

MISSIONE 4
ISTRUZIONE
RICERCA

Climate Resilient Strategies by Archetype-based Urban Energy Modelling

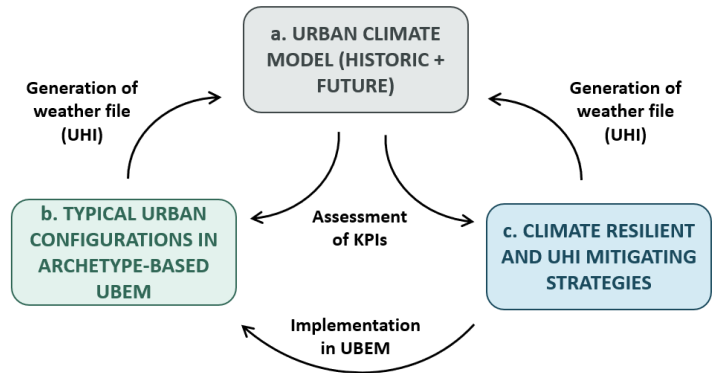
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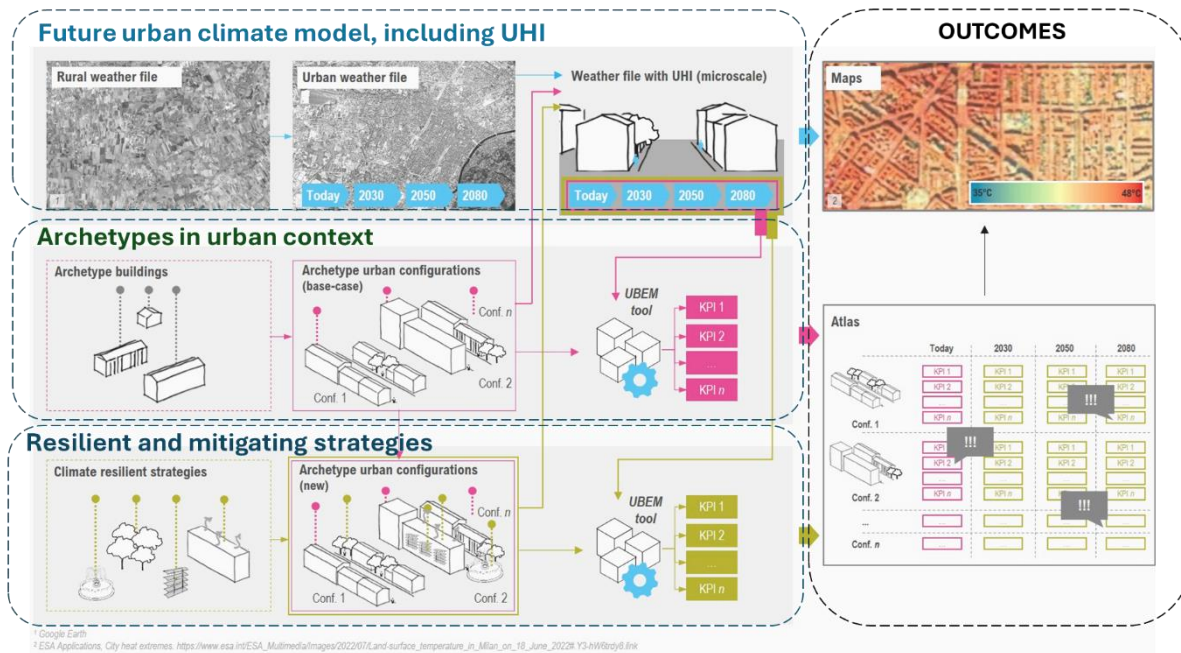
ABOUT THE PROJECT

The CRiStAll project aims to tackle the challenges posed by rising temperatures and urban heat islands (UHIs) in Italian cities. By creating detailed climate datasets and using Urban Building Energy Modelling (UBEM) techniques, it seeks to enhance understanding of UHI impacts and inform the development of strategies to improve climate resilience. The main outcomes of the projects will be the **Maps** of UHI intensity for typical districts in different periods of time and under the application of climate resilience strategies, and the **Atlas** of typical urban configurations based on Italian archetypes.

THE RESEARCH LINES



THE PROJECT WORK PACKAGES



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CRiStAll



THE KICK-OFF MEETING

On December 18th, 2023, the CRiStALL project held its Kick-Off Meeting (KOM) in Turin at Politecnico di Torino.

During the meeting, the project context, objectives, and work packages were presented and analysed. Emphasis was placed on overviewing the defined milestones and sub-milestones.

As agreed in the KOM, bimonthly online meetings are planned, along with one in-person meeting per year. Technical meetings on specific topics will be convened as needed.

PROJECT UPDATES

The project started in December 2023. Besides the management and dissemination activities, according to research lines, three work packages have been launched.

For the future urban climate model, including UHI, the weather data from three Italian cities – Turin, Rome, and Bari – each representing different climatic zones, were gathered and analysed to create a comprehensive database of physical parameters for project utilisation. Furthermore, a systematic examination was conducted to determine the optimal approach for integrating the *Urban Heat Island* (UHI) effect into the weather dataset, and the *Urban Weather Generator* (UWG) tool was selected.

For the archetypes in the urban context, to initiate the definition of the typical urban configurations, the process began with gathering data on the features of archetype buildings from prior and ongoing studies like IEE-TABULA and PRIN 2020 – URBEM, relevant to the respective climatic zones. Following that, metrics for districts were established, along with a methodology for conducting parametric analysis. Additionally, a comprehensive analysis was conducted on the features of the CitySim tool (the UBEM tool adopted in the project), the data of building archetypes, and representative districts.

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“We are determined to protect the planet by taking urgent action on climate change so that it can support the needs of the present and future generations.”

- United Nations Agenda for Sustainable Development

NEXT STEPS

Various historical and future climate models from CORDEX will be acquired to apply both morphing and dynamic downscaling methods. Following bias adjustment, the Urban Heat Island (UHI) effect will be integrated using UWG. Besides, GIS will be utilised to calculate defined context metrics for the zones with elevated UHI risk in the chosen cities. After gathering the metrics, the typical urban configurations will be defined and tested.