Politecnico di Torino

Master's degree program in
Territorial, Urban, Environmental and Landscape Planning
Curriculum: **Planning for the Global Urban Agenda**

Honors Thesis

ABSTRACT

ADDRESSING THE URBAN HEAT ISLAND:
The methodological application of *The Plan Integration for Resilience Scorecard™ (PIRS™) for Heat* in the city of Turin, Italy

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This thesis, titled 'Addressing the Urban Heat Island: The Methodological Application of The Plan Integration for Resilience Scorecard™ (PIRS™) for Heat in the City of Turin, Italy,' contextualizes the Urban Heat Island (UHI) effect in Turin. The PIRS™ for Heat (2022) methodology emphasizes the urgent need to address the UHI effect in Turin. By assessing the PIRS for Heat methodology as a policy transfer tool, the study gauges its effectiveness in Turin. The research advocates an integrated approach to urban planning and policy implementation and underscores the necessity for a comprehensive strategy to mitigate the UHI impact in the city efficiently.

Research stresses Italy's urgent heat hazard and UHI challenges exacerbated by climate change, urban expansion, and limited green spaces, which is demonstrated by a 2022 research that cited Italy as having the worst rate of summertime heat-related mortality in all of Europe. The trend continues in 2023 with record heat and a decade-high frequency of nearly eleven daily extreme weather events. Turin's vulnerability during the August 2023 African heatwave underscores the pressing need for resilience measures. Addressing the UHI effect in Turin requires a coordinated effort through spatial plans and policies. This study comprehensively analyzes the current planning framework for mitigating and adapting to the UHI effect in Turin, evaluating how various plans and policies are integrated into an overarching strategy to enhance resilience and address primary issues within the planning system.

The Plan Integration for Resilience Scorecard™ (PIRS™) for Heat methodology was utilized as a testing approach in the Turin case study. The various plans addressing Heat Hazards within Turin were initially identified, and a 'Three Point Test' was applied to assess all associated actions and policies. Subsequently, the selected actions and policies were scored and categorized based on their impact on the UHI effect -whether they mitigated, exacerbated, or had neutral or unknown implications. The scored policies were then overlaid onto Turin's urban plan to identify focal points and compare them with the city's most vulnerable areas, assessed through both physical and social vulnerability analysis, such as the UHI effect map and the map based on socio-economic data of the city of Turin. The results were then analyzed to underline areas that either address the city's vulnerability or require more attention from planners and decision-makers.

The application of the PIRS for Heat methodology revealed the impracticality of policy transfer within Turin's system of plans, which is attributed to the absence of effective coordination and seamless integration of planning practices into a unified framework. A distinct analysis indicates that only a limited number of plans within Turin's framework align with the scorecard criteria, having a coherent correlation between their actions and specific locations within the city. This highlights the need for a place-based approach and improved coordination of mitigation and adaptation strategies.

Moreover, it underscores the necessity for updates of not only the pivotal planning instruments, such as the General Municipal Master Plan of Turin, and the comprehensive integration and updating of non-binding yet pertinent strategic plans but the system overall, making it more flexible and resilient to current and future hazards. This strategic approach

is essential for a holistic and effective response to urban heat resilience challenges in future planning endeavors.

KEYWORDS: Urban Heat Island (UHI), Heat Hazard, The PIRS™ For Heat, Urban Resilience, Mitigation and Adaptation Strategies.

SUSTAINABLE DEVELOPMENT GOALS:
11. SUSTAINABLE CITIES AND COMMUNITIES
13. CLIMATE ACTION
15. LIFE ON LAND

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