SUSTAINABLE URBAN REGENERATION AND GREEN SPACE: STRATEGIES FOR RESILIENT CITIES IN THE CONTEXT OF THE CLIMATE CRISIS

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Abstract
Sustainable urban regeneration is a pressing challenge for Mediterranean cities, which are particularly vulnerable to climate change and the intensification of the Urban Heat Island (UHI) effect. Within this context, the climate resilient city emerges, and sustainable urban forms are explored as a means towards climate neutral, zero energy and greener future development. This paper explores how parameters, such as the geometry of the urban canyons and the typology of urban blocks, combined with green infrastructure interventions and the reconfiguration of public space, can significantly improve urban microclimates.

Recent research demonstrates that targeted interventions for increasing urban vegetation in the cities' open spaces and building facades and roofs, can reduce peak summer temperatures, mitigating the UHI effect while lowering the energy footprint and enhancing livability. These findings are discussed against the broader theoretical framework for green and sustainable urbanism, which emphasizes the integration of ecological principles into urban planning as a pathway towards sustainability, social cohesion, and climate resilience.

By bridging theory and empirical evidence, this contribution highlights urban planning as a powerful driver of sustainable regeneration. It proposes a framework of green strategies for the densely built Mediterranean cities, stressing the role of urban form and public space in improving microclimatic conditions, strengthening climate adaptation, and ultimately enhancing citizens' quality of life.

Keywords: *Sustainable urban regeneration, urban heat island (UHI), green strategies, urban planning*

INTRODUCTION

Mediterranean cities are increasingly confronted with the intertwined challenges of climate change, rapid urbanization, and environmental degradation. Rising temperatures, prolonged heatwaves, and the intensification of the Urban Heat Island (UHI) effect disproportionately affect these regions, where dense urban fabrics and limited green space exacerbate thermal stress. As a result, sustainable urban regeneration has emerged not only as a design ambition but as an urgent necessity. Within this context, the concept of the climate-resilient city has gained prominence, promoting sustainable urban forms capable of supporting climate neutrality, reducing energy consumption, and fostering healthier living environments.

This growing interest in sustainable urban transformation aligns with a suite of European Union policy agendas and initiatives that position cities at the forefront of climate, environmental, and innovation policy. Under the EU Mission for Climate-Neutral and Smart Cities, launched within Horizon Europe (2021–2027), the European Commission aimed to deliver 100 climate-neutral and smart cities by 2030, enabling participating cities to serve as experimentation and innovation hubs for climate mitigation and adaptation solutions, including energy efficiency, sustainable mobility, digital planning tools, and cross-sectoral governance models (*Climate-Neutral and Smart Cities - Research and Innovation*, n.d.). By October 2025, 103 cities had received the Mission Label in recognition of their robust Climate City Contracts and implementation strategies directed toward climate neutrality and smart transformation, strengthening access to finance and innovation networks through instruments such as the Climate City Capital Hub.

Complementing the Mission, the European Green City Accord (GCA) continues to expand its reach and ambition. As of early 2025, over 115 cities have committed to the GCA framework, pledging to improve air and water quality, biodiversity, circularity, waste management, and noise reduction by 2030. Among them over 20 Mediterranean cities from countries like Spain, Italy, France, and Greece are officially participating. The Accord has recently evolved to include an “associated city” status that broadens participation beyond EU Member States, emphasizing collaborative knowledge exchange and shared environmental commitments across Europe (*Green City Accord - Environment - European Commission*, n.d.).

The updated 2026 report also highlights the prioritization for expanding green spaces and increasing the number of bird species mentioning that the average tree canopy cover among GCA cities is currently approximately 31%, which is higher than the EU average in 2018 (28.5%), (Green City Accord, Clean and Healthy Cities for Europe, Baseline Report 2020-2025, 2026).

In addition, the Urban Agenda for the EU–Greening Cities Partnership, established in December 2022, fosters multi-level cooperation to integrate urban green infrastructure and nature-based solutions into policy and practice. The Partnership engages local, regional, and national authorities to catalyze policy frameworks that support ecosystem services, biodiversity enhancement, and resilient urban planning.

Addressing the energy and building sectors, the broader EU policy landscape incentivizes deep renovation and energy performance improvements in existing buildings as central to climate goals. While specific post-2021 Renovation Wave actions feed into national and local strategies, cities participating in EU Missions also incorporate near-zero or positive energy building standards into their Climate City Contracts, aligning urban form and energy-efficient building practices with climate targets (Mission Cities’ Policy Brief Built Environment Policy Lab, 2024).

Within the framework of European climate policies, Mediterranean cities are increasingly recognized as frontline areas in the fight against climate change. Climate change is having profound effects on these urban centers, intensifying thermal loads, exacerbating energy poverty, and deepening social vulnerability. Rising temperatures and more frequent heatwaves increase the urban heat island effect, placing significant stress on buildings, infrastructure, and public health systems. As cooling demands grow, households face higher energy costs, and low-income families in particular struggle to afford adequate air conditioning, leading to greater exposure to extreme heat.

This situation contributes to energy poverty, where vulnerable populations must choose between essential needs and maintaining safe indoor temperatures (Oliveras et al., 2021). At the same time, social inequalities become more visible, as elderly people, migrants, and economically disadvantaged communities are disproportionately affected by heat stress and limited access to green spaces or resilient housing. Without inclusive urban planning and climate adaptation strategies aligned with European objectives for climate neutrality and resilience, Mediterranean cities risk facing widening social disparities alongside escalating environmental challenges. Especially in the southern Mediterranean areas where Summer Energy Poverty (SEP) has become a critical issue due to the increased intensity and frequency of heat waves (Torrego-Gómez et al., 2024).

Urban form plays a decisive role in shaping microclimatic conditions. Parameters such as the geometry of urban canyons, the orientation and height-to-width ratios of streets, and the typology of urban blocks directly influence solar exposure, airflow, shading patterns, and heat retention. When strategically combined with green infrastructure interventions—such as increased vegetation in public open spaces, green roofs, and vegetated facades—and with the reconfiguration of public space, these morphological characteristics can significantly mitigate local thermal stress.

Recent research demonstrates that targeted greening strategies can reduce peak summer temperatures, limit heat accumulation, and decrease building energy demand, while simultaneously enhancing urban livability and ecological performance (Erell & Zhou, 2022; He, 2022).

On the other hand, researchers have investigated urban cooling strategies through the implementation of green infrastructure and design solutions, supporting that they can foster improvement of city vitality and contribute towards an overall heat-responsive urban fabric (Elliott et al., 2020).

These practical findings align with broader theoretical perspectives in green and sustainable urbanism, which advocate for the integration of ecological principles into planning and design processes. Rather than treating environmental performance as an add-on, this approach positions climate adaptation, social cohesion, and environmental quality at the core of urban transformation. In Mediterranean contexts—where compact urban structures, historical fabrics, and socio-spatial complexity define the built environment—the challenge lies in adapting existing forms without undermining their cultural and spatial identity.

This paper positions urban planning as a critical instrument for advancing sustainable regeneration. It examines how the interaction between urban morphology and green infrastructure can improve microclimatic performance in densely built Mediterranean cities. Building on this analysis, the study analyses the effect of green interventions together with urban form parameters and public space quality, aiming to strengthen climate resilience, enhance environmental performance, and ultimately improve citizens' quality of life.

A distinct methodological focus on Mediterranean cities is required due to their specific climatic, morphological, and socio-spatial characteristics. Prolonged heatwaves, high solar radiation, limited summer precipitation, dense compact urban fabrics, and historically layered built environments create conditions where heat accumulation is particularly intense and retrofitting options are spatially constrained. These factors necessitate tailored strategies that differ from those applicable to temperate or northern European contexts.

METHODOLOGY

This research adopts a **critical literature review** to examine the role of green infrastructure in mitigating the Urban Heat Island (UHI) effect and enhancing environmental performance in Mediterranean cities. The study synthesizes findings from existing literature focusing on Mediterranean or climatically comparable hot-summer regions. Selection criteria include studies providing quantitative or simulation-based assessments of temperature reduction, energy performance, thermal comfort, and citizens wellbeing related outcomes.

The analysis is structured across three interconnected scales:

1. *Urban scale* – Examination of parks, street trees, and vegetated public spaces in mitigating UHI effects, with attention to urban morphology parameters such as canyon geometry, block typology, and spatial distribution of greenery.
2. *Building scale* – Assessment of green roofs, green façades, and vertical greenery systems in terms of microclimatic regulation and building energy performance, including their contribution to reducing cooling demand.
3. *Human scale* – Evaluation of the relationship between increased urban greenery, thermal comfort, public health, and overall quality of life.

The findings from these three scales are comparatively analyzed and synthesized to develop an understanding of the potential of the densely built Mediterranean cities to support climate resilience, energy efficiency, and improved urban livability.

The text is structured as a progressively deepening, multi-scalar analysis that moves from theoretical framing to empirical evidence and finally to synthesis and conclusions. It begins with a broad conceptual introduction to bioclimatic architecture and sustainable urban planning, situating urban greening within the evolution of climate-adaptive design paradigms. The discussion then narrows to thematic sections—first examining urban green interventions and public space performance through comparative case studies across Mediterranean cities, followed by building-integrated greening and energy performance at the architectural and block scales. A subsequent section expands the scope to policy frameworks and smart renovation strategies, integrating governance and digital monitoring into the sustainability discourse. Finally, the findings are synthesized in the Discussion and Conclusion section across scales—urban, building, and human—articulating overarching principles and strategic implications.

URBAN GREENING AS A DRIVER OF CLIMATE-ADAPTIVE AND SUSTAINABLE CITY DESIGN

The concept of bioclimatic architecture is as old as human settlement itself, although it was reintroduced and systematized in the 1990s as a key pathway toward sustainable development, particularly following the 1992 Rio Earth Summit and the adoption of Agenda 21. Since then, sustainable urban planning has evolved in response to the rapid expansion of cities, their increasing consumption rates, and their substantial contribution to environmental degradation and climate change.

Urban form and geometry are widely recognized as critical factors influencing both microclimatic conditions and the energy performance of buildings. In this context, sustainable architecture has been extensively explored as a means of promoting greener, more resilient buildings and urban environments (Cuentas & Moreira, 2024). Over time, bioclimatic design and sustainable construction practices have progressed toward climate-adaptive architecture, marking a transition from "static" to "dynamic" buildings and responsive envelopes (Sommese et al., 2022). Contemporary architectural practice increasingly draws upon insights from diverse scientific fields to address the pressing need for environmental resilience and to minimize ecological footprints.

Within this broader shift toward sustainability and adaptation, urban greening has emerged as a central strategy for reintegrating nature into cities. Green buildings represent a renewed effort to restore lost natural elements within dense urban environments, contributing to improved microclimatic conditions. Beyond environmental performance, however, such interventions enhance human well-being, supporting thermal comfort as well as mental and physical health—benefits closely associated with greener urban settings.

Alongside nature-inspired approaches, technological innovation has also shaped contemporary sustainable architecture. Smart buildings and digital twins are increasingly regarded as fundamental components of this new paradigm, enabling real-time monitoring, optimization, and adaptive management of building performance.

Quantitative research methods are commonly employed to evaluate the environmental benefits of greening strategies, including reductions in CO_2 emissions and improvements in thermal comfort at the urban scale. The size, distribution, and spatial configuration of green spaces are critical parameters in assessing both micro- and macroclimatic indicators, while also serving as measurable determinants of quality of life.

A growing body of research indicates that urban geometry significantly conditions the effectiveness of green interventions, particularly within dense Mediterranean urban fabrics. Methodological approaches to substantiate this relationship range from theoretical modeling to experimental studies and in situ measurements, collectively reinforcing the importance of spatial form in shaping sustainable urban outcomes.

URBAN GREEN INTERVENTIONS AND PUBLIC SPACE PERFORMANCE

Green interventions in Mediterranean cities have been extensively investigated through quantitative methodologies, primarily employing microclimatic simulations of regeneration scenarios, often complemented by field measurements of key environmental indicators. These analyses reveal both the shared morphological characteristics of compact Mediterranean urban fabrics and the differentiated performance of specific greening strategies under local climatic and spatial conditions.

Most studies focus on ambient and surface air temperatures as a primary indicator to assess the mitigation of overheating during summer heatwaves. However, an increasing body of research also incorporates thermal comfort indices—such as mean radiant temperature and composite comfort metrics—to evaluate not only the magnitude but also the perceived quality of microclimatic improvement from a human-centered perspective.

Simulation analyses conducted in Thessaloniki Greece for specific urban canyons demonstrate that the strategic introduction of tree planting and vegetated surfaces within compact blocks can reduce peak surface temperatures by 8–12°C, while near-ground air temperature reductions range between 1.5 and 3.0°C under extreme summer conditions (Tsirigoti, 2025b) . Cooling performance was strongly influenced by canyon geometry—particularly height-to-width (H/W) ratios—and street orientation. Narrow canyons with optimized shading and increased canopy coverage exhibited the most significant improvements in thermal comfort. In a 10 m intervention scenario, green surfaces reduced the maximum potential air temperature by up to 2.9°C.

At the neighborhood scale, distributed green corridors, pocket parks, and vegetated public nodes were shown to lower localized ambient temperatures. Enhanced shading along pedestrian routes contributed to measurable reductions in mean radiant temperature, substantially improving outdoor thermal comfort during heatwave events. Importantly, these findings underscore that even small-scale, spatially connected green insertions can generate cumulative cooling effects across compact districts, reinforcing walkability and the usability of public space (Tsirigoti, 2025a).

In Athens, the daily peak ambient temperature at 17:00 local time decreased by approximately 0.0157°C per unit increase in the Green Infrastructure (GI) index. The maximum expected daytime summer temperature reductions reached 0.7°C, 1.0°C, and 1.1°C under three different Green Infrastructure scenarios respectively, compared to the control case. Nighttime cooling effects were even more pronounced, with reductions of up to 1.9°C (Khan et al., 2022).

Evidence from other Mediterranean cities further supports these conclusions. In Granada, a study showed that small, distributed green spaces—classified as “Other” areas—registered the lowest average land surface temperature (LST) values during heatwave episodes. These areas exhibited the strongest negative correlation with extreme temperatures, indicating a superior cooling capacity compared to larger but more spatially isolated green spaces (Delgado-Capel et al., 2023).

Similarly, research in Jijel, Algeria reported air temperature reductions ranging between 0.88°C and 1.00°C under green scenario simulations (Bouketta, 2023).

In Genova, simulation of three design scenarios targeting an urban heat hotspot—including systemic plant species selection and the application of light-colored pavements—demonstrated temperature reductions between 1.2°C and 1.8°C, depending on the extent and configuration of greening interventions (Perini et al., 2022) . Interestingly, scenarios with greater but less strategically configured greening did not always yield proportionally higher cooling, highlighting the importance of spatial design and integration rather than greening quantity alone.

Table 1. Mediterranean cities' green interventions performance

City	Study Context / Intervention Scale	Reported Temperature Reduction	Key Findings
Thessaloniki	Canyon-scale tree planting & vegetated surfaces	Surface temperature: 8–12°C reduction Air temperature: 1.5–3.0°C 10 m scenario: up to 2.9°C	Cooling strongly dependent on H/W ratio and orientation; narrow canyons with optimized shading show highest improvements.
Athens	Green Infrastructure (scenarios)	Daytime: 0.7–1.1°C Nighttime: up to 1.9°C 0.0157°C decrease per GI unit (daytime peak)	Nighttime cooling is more pronounced than daytime; incremental GI increase produces measurable temperature decline.
Genova	Three redesign scenarios (vegetation + light pavements)	1.2–1.8°C	Cooling depends on configuration; greater greening does not automatically yield higher reductions—design integration is critical.
Granada	Distributed small green spaces ("Other" areas) during heatwaves	Lowest LST averages (exact reduction varies per episode)	Small, spatially distributed green areas showed strongest negative correlation with extreme temperatures; high cooling efficiency during heatwaves.
Jijel	Green scenario simulation	0.88–1.00°C	Moderate but consistent air temperature reduction under greening scenario.

Overall, the reviewed studies converge on the conclusion that urban greening strategies in compact Mediterranean cities can deliver measurable and context-sensitive cooling benefits. Their effectiveness depends not only on vegetation density but also on spatial configuration, connectivity, canyon geometry, and integration within the urban fabric. These findings reinforce the need for climate-responsive, morphology-aware design approaches in future urban regeneration strategies.

BUILDING-INTEGRATED GREENING AND ENERGY PERFORMANCE IN MEDITERRANEAN CONTEXTS

In Greece, research on green roofs and green façades has primarily focused on building-scale performance, examining both microclimatic improvements and energy efficiency outcomes. Early studies reported measurable reductions in ambient and surface temperatures, alongside energy savings of up to 15% following the implementation of vegetated envelopes

(Foustalieraki et al., 2017) . More recent investigations in Athens further demonstrate the benefits of combining vertical and horizontal greening systems. According to (Tseliou et al., 2023) , the synergistic application of green façades and green roofs achieved the greatest improvement in thermal conditions during the hottest hours of the day (12:00–18:00). In courtyard configurations, this combined strategy produced average air temperature (T_air) reductions of up to 0.7°C and a reduction in the Universal Thermal Climate Index (UTCI) of 1.6°C.

Broader empirical evidence confirms the strong mitigation potential of vegetated building envelopes in Mediterranean climates. Experimental and simulation-based studies indicate that green roofs and façades can reduce outdoor surface temperatures by up to 7.4°C during summer, contributing to the attenuation of urban heat island effects. Indoors, air temperature reductions typically range from 0.2°C to 2.3°C, while annual energy savings vary between 10% and 34.7%, depending on climatic conditions, construction characteristics, and design parameters (De Cristo et al., 2025) . Importantly, local meteorological conditions significantly influence the magnitude of these benefits, as cooling and heating demand reductions vary according to regional climate profiles.

At the urban block scale, research conducted in Thessaloniki (Tsirigoti et al., 2022) provides quantitative evidence of the compounded impact of energy renovation and greening strategies. The examined scenarios—incorporating façade insulation, high-performance glazing, external shading devices, and green roofs—resulted in: Reductions in annual cooling energy demand of 18–35%, Total primary energy savings ranging from 30–45%, depending on intervention intensity, Surface temperature reductions on green roofs of up to 15–20°C compared to conventional roofing materials during summer peak conditions. Cooling load reductions were particularly pronounced in upper-floor dwellings exposed to intense solar radiation, highlighting the protective role of vegetated roof systems.

Complementary experimental measurements in Valenzano, Italy, reported that green façades reduced wall surface temperatures by up to 9.9°C between the vegetated layer and the external wall surface during daytime conditions (Liberalesso et al., 2020) . Such findings reinforce the importance of vertical greening in mitigating solar heat gains in dense urban settings.

Overall, the reviewed studies indicate that integrated renovation scenarios at the urban block scale outperform isolated building-level interventions. Collective upgrading strategies not only enhance indoor energy performance but also improve outdoor microclimatic conditions by increasing shading, reducing reflected radiation, and lowering surface temperatures within shared semi-open spaces such as courtyards. These combined effects strengthen both thermal comfort and energy resilience, emphasizing the value of systemic, multi-scalar design approaches in Mediterranean urban regeneration.

SMART RENOVATION POLICIES AND INTEGRATED FRAMEWORKS

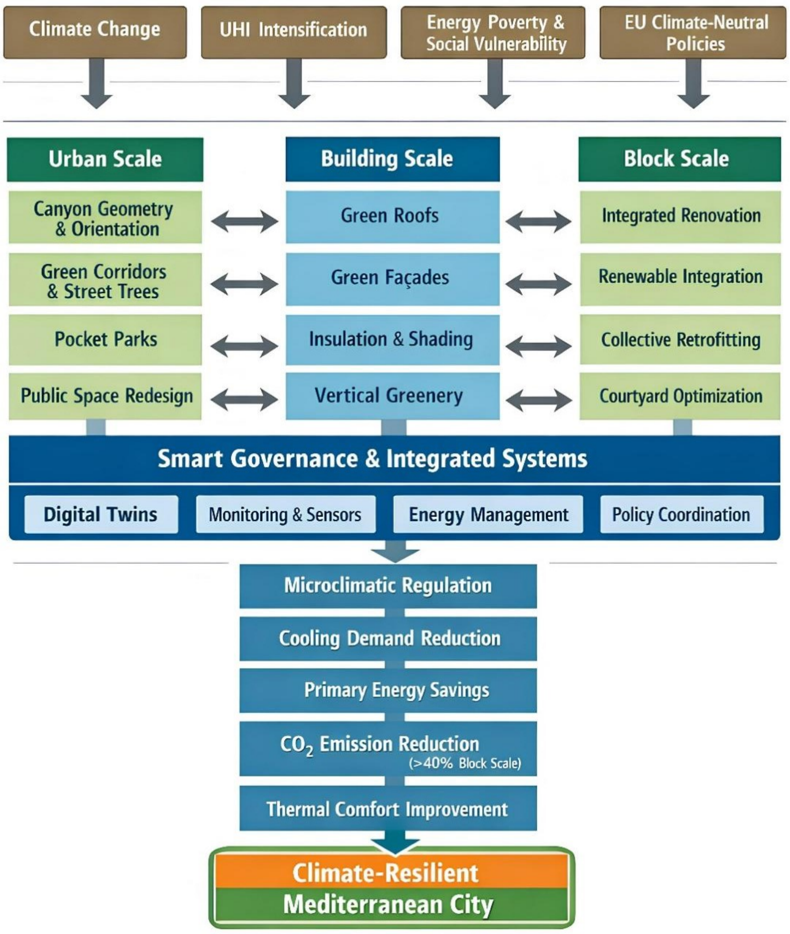
Beyond isolated technical interventions, recent research highlights the importance of policy-oriented frameworks and coordinated smart renovation strategies in maximizing the environmental performance of urban districts. In this context, integrated approaches supported by digital monitoring systems and energy management tools can substantially enhance the long-term effectiveness of building retrofits. Simulated smart-renovation scenarios combining energy efficiency measures, renewable energy systems, and digital performance monitoring can result in significant CO_2 emissions reductions exceeding 40% at the urban block scale (Tsirigoti, 2022). These findings demonstrate that technological integration, when embedded within coordinated planning frameworks, can significantly amplify the benefits of conventional retrofitting strategies.

The transition toward compact, green, and digitally enabled urban environments has also been conceptualized within broader systemic planning models. Artmann et al. (2019) propose a framework illustrating how smart growth principles and green infrastructure strategies can mutually reinforce one another in shaping compact and environmentally responsive cities. Their conceptual model positions cities as complex socio-ecological systems, emphasizing the need to integrate spatial planning, ecological networks, and digital governance mechanisms. By mainstreaming the “ecology of and for cities,” the framework supports both researchers and practitioners in developing long-term visions for smart-compact-green urban development.

A central element of such systemic approaches is coordinated spatial monitoring. Continuous data collection and performance assessment enable municipalities to track environmental indicators, energy consumption patterns, and microclimatic conditions over time. Smart governance mechanisms—supported by digital twins, sensor networks, and building management systems—facilitate evidence-based decision-making and adaptive policy implementation. Importantly, long-term monitoring ensures that projected energy and emissions reductions are not limited to simulation outputs but translate into sustained operational savings and measurable environmental benefits (Kalemis, 2025).

Overall, the integration of policy frameworks, smart technologies, and green infrastructure within a systemic planning approach can strengthen the resilience and performance of compact Mediterranean cities. By aligning ecological design, energy retrofitting, and digital governance, coordinated smart renovation strategies provide a scalable pathway toward low-carbon, climate-adaptive urban transformation.

Figure 1. Integrated Multi-Scalar Framework for Climate-Resilient Urban Regeneration in Mediterranean Cities.



DISCUSSION AND CONCLUSIONS

This paper examined sustainable urban regeneration in Mediterranean cities integrating urban morphology, green infrastructure, building performance, and smart governance frameworks. Climate-resilient urban transformation requires a coordinated approach that connects urban form, public space design, building retrofitting, and digital monitoring within a coherent planning strategy.

At the *urban scale*, the findings demonstrate that green infrastructure interventions—when strategically integrated into compact Mediterranean fabrics—produce measurable and context-sensitive cooling effects. Temperature reductions ranging from approximately 0.7°C to over 3°C in ambient air, and significantly higher reductions in surface temperatures indicate that vegetation is not merely an aesthetic enhancement but a functional climatic regulator. However, the magnitude of cooling is strongly mediated by morphological parameters, including canyon geometry, height-to-width ratios, orientation, and spatial continuity of greenery. This confirms that urban form acts as a conditioning framework that either amplifies or limits the effectiveness of green interventions. Consequently, climate adaptation strategies must be morphology-aware and site-specific rather than prescriptive or uniform.

At the *building scale*, vegetated roofs and façades contribute substantially to both microclimatic improvement and energy performance. Reported reductions in cooling demand (18–35%), primary energy savings (up to 45%), and significant surface temperature decreases demonstrate the dual environmental and economic benefits of integrated renovation strategies. Importantly, urban block-scale retrofitting scenarios consistently outperform isolated building interventions, highlighting the systemic advantages of coordinated upgrading. These results reinforce the need to view buildings not as independent units but as interconnected components within a broader urban energy and climatic system.

The *human scale* perspective further strengthens the argument for integrated greening. Improvements in thermal comfort indices, reductions in mean radiant temperature, and enhanced shading of pedestrian routes directly influence walkability, social interaction, and public health—particularly during prolonged heatwaves. In Mediterranean cities, where summer energy poverty is increasingly documented, climate-responsive urban design becomes a matter of social equity as well as environmental performance. Vulnerable populations, including the elderly and low-income households, benefit disproportionately from reduced thermal stress and lower cooling energy requirements. Therefore, sustainable regeneration must be framed not only as an environmental agenda but as a socio-spatial justice strategy.

The analysis of smart renovation policies and systemic governance models adds a critical institutional dimension to this discussion. Simulation-based evidence suggests that integrating energy efficiency measures with renewable systems and digital monitoring can reduce CO_2 emissions by more than 40% at the block scale. Yet technological capacity alone is insufficient. Long-term performance tracking, spatial monitoring, and adaptive governance mechanisms are essential to ensure that projected environmental gains are sustained operationally. Conceptual frameworks that position cities as complex socio-ecological systems provide a valuable theoretical foundation for this transition, emphasizing coordination between planning, ecology, and digital innovation.

Taken together, the findings support several overarching conclusions:

1. Urban form and green infrastructure are interdependent variables in shaping microclimatic performance. Effective regeneration requires their simultaneous consideration.

2. Integrated, block-scale interventions generate cumulative environmental benefits, outperforming fragmented or building-by-building approaches.
3. Green strategies deliver both climate mitigation and adaptation outcomes, reducing energy demand while improving outdoor comfort and public health.
4. Smart governance and monitoring systems are indispensable for translating design intentions into measurable, long-term environmental performance.

For densely built Mediterranean cities, the pathway toward climate resilience lies in combining compact urban structure with distributed, well-connected green systems and deep energy retrofitting, supported by digital management tools. This integrated model aligns closely with European climate-neutrality objectives while responding to region-specific climatic and socio-spatial constraints.

In conclusion, sustainable urban regeneration in the context of the climate crisis demands a paradigm shift from fragmented interventions to systemic transformation. By positioning urban planning as a strategic driver that integrates morphology, ecology, energy, and governance, Mediterranean cities can evolve toward climate-neutral, thermally comfortable, and socially inclusive urban environments.

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