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Regional Agency for Environment Protection in Emilia-Romagna
<http://www.arpa.emr.it>



Vienna University of Technology - Department of Building Physics and Building Ecology - Institute of Architectural Sciences
<http://tuwien.ac.at>



Emilia Romagna Region, General Directorate Territorial and negotiated planning, agreements.
<http://www.regione.emilia-romagna.it>



Municipal Department 22 - Environmental Protection Department in Vienna (MA 22)
<http://www.wien.gv.at/english/environment/protection>



REGIONE DEL VENETO

Veneto Region - Spatial Planning and Parks Department
<http://www.regione.veneto.it>



Hungarian Meteorological Service
<http://www.met.hu>



Consortium for Coordination of Research Activities Concerning the Venice Lagoon System (CORILA)
<http://www.corila.it>



Charles University in Prague, Faculty of Mathematics and Physics
<http://www.mff.cuni.cz>



Karlsruhe Institute of Technology
<http://imk-ifu.kit.edu>



City Development Authority of Prague
<http://www.urm.cz>



Municipality of Stuttgart
<http://www.stuttgart.de>



Czech Hydrometeorological Institute
<http://portal.chmi.cz>



Meteorological Institute - University of Freiburg
<http://www.uni-freiburg.de>



Scientific Research Centre of the Slovenian Academy of Sciences and Arts
<http://giam.zrc-sazu.si>



Institute of Geography and Spatial Organization, Polish Academy of Sciences
<http://www.igipz.pan.pl>



Nofer Institute of Occupational Health
<http://www.imp.lodz.pl>



Municipality of Ljubljana
<http://www.ljubljana.si>



CENTRAL EUROPE
COOPERATING FOR SUCCESS.



EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND



UHI

Development and application
of mitigation and adaptation strategies
and measures for counteracting
the global Urban Heat Islands phenomenon

www.eu-uhi.eu

Questo progetto è sviluppato nell'ambito del programma **CENTRAL EUROPE** co-finanziato dai Fondi **ERDF** (www.central2013.eu)



EUROPEAN UNION
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COOPERATING FOR SUCCESS

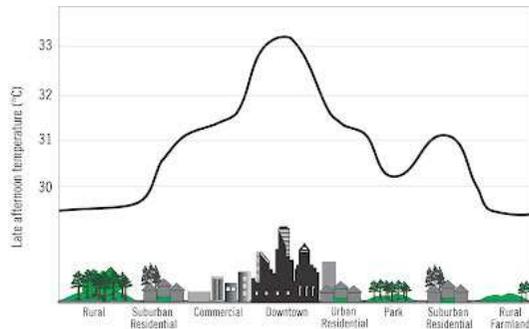
THE UHI PHENOMENON

In 2050 the share of the urban population will reach almost 70% of the total: that means that it is expected that about 6.3 billion people will live in urban areas.

The term "heat island" describes a phenomenon that occurs in urban environments that are generally warmer than the nearby rural areas.

The difference of temperature is usually more important during the night than during the day and it's most apparent when winds are weak. A seasonal level, the phenomenon of heat islands is reflected both in summer and winter.

The average annual temperature of a city with 1 million or more inhabitants may be 1.8 to 5.4 F (1-3 ° C) warmer than its surroundings. In the evening, the difference can reach 22 F (12 ° C).



The phenomenon is closely related to urban development which often involves the use of materials that retain heat. A further factor in the increase of the temperature is the waste heat generated by energy consumption.

The high temperatures of urban heat islands, especially during the summer, may affect the environment of a community and the quality of life by producing negative impacts such as:

- ✓ increased energy consumption;
- ✓ elevated emissions of air pollutants and greenhouse gases;
- ✓ compromised human health and comfort;
- ✓ alteration of water quality.

The urban agglomerations will thus become increasingly vulnerable to climate change.

MITIGATION STRATEGIES

The project includes the review of a wide range of possible mitigation actions for lowering the negative effects of UHI in cities.

Most of the actions that are commonly employed can be divided into three main realms of interventions: buildings, pavements, and vegetation.

Buildings

Mitigating the effect buildings have on urban heat islands primarily involves changing the material properties of buildings or the geometry of the urban settings created by buildings (for example, changing the typical street section). While the first strategy deals mainly with the thermal performance of buildings, the other has to do much with the way air currents can remove excess heat from areas between buildings (streets, passageways).

Pavements

Pavements play an important role in the formation of the UHI phenomenon, since conventional paving materials (mainly concrete and asphalt) tend to absorb large amounts of solar radiation during daytime and to release it to the cooler surrounding air. Another property of these paving materials is their limited permeability to water, which prevents the absorption of water in the ground and thus reduces the evaporation potential of the ground surface which may help in reducing air temperatures.

Vegetation

Trees and vegetation reduces ambient air temperature by evapotranspiration and shading and is therefore expected to help in mitigating UHI intensity levels .

The common practices within this scope are the planting of trees and vegetation in existing urban fabric (mainly city streets), or the creation or preservation of wider green areas (parks, groves) within the urban fabric.

TRANSNATIONAL FOCUS GROUPS

Transnational working groups and local working groups are one of the project's operational tools to ensure maximum synergy between the various partners and between stakeholders involved locally in the pilot actions.

The logic of the working groups is to encourage the exchange of ideas and best practices in a not only transnational context but also multidisciplinary. In particular, the working groups are transnational thematic meetings where different experts involved in the project engage and debate on the issues related to the phenomenon of heat islands (such as meteorology, biometeorology, the techniques of architecture and urban planning and others). These meetings are held in conjunction with meetings of the Monitoring Committee of the project (5 times during the duration of the project).

The local working groups have been designed to facilitate the interaction between partners that are developing pilot activities and local stakeholders that can contribute to them.

The necessary interplay between local and transnational groups will ensure a marketability in the field of the project and at the same time the possibility to treat real issues.

The discussion deals with general developed problems and will implement scientific activities carried out in parallel in the context of the whole project. The working groups may in fact be considered as a cross-cutting approach that helps to define technical scenarios associated with the phenomenon of urban heat islands.

The issues that act as driver of the debate are the following:

Urban Planning

Urban sustainability, regeneration and sprawl limitation policies.

Environmentally-Driven Consent: Policy & Communication

Pro-active strategies aiming at an environmentally significant UHI accounting behavior (attitude and context) addressing to citizens, planners, policy makers, researchers.

Urban Health

Bioclimatic discomfort, human health.

Urban Meteorology

Micro-scale and macro-scale analysis of the phenomenon



THE UHI PROJECT

The project, starting from a deep analysis of the phenomenon carried out with traditional micrometeorology techniques, is designed to both develop mitigation and risk prevention and management strategies.



In particular, **mitigation strategies** consist in the adoption of urban and land planning models that prevent the establishment of UHI, while **adaptation strategies** aim at reducing the impact of phenomena related to UHI, such as summer bioclimatic discomfort.

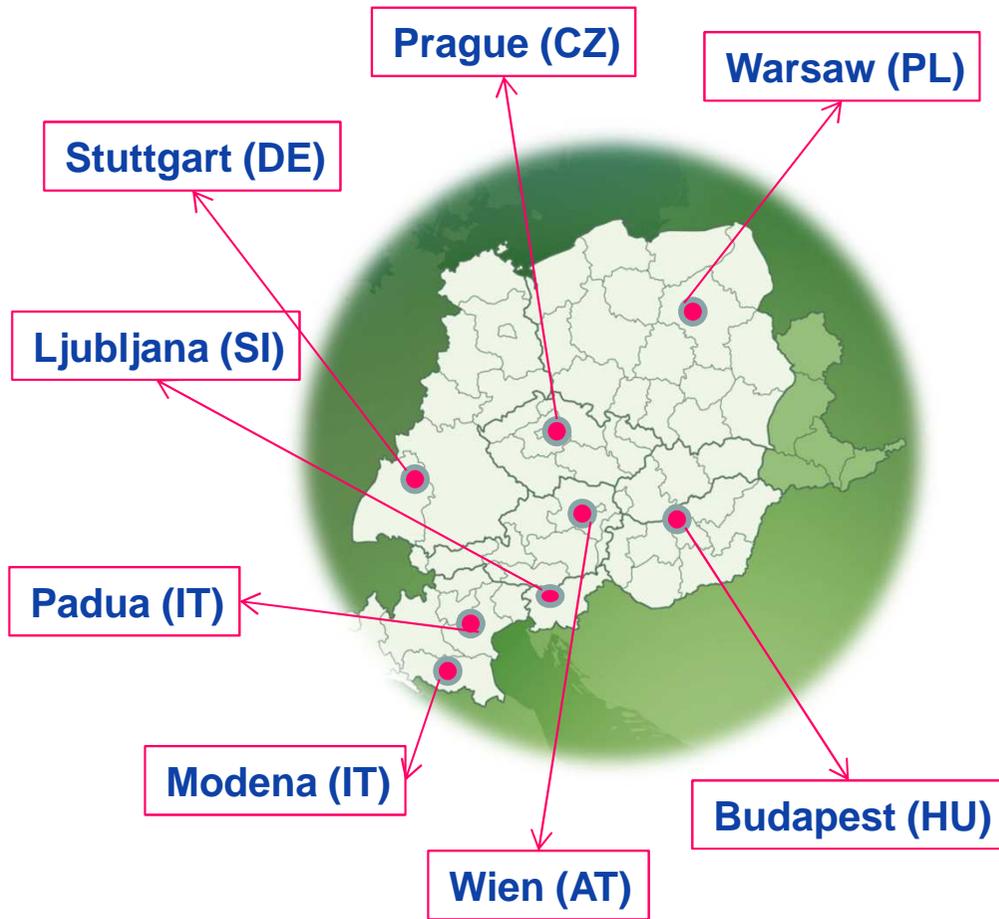
The innovative strategy of the project UHI is to interact two disciplines that are traditionally strangers one to another: **meteoclimatology** and **urban planning**: through the development of traditional micrometeorology models and analysis, the definition of particular strategies will guide the choices of development and urban renewal.

The general objective of the project is to establish a **Transnational attention**, as well as policies and practical actions, for the prevention, adaptation and mitigation of the natural and man-made risks arising from the Urban Heat Island phenomenon.

PILOT AREAS

Pilot actions are going to be implemented in 8 selected urban areas within Central Europe. UHI project partners will carry out feasibility studies to evaluate how city spaces can be developed taking in consideration strategies of mitigation and adaptation to fight UHI phenomena.

The results of the pilot actions are expected to be useful and innovative sources to help European local administrators integrate sustainable development approaches in their territorial planning policies.



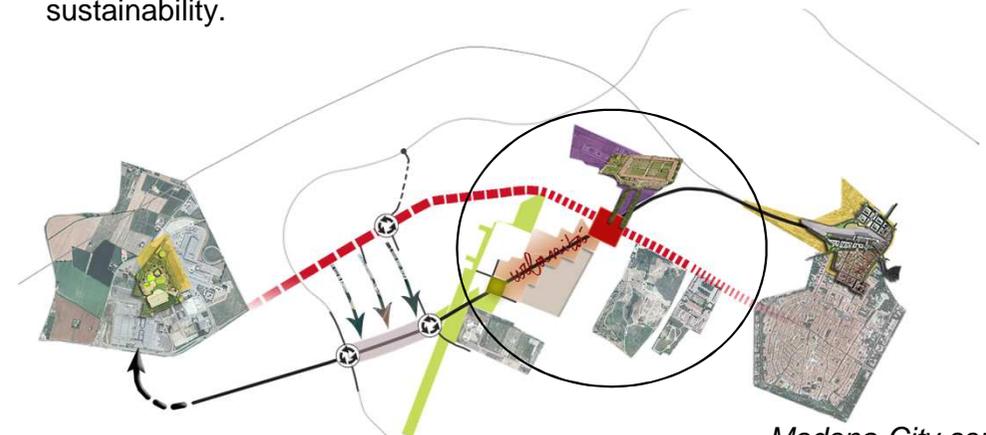
MODENA – VILLAGGIO ARTIGIANO



“Villaggio Artigianale – Modena Ovest”

In 2010 the Municipality of Modena initiated the sustainable regeneration of the west area of the city, historically destined to crafts activities and residential use.

The closure of the urban section of the railway line Bologna-Milan will encourage the link between the district and the historic center; the redevelopment of the area will keep spaces dedicated to the craft activities, including new creative industries and will add new features to the territory. As part of the UHI project, a feasibility study will be conducted in order to assess how the neighborhood of Villaggio Artigiano can be transformed by taking into account mitigation and adaptation strategies in order to counter the phenomenon of urban heat islands. A further objective is to update and improve local regulations and planning tools in the field of environmental sustainability.



Modena City centre