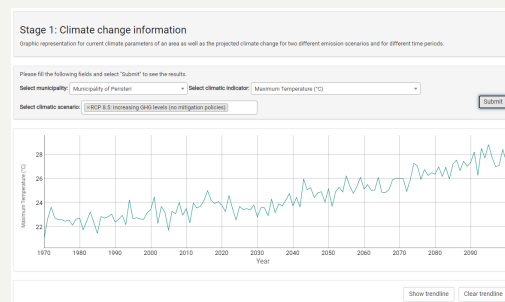
## THE URBANPROOF TOOLKIT

The **URBANPROOF** toolkit is a powerful decision support system aimed to enable better informed decision making for climate change adaptation planning. In specific, the user is guided through the different stages of the toolkit in order to gain insight into the climate change impacts to the urban environment, to explore and evaluate the available adaptation options and to investigate the effect of adaptation interventions in increasing climate change resilience.

The UrbanProof toolkit consists of 5 interdependent stages which altogether comprise the adaptation process:

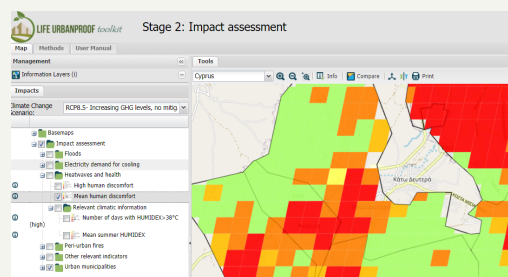


## STAGE 1: CLIMATE CHANGE INFORMATION



In **Stage 1**, the users may explore through interactive charts, information on climatic projections based on the greenhouse concentration levels of two Representative Concentration Pathways.

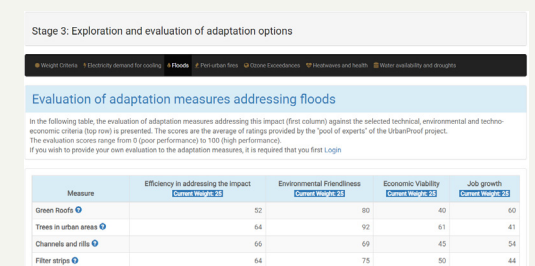
## STAGE 2: IMPACT ASSESSMENT



In **Stage 2**, the users may investigate through interactive GIS maps useful information with respect to selected climate change impact indicators relevant to the urban environment, as well as gain insight into the individual parameters (physical, structural & socio-economic) contributing to the creation of these impacts.

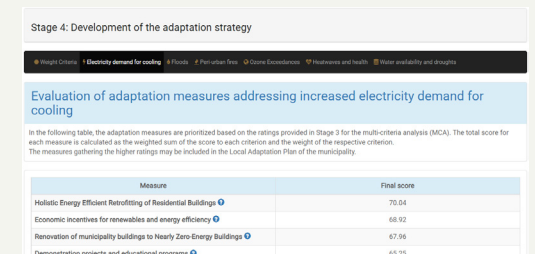
### **STAGE 3: EXPLORATION AND EVALUATION OF ADAPTATION OPTIONS**

In **Stage 3**, the users may explore information on the available adaptation measures and their evaluation against several criteria (MCA), while local stakeholders or experts may also evaluate the measures and set their own weights to the evaluation criteria.



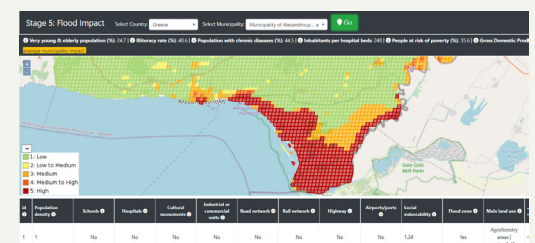
## **STAGE 4:** **DEVELOPMENT OF THE ADAPTATION STRATEGY**

In **Stage 4**, the users may see the results of the prioritization of the evaluation that took place in Stage 3, and to select the ones that gathered the highest scoring for inclusion in the local climate action plan.



## **STAGE 5:** **MONITORING AND REVIEW**

In **Stage 5**, the users may investigate the effect of adaptation measures in reducing the expected impacts for the municipality. This is useful both for the targets setting phase and for the monitoring phase of the local adaptation plan.





The climate change impacts examined are those relevant to the urban context as shown next:



The **UrbanProof** toolkit (except Stage 1) can be readily used by all urban municipalities (cities, towns and suburbs) of **Cyprus, Greece and Italy** (~3000) for the development of their Climate action plans, meaning that all relevant databases are integrated to the toolkit and therefore the users do not have to insert any data.

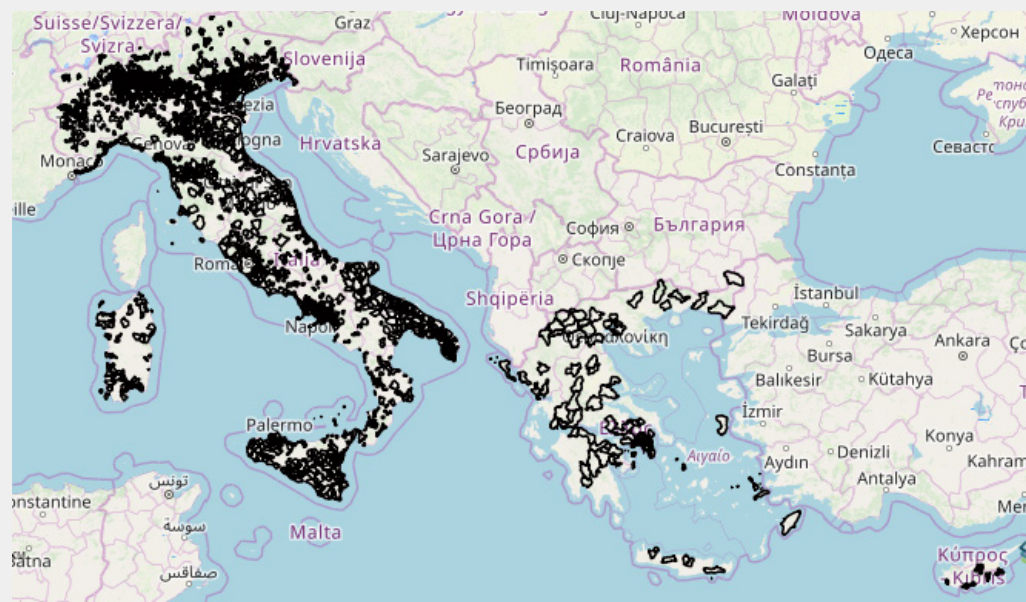
**2807**

 Municipalities in  
Italy

**129**

 Municipalities in  
Greece

**62**

 Municipalities in  
Cyprus


The toolkit is available online at the following address  
<https://tool.urbanproof.eu/>

## METHODOLOGY

The impact assessment methodology applied in the UrbanProof toolkit is based on the relevant conceptual framework presented within the 5<sup>th</sup> Assessment Report (AR5) of the IPCC (2014). In specific, impacts are considered to result from the interaction of hazard and vulnerability, while the latter is considered to be a function of the exposure, sensitivity and adaptive capacity of population and infrastructure.

### Hazard indicators

Relevant climatic information for each impact

### Exposure indicators

Exposure of population, land and/or critical infrastructure to an impact

### Sensitivity indicators

Population groups which are considered sensitive to climate change

### Adaptive capacity indicators

Capacity of the health care system and of the economy to address climate change impacts

## COST SAVINGS

The methodology applied is considered very cost-efficient since the toolkit is capable of providing impact assessment results for all urban municipalities of Greece, Cyprus and Italy. Therefore, the use of the UP toolkit by urban municipalities may save substantial resources, as these municipalities may exploit its results to develop their own adaptation strategy, instead of conducting a climate change impact and adaptation assessment from scratch. In particular, the candidate users/municipalities would have to search for, create and load their relevant databases to the toolkit, which would be a quite time-consuming process, requiring skilled personnel from both the municipalities and the project team.

## POTENTIAL END USERS OF THE URBAN- PROOF TOOLKIT

Municipalities  
 Environmental consultancy companies  
 Competent regional and national departments  
 Environmental technology companies  
 Assurance companies  
 Organizations and initiatives dealing with climate change adaptation  
 Researchers, students  
 All citizens

## STAKEHOLDERS' IMPRESSIONS

The UrbanProof toolkit has been warmly accepted by the vast majority of stakeholders who have acknowledged its usefulness and its potential for replication and have positively evaluated its features and capabilities.

Poll results on the evaluation of the UrbanProof toolkit (140 respondents):

- 100% of the respondents gave rating  $\geq 3$
- 96% gave rating  $\geq 4$
- the average evaluation was 4.8/5



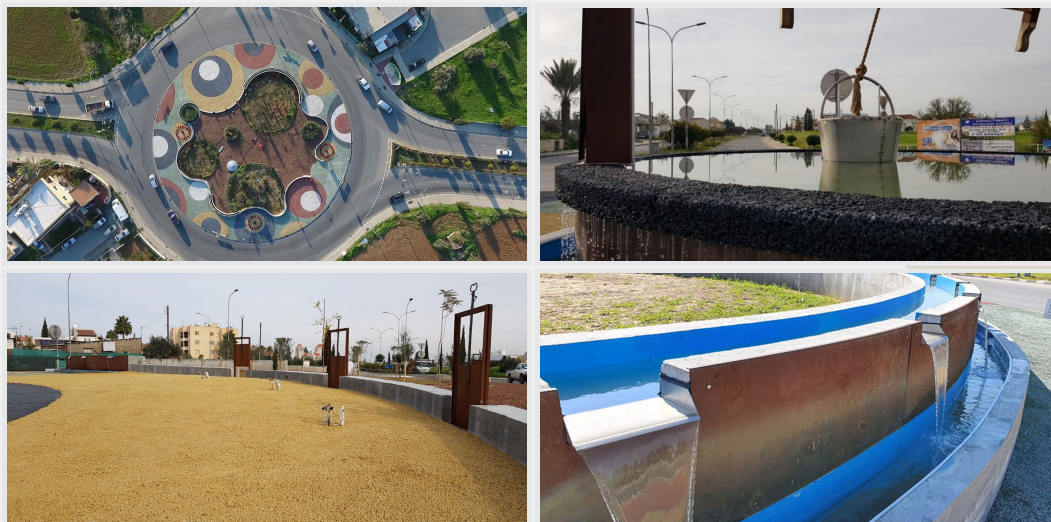
## DEMONSTRATION OF ADAPTATION PRACTICES

Selected green and soft adaptation measures have been implemented at the partner municipalities, in order to examine their effectiveness in reducing the impacts of climate change, to increase public awareness on climate change adaptation and to prepare the ground for the implementation of the adaptation strategies.

### LAKATAMIA MUNICIPALITY:

#### RECONSTRUCTION OF MELINA MERKOURI AVENUE ROUNDABOUT

The Municipality of Lakatamia has renovated the roundabout of Melina Merkouri Avenue. A dominant element in the design of the project is the use of permeable materials such as permeable concrete as well as the collection and use of rainwater. As regards irrigation, a traditional way of it has been established, with the use of irrigation channels, tanks and wells. For the operation of the artificial well, photovoltaic panels have been installed. Concerning the plantations of the roundabout, endemic shrubs and trees with low water requirements have been used.



Melina Mencouri roundabout

### STROVOLOS MUNICIPALITY:

#### CREATION OF AN URBAN SUSTAINABLE PARK AT GEORGIU IONA STREET

The adaptation measure implemented by the Municipality of Strovolos is related to the greening of 1909m<sup>2</sup> of public area. Within the green area, a botanical garden is created with plants highly harmonized in the natural environment of the area. The plants have been specifically selected due to their reduced irrigation needs and drought-resistant water requirements. The planting techniques which have been used aim at water retention at the level of plant rhizosphere.

As regards irrigation water, a drilling has been constructed so as to ensure its availability. In addition, all pathways' coatings are covered with water-permeable materials for the sufficient infiltration of rainwater. The plan also includes the construction of a fitness area which will produce energy through the use of fitness equipment.



The central PAVILLION is an innovative construction with a canopy and use of recycled materials.



Sustainable urban park area at Georgiou Iona street, Strovolos municipality.

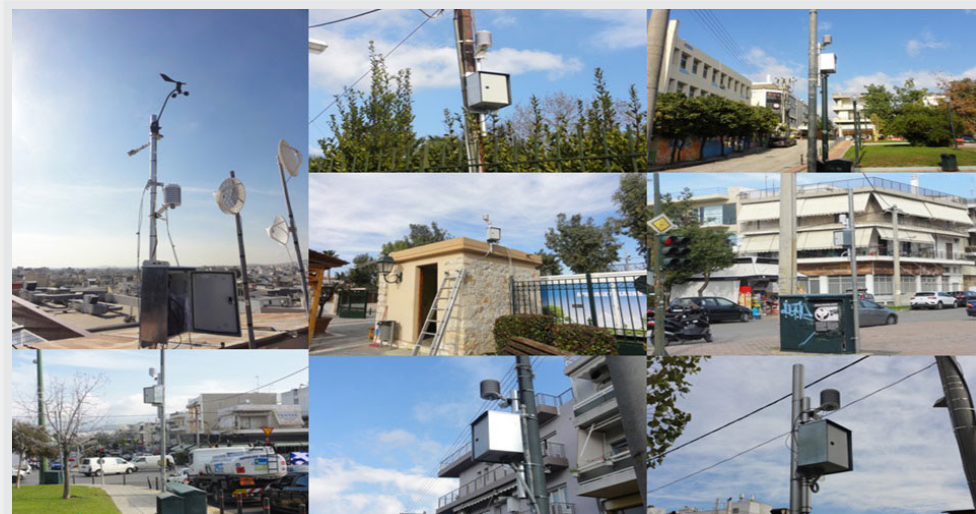


## PERISTERI MUNICIPALITY:

### PROVISION OF THERMAL DISCOMFORT INFORMATION

The Municipality of Peristeri installed a network of sensors across the municipality for providing real-time information to citizens about the level of thermal discomfort within the Municipality and providing instructions and advice for the avoidance of health burden during heat episodes (e.g. air-conditioned rooms, places with low discomfort, etc.).

In specific, a network of 12 online stations recording the temperature and relative humidity have been placed at selected sites within the municipality. The stations consist of 11 online installed at strategic places throughout the municipality, as well as, 1 mobile station installed at a municipal bus that crosses Peristeri. The provision of information to citizens is realized through an electronic billboard which is installed outside the municipality town hall.



Sensors for providing real-time information to citizens about the level of thermal discomfort in the municipality of Peristeri.



Electronic billboard for citizens' information outside the town hall of Peristeri municipality.

## REGGIO EMILIA MUNICIPALITY:

### STRENGTHENING THE ADAPTATION ASPECT IN EXISTING MUNICIPAL PLANS

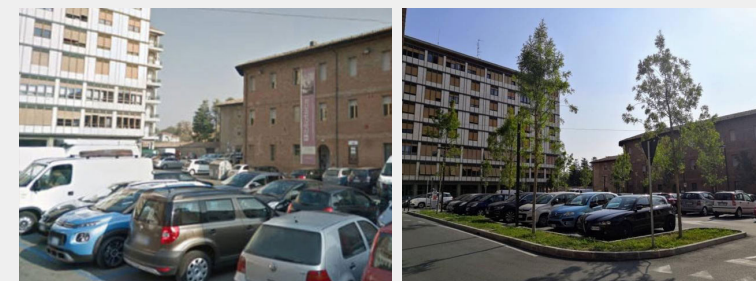
The municipality of Reggio Emilia has chosen 23 adaptation projects already envisaged in Municipal programming and strengthened, where possible, the adaptive aspects for actions not yet definitively designed. In this way, the municipality has guaranteed the realisation of more green and soft adaptation measures than those initially planned, also integrating some adaptation measures and criteria into the planning institutional tools. Indicative examples are shown next:

Piazzale Europa Redevelopment



Before redevelopment

After redevelopment



Before redevelopment

After redevelopment

Piazza Vallisneri  
Redevelopment

Via GUASCO Redevelopment

(Up: Before redevelopment,  
Down: After redevelopment)





## DIRECT BENEFITS OF ADAPTATION FOR THE URBANPROOF PARTNER MUNICIPALITIES

Increase in water availability through rainwater harvesting, increased water infiltration

Increase water infiltration and retention through the use of permeable materials and green-ing/planting

Increase in water use efficiency through the planting of drought resistant plants, use of advanced irrigation systems, planting techniques for enhancing water retention at the level of plant rhizosphere

Decrease run-off and flood risk through the increase of water infiltration and retention, rain-water harvesting

Decrease heat related stress through greening areas and planting trees, use of materials with high albedo

Decrease in electricity demand for cooling through the decrease in air temperature due to planting trees

Decrease of fire risk through the reduction of flammable matter due to land use change and the application of irrigation

Increase public awareness on self-protection from climate change related risks through the provision of advice for self- protection at the electronic billboard of Peristeri town hall

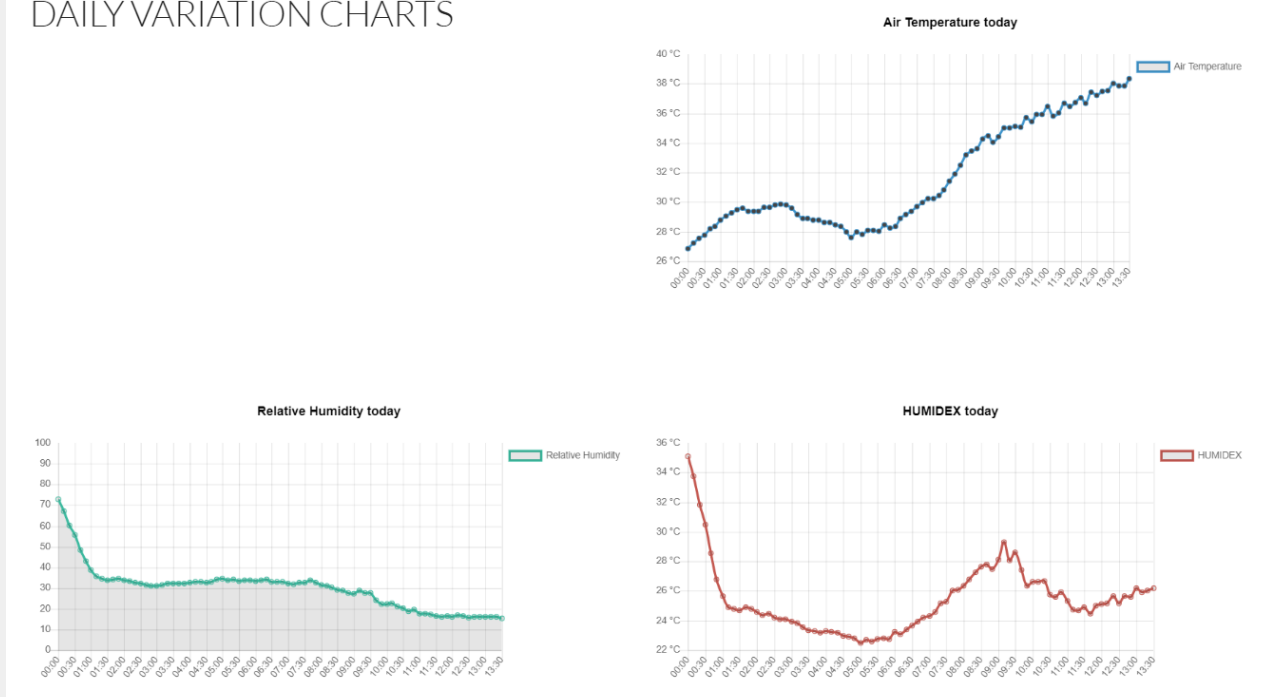
## ENVIRONMENTAL MONITORING PLATFORM

In the framework of the UrbanProof project, a set of sensors has been installed at selected locations of the UrbanProof municipalities where adaptation measures were implemented. The sensors are aimed at monitoring several critical meteorological and hydrological indicators for assessing heat and water related impacts, validating the effect of adaptation measures in decreasing impacts, as well as, at informing citizens.



The network of sensors includes sensors for measuring ambient temperature, precipitation, relative humidity and water infiltration. The information from sensors is further processed to produce useful impact indicators, such as the thermal discomfort index and the daily infiltrated water. All information is displayed online in a dedicated platform of the UrbanProof project, where someone may have access both to real-time information as well as to historical timeseries. The link to the platform is provided here.

### DAILY VARIATION CHARTS



## TRANSFORMING KNOWLEDGE TO POLICY

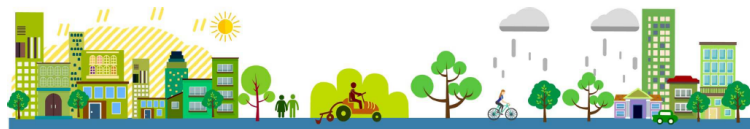
In the framework of the project, the adaptation strategies for the four partner municipalities have been developed. The strategies include information on the methodology applied and the results of the impact and adaptation assessment provided through the UrbanProof tool for the partner municipalities. Following, the selected adaptation measures are further described and analyzed and a monitoring plan is laid down.

Stage 5 of the tool was used to test the potential of selected adaptation measures to reduce the estimated impact locally and overall, at municipal level.

The strategies form part of the Sustainable Energy and Climate Action Plans (SECAP) that the municipalities submit as signatories to the Covenant of Mayors. Before the official submission of the SECAPs, the municipalities also published the draft plans for public consultation in order to increase visibility and acceptability of the foreseen actions.

## STRATEGIA DI ADATTAMENTO AI CAMBIAMENTI CLIMATICI DI REGGIO EMILIA

e indicazioni attuative per il Piano di Adattamento



Ottobre 2020

ΔΗΜΟΣ ΠΕΡΙΣΤΕΡΙΟΥ  
Στρατηγικές & Πλάνο Προσαρμογής  
στην κλιματική αλλαγή



Σχέδιο Δράσης Αειφόρου  
Ενέργειας και Κλίματος  
Δήμου Λακατάμιας  
2020-2030



Σχέδιο Δράσης Αειφόρου  
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