

İzmir Institute of Technology (IZTECH) – Türkiye (State University)

- Currently hosts 444 ongoing research projects funded the European Union, the Turkish State Planning Organization (DPT), the Scientific and Technological Research Council of Turkey (TÜBİTAK), and the Turkish Industry Theses Support Program (SANTEZ).

- Department of Conservation and Restoration of Cultural Heritage

Expertise of the Department: Conservation and restoration of cultural assets, thermal behavior of historic buildings, conservation of historic building materials, advanced documentation techniques

- Department of Mechanical Engineering
- Department of City and Regional Planning
- Department of General Culture Courses
 - Department of Civil Engineering
- Department of Scientific Research Projects Coordination

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IZTECH Official Web Site: www.iyte.edu.tr

Department Official Web Site: <https://restoration.iyte.edu.tr/en/home-page/>

Project Title: Improving Thermal Comfort of Outdoor Spaces in Cultural Heritage Built Environment in Mediterranean Cities with Innovative and Nature-based Solutions

TOPIC ID: HORIZON-CL5-2022-D4-02-03

Sustainable and resource-efficient solutions for an open, accessible, inclusive, resilient and low-emission cultural heritage: prevention, monitoring, management, maintenance, and renovation (Built4People)

Project Description:

- Thermally comfortable outdoor spaces are indispensable portions of cultural heritage built environment in Mediterranean cities. However, their ineffective usage in summer times because of global warming is becoming a burden.
- The project will consider an **innovative approach of hybridizing nature-based solutions with innovative technologies for cooling of outdoor spaces in historic urban sites around the Mediterranean** in order to improve user comfort.

Current Consortium:

1. IZTECH (www.iyte.edu.tr), Türkiye
2. Metropolitan Municipality of Izmir (<https://www.izmir.bel.tr/>), Türkiye
3. Korder (Conservation and Restoration Professionals Association – NGO, <http://korder.org/>), Türkiye

Profile of the Partners Sought:

- Private firms and research institutes working on cooling technologies for developing and producing technical utilities.
- Local administrations and research institutes of the historic cities around Mediterranean for:
 - documentation of the current thermal characteristics of selected open spaces
 - implementation of the innovative design of the project to improve the thermal comfort
- NGOs of cultural heritage for disseminating results

Hybrid cooling (nature based solutions + radiative cooling) with tracking capability of the human traffic will minimize the energy consumption.

Renewable energy sources will be integrated with the cooling system to yield to minimize CO₂ emissions with the aim of net zero emission.

Technology on the thermal comfort for open spaces will benefit the scientific and industrial air conditioning sector.

The methodology will involve:

- characterization of thermal behavior and usage of outdoor spaces in historic urban sites;
- generation of computer-based simulations;
- development of proposals for cooling techniques, physical interventions, and socio-cultural integration
- pilot implementations and monitoring;
- revisions and providing the feasibility;
- application of the results for socio-economic development;
- disseminations of the results to Mediterranean countries.

Case Area 1:

İzmir, Kemeraltı Historic Urban Site



252 Hectares in size

Heritage sites:

- Urban, natural and archaeological protection areas,
- 2316 of 12958 plots listed

Thank you.

WP1 – Project management:

To ensure the project is carried out in a timely and efficient manner.

WP2 – Understanding the Current State:

To collect, interpret, analyse and model the current cooling performance of open spaces in heritage sites and socio-cultural usage of these spaces via different user groups.

WP3 – Investigation, Intervention Decisions and Simulation Modelling:

- Investigate innovative methodologies for cooling of open spaces in heritage sites.
- Generate intervention decisions for improvement of cooling in order to cope with the effects of climate change;
- Propose socio-cultural integration tools for inhabitants, workers and visitors.

WP4 – Implementation of intervention decisions:

To intervene three selected cases representing different heritage qualities.

WP5 – Social, financial, and environmental studies:

To engage with stakeholders to adopt project tools regarding social, financial, and environmental perspective

WP6 – Dissemination:

To disseminate the results of the project to any stakeholders.

Squares



Streets





Streets



Courtyards of churches, mosques, synagogues



Courtyards of khans



Courtyard of a traditional house, Kemeraltı



The Castle



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 - The Center for Materials Research (IZTECH-CMR)
 - Eurasia Advanced Research application and Research Center (AVILAR)
 - Urban Research application and Research Center (TAMIKAM)
 - Environmental Development Application and Research Center (Environmental R&D)
 - Geothermal Energy Research and Application Center (GEOMER)
 - Biotechnology and Bioengineering Application and Research Center (BIOMER)
 - Mass Spectrometer Center
 - Applied Quantum Research Center (UKAM)
 - Composite Materials Research Center

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