REBUILDING VENICE: HOUSING, CLIMATE ADAPTATION AND PRACTICAL URBAN RETROFITTING

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INTRODUCTION

"A city is not just stones, palaces, and canals: it is the community of citizens who inhabit it. Without its residents, Venice ceases to be a city and becomes merely a stage."
(Salvatore Settis, If Venice Dies)

Venice represents a prime example of the complex relationship between the conservation of historic heritage, housing affordability, and adaptation to climate change. Although these issues affect many European cities, they take on particular significance in the Venetian context due to the lagoon setting, environmental fragility, and the need to reconcile heritage conservation with the demands of contemporary life and its projections.
To understand this complex relationship requires recognizing how physical and social vulnerabilities are deeply intertwined. In Venice, tourism pressure, rising housing costs and the difficulty of ensuring adequate services all contribute to the displacement of residents and students to the mainland. This phenomenon threatens not only the continuity of the local community, but also the relationships and everyday activities that make the city a lived-in place, rather than simply a heritage site to be preserved. Therefore, housing is not merely a material necessity, but a fundamental element of social cohesion and urban vitality.
The limited opportunities for urban expansion also make the rehabilitation of existing buildings a central issue. The high costs of interventions, together with the risks associated with climate change and rising sea levels, call for a rethinking of regeneration strategies from a perspective that integrates economic sustainability, architectural conservation, and environmental resilience.
The history of Venice nevertheless demonstrates that its identity has never been immutable. As highlighted in *Storia della resilienza di Venezia* (De Marchi et al., 2025), the city has undergone profound economic, social, and technological transformations, adapting its relationship with the sea, the lagoon, and human activities over time. Resilience, therefore, does not consist in keeping existing conditions unchanged, but rather in the ability to address change while preserving the historical and cultural values of the built heritage.
This perspective aligns with the "right to the city" a concept advocated by social movements, t heorists such as Henri Lefebvre, and global policy agendas like UN-Habitat (2019), which asserts that urban space should be shaped and defined by those who inhabit it. This framework demands a holistic approach to urban development, prioritizing access to decent housing, democratic participation, and sustainable adaptation to globalization and climate change.
These elements are viewed as essential, systemic components that enable a good quality of life and the effective use of urban space. Furthermore, this perspective allows for a holistic approach to urban development, one capable of adapting to the challenges and innovations brought about by globalization, while envisioning alternative urban futures and the renewal of cities. Consequently, this framework prompts an examination and definition of the diverse elements that must be taken into account when discussing human settlements, including their constituent background, sides, processes, and developmental phases and, above all, their evolution.
In this sense, linking it to the goal of enabling users to exercise their rights, while simultaneously upholding fundamental values such as historic heritage, the situation becomes complex. This is due to the significance inherent in such heritage and the need for interventions that address external factors that jeopardize the use of the space, the quality of life, and the preservation of the built environment.

Under these conditions, a fundamental question emerges: **"Whose Venice are we planning for, and to whom does it belong?"** Answering this question requires recognising the close relationship between *urbs*, the material structure of the city, and *civitas*, the community that brings it to life. Preserving buildings without ensuring that people can continue to inhabit them risks safeguarding the image of the city at the expense of its vitality.

This reflection gives rise to **Rebuilding Venice: Housing, Climate Adaptation and Practical Urban Retrofitting**, a contribution that approaches Venice from multiple perspectives and is structured around three dimensions:

- **Living (housing, affordability, and urban vitality)**: placing habitability and a sense of belonging at the heart of everyday urban life, recognising students as active members of the community, and addressing the demographic imbalance driven by tourism pressure.

- **Adapting (climate resilience and heritage conservation)**: adapting to climate change without compromising architectural identity or local culture, assessing the durability of interventions at the building scale and their social justification in which it is necessary to acknowledge that major protective infrastructure like the MOSE are time-limited solutions.

- **Regenerating (intervention strategies, feasibility, and governance)**: developing shared-cost financing models with strong public participation, overcoming the fragmentation between the historic centre, the mainland, and the lagoon, and ensuring transparency in planning processes by clarifying “who benefits from what.”

Rebuilding Venice thus conceived of regeneration not as a simple process of building rehabilitation,but as a project to restore habitability and social vitality. Rebuilding Venice means preserving not only its inherited heritage, but also the conditions that will allow the city to continue to be lived in,transformed, and passed onto future generations.

1. LIVING VENICE: HOUSING, ACCESSIBILITY, AND URBAN VITALITY

The sustainability of a historic city depends on whether residents can remain living in their neighborhood and take part in daily civic life. From this perspective, housing is a fundamental dimension for understanding the contemporary transformations taking place in Venice. The city's resident population decreased by 11% in just over three years, dropping from 52,760 in April 2023 to 46,964 in September 2026 (OCIO, 2026). Residential stability is essential to maintaining the social, economic, and functional continuity of the city. This crisis is especially intense in Venice's historic center, where the surge of tourist rentals, increasing maintenance costs of historic buildings, and real estate market speculation are pricing out long-term residents (Figure 1-2).

Figure 1: Demographic and Accommodation Trends in the Historic Centre

Indicator	Previous Period	September 2026	Trend
Resident Population	52,760 (Apr 2023)	46,964	– 11.0%
Total Tourist Beds	44,484 (Apr 2023)	50,207	+ 12.8%
Tourist Rental Beds	19,016 (2019)	24,760	+ 30.0%
Traditional Hotel Beds	25,468 (2019)	25,447	Stable

Source: OCIO (2026) data.

Figure 2: Spatial Distribution of Demographic and Tourism pressure



The chart illustrates the acute concentration of tourism in Venice's historic centre. While housing only 19% of the municipal population, the historic city absorbs 69% of all tourist rental beds. Source: OCIO (2026) data.

As these figures shows, tourist rentals are actively consuming the physical fabric necessary for the residential property market. Venice's reality reflects a broader context of difficulties in accessing housing. The European Commission's European Affordable Housing Plan (2025) reports that, between 2013 and 2024, nominal house prices across the European Union increased by more than 60%, while average rents rose by approximately 20%. Although these dynamics affect urban areas across Europe, Venice pushes them to an extreme, an open market pressure collides with strict conservation rules and a restricted island.

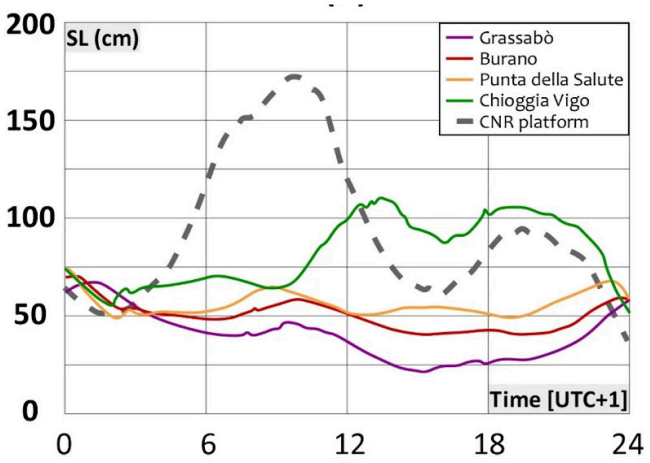
Living in Venice means fostering social relationships, supporting local services, sustaining everyday activities, and contributing to the continuity of local communities, calling into question its ability to remain a lived-in place rather than simply a tourist destination. From this perspective, underused housing stock represents a potential resource. However, its recovery requires a distinction between genuinely vacant units, those requiring renovation or those tied up in legal or

those requiring renovation or those tied up in legal or ownership constraints.
The estimate that 26% of the housing stock is unused, must also be verified against the definition adopted and the geographical area to which it refers. Furthermore, building renovation does not automatically guarantee affordability: the costs of refurbishment, rental prices, and the conditions that enable residents to maintain access to housing over time must also be taken into account. At the same time, incorporate potential modifications,taking into account the conditions under which the original structures were built as well as the new context (especially regarding climate), while also considering their materials and structural factors such as ventilation, permeability, and moisture. Housing must be addressed in relation to the overall spatial organisation of the territory. The concept of “Functional Venice”, introduced in the *Scenario di sostenibilità urbana integrata* (De Marchi, Oliva and Pace, 2025), moves beyond an isolated view of the historic centre towards an understanding of the relationships between housing, employment, education, mobility, and services, including those connecting Venice with the mainland and the wider metropolitan area, as an integration between the mainland, the islands, and the coastal zone, with their diverse dynamics and interests.
Within this framework, university students represent a vital demographic for the city’s future. I nitiatives like the Venice City Campus project, promoted by the Venice Sustainability Foundation (VSF), seeks to diversify the local economy through research, higher education, and reuse of existing buildings. However, students must not be viewed merely as temporary visitors or consumers. Current housing costs and leasing conditions present significant challenges for students, frequently leading them to look toward mainland dormitories for stability. Expanding affordable dedicated student housing through partnerships between private and public entities, is essential to maintaining social continuity in the historic centre. Students must have the physical and social conditions to experience Venice as an active, integrated part of the host community.
Ensuring Venice’s vitality requires aligning property regulations, tourism rental quotas, public housing recovery, and affordability protections into a single strategy. Housing cannot be treated merely as an investment asset; it is the foundation of civic survival. Rebuilding Venice begins with giving residents, families, and students the security to remain, establishing the social fabric that must underpin any architectural or climate intervention.

2. ADAPTING VENICE: CLIMATE RESILIENCE AND HERITAGE CONSERVATION

Climate change presents an existential challenge to the built fabric of Venice. While large-scale engineering works, most notably the MOSE (Experimental Electromechanical Module) barrier system at the lagoon inlets, provide essential protection against extreme high-water events (*acqua alta*), relying on them alone offers only a partial solution (Figure 3). As highlighted in PSSG 2, the MOSE essentially buys time: it shields the city from catastrophic storm surges, but it cannot prevent the slow, continuous physical deterioration of the urban fabric. Besides, the trade-offs in its use is questionable, as it has severe environmental and financial implications.

Figure 3: Sea Level



Sea level observations during the extreme storm surge of 22 November 2022, demonstrating the operational impact of the MoSE barriers. The external sea level (CNR platform, dashed line) reached approximately 173 cm, while the protected water level inside the historic centre (Punta della Salute, orange line) was maintained safely at approximately 60 cm. Adapted from Bajo et al. (2023).

Relative sea-level rise in the lagoon continues to accelerate. Recent data from *Istituto Superiore per la Protezione e la Ricerca Ambientale* (ISPRA, 2025) indicates the mean relative sea-level rise in Venice reached approximately 4.8 mm/year between 1993 and 2024, nearly doubling the historical average of 2.6 mm/year observed over the period 1872 and 2024. This phenomenon, influenced by both variations in ocean levels and local land subsidence, highlights the territory's growing vulnerability. The European Climate Risk Assessment report (EEA, 2024) places these issues within a broader context, emphasising the interconnections between climate risks, infrastructure, health, ecosystems and economic activities.

Recurring dampness, exposure to salts, overheating, inadequate ventilation and energy inefficiency all affect the conservation of the built heritage and living conditions. The publication *Storia della resilienza di Venezia* (De Marchi et al., 2025) provides a historical perspective on these issues by examining urban transformations and the relationship between the city, the lagoon environment and infrastructure. It highlights the importance of understanding resilience not as freezing the city in time, but as the capacity to respond to environmental change while maintaining the essential civic and residential functions.

For this reason, the refurbishment of historical buildings requires specific strategies capable of reconciling climate change adaptation and energy performance with the conservation of architectural and cultural values. Retrofit should be understood as a considered transformation of existing buildings that improves living conditions and reduces vulnerability without compromising essential spatial qualities. Furthermore, as questioned during PSSG2 discussions, planning must critically examine the policies that govern these typologies. No single technical solution is suitable for every structure; heritage conservation policies must evolve to enable everyday habitability,

avoiding rigid constraints that turn architectural preservation into a barrier to technical improvements, climate protection and housing access.
Heritage conservation and building retrofitting must also be incorporated into a broader urban strategy that considers the relationship between residential living, economic activities and tourism. As articulated in *Scenario di sostenibilità urbana integrata per Venezia e il suo territorio* (De Marchi, Oliva and Pace, 2025), tourism is a structural component of Venice's urban reality and must be assessed in relation to environmental fragility and the needs of the resident population. When applied to historic housing, circular adaptation frameworks, such as those promoted by the Venice Sustainability Foundation (VSF), should prioritise cyclical maintenance and the reuse of existing materials rather than continuous, disruptive rebuild. Crucially, as emphasized in PSSG2, adaptation measures should evaluate whether an intervention will endure over time and whether its social outcome justifies the logistical effort and cost. Upgrading the built fabric must not simply serve tourism pressure, public resources and retrofitting initiatives must ensure that environmental protection and structural investments directly sustain the everyday resident community.
The sources considered highlight the need to integrate climate risk assessment, heritage conservation, building refurbishment, and economic feasibility into a unified agenda. Venice's true challenge is to reduce climate vulnerability without compromising the city's historical identity, while ensuring that buildings remain functional, protected and habitable. Resilience must not therefore be understood as a purely defensive engineering effort, but as an integrated process that links environmental protection with social continuity, keeping the living community firmly at the center of Venice's future.

3. REGENERATING VENICE: INTERVENTION, FEASIBILITY, AND GOVERNANCE STRATEGIES

Translating habitability and climate adaptation into physical reality requires clear operational and governance strategies. As outlined in *Venezia Città Circolare* (Colombara et al., 2025), urban regeneration cannot be treated as a collection of isolated architectural projects; it must be approached as a coordinated system that combines resource efficiency, structural maintenance, and long-term residential continuity.

Determining where and how to intervene requires moving beyond uncoordinated restorations to comprehensive assessment. Building selection must evaluate conservation status, ownership structures, refurbishment costs, and heritage constraints alongside the concrete potential to restore stable residential use. Moreover, the recommended scale of intervention is of entire building complexes or street fronts, rather than isolated flats, which may create economies of scale that can significantly reduce project overheads and simplify technical coordination. Feasibility must also balance technical and environmental metrics with social outcomes, ensuring that public investments do not end up subsidizing real estate that slips out of the residential market.

The financial structure of the execution is a challenge that must not depend solely on private investment, submitted to profitability-driven choice. Regenerating the city requires innovative, shared-cost financing models that blend public subsidies, private investments, and civic resources. Where public funds are deployed, whether through direct renovation grants, subsidized loans, or tax incentives, they must be legally tied to binding affordability clauses. These clauses must guarantee long-term residential occupancy, rent caps, and ongoing maintenance obligations and flexible regulations,ensuring that public expenditure directly serves the local community rather than short-term real estate profits.

Sustainable regeneration requires overcoming the deep administrative and spatial fragmentation between the historic centre, the mainland, and the wider lagoon basin. As highlighted in *Scenario di sostenibilità urbana integrata* (De Marchi, Oliva, and Pace, 2025), Venice operates as an interconnected metropolitan system where housing, transport, university life, and employment are interdependent. While collaborative platforms like the Venice Sustainability Foundation (VSF) facilitate dialogue among public bodies, universities, and private actors, Venice still lacks a permanent institutional mechanism dedicated to delivering non-market affordable housing. Overcoming institutional divides requires transparent planning processes that explicitly answer the question raised in PSSG 2: **“who benefits from what?”** Decision-making must make clear how costs, risks, and tangible benefits of regeneration are shared among public institutions, private investors, and permanent residents in a multifunctional approach, considering the lifetime of each intervention.

To translate these principles into practice, an operational approach can be structured around four main stages:

- **Building Selection**: Identifying underused public and private assets based on structural condition, ownership, and residential potential.
- **Evaluation and Design**: Comparing technical solutions and balancing upfront retrofitting costs against long-term maintenance and heritage compatibility.
- **Financing and Management**: Structuring shared-cost funding mechanisms with clear commitments regarding rent affordability and resident access.
- **Outcome Monitoring**: Tracking indicators such as restored housing units, energy performance, maintenance costs, and residential stability.

Starting with localized pilot initiatives supports gradual adaptation over time, allowing technical and financial approaches to be refined before applying them more broadly.

Ultimately, urban regeneration must not be reduced to physical restoration alone. By pairing technical feasibility with shared-cost financing and transparent governance, Venice can move beyond stated ambitions toward measurable community outcomes. Regeneration succeeds only when it protects the city’s built heritage while guaranteeing that the social, economic, and environmental benefits remain firmly anchored in the lives of those who inhabit it.

CONCLUSION

Venice raises a fundamental question for the future of historic cities worldwide: how can an exceptional cultural and architectural heritage be preserved while securing the social, economic, and environmental conditions that make everyday life possible? Across the three dimensions examined, Living, Adapting, and Regenerating, it is evident that housing affordability, climate resilience, and urban governance are not separate technical sectors, but interdependent parts of a single spatial reality. Protecting the built fabric is tied directly to confronting the pressures that displace the local community.

Given the exceptional complexity of Venice, urban resilience cannot be delivered through rigid, top-down blueprints. Venice requires instead a process of gradual adaptation, mirroring the historical capacity of human communities to continually adjust their relationship with the lagoon environment. True sustainability extends far beyond green technology or flood barriers: it requires keeping local communities, craftsmanship, memory, and everyday social life alive, safeguarding the human foundations that make Venice a living city rather than a preserved stage.

Translating this perspective into practice requires overcoming the deep administrative and spatial fragmentation between the historic centre, the mainland, and the wider lagoon basin. Interventions cannot be planned in isolation. Public and private resources must be combined through shared-cost financing models tied to binding affordability conditions, preventing public investments from simply subsidizing short-term tourism conversion. Urban planning processes must maintain absolute transparency, continuously addressing the critical question raised during the conference: **“who benefits from what?”** The physical and economic benefits of urban regeneration must remain firmly with the people who inhabit the city.

In this light, Rebuilding Venice conceives of regeneration as a process of gradual experimentation. Rather than imposing sweeping changes, planning should move forward through targeted pilot initiatives, identifying underused buildings, testing retrofit strategies compatible with historic typologies, structuring fair financing models, and monitoring residential outcomes over time. Important open questions naturally remain: evaluating whether building-scale interventions realistically endure against rising sea levels to justify their logistical effort and cost, establishing where heritage conservation rules must evolve to permit essential habitability upgrades, and designing permanent governance frameworks that defend the rights of permanent residents and students.

Ultimately, the challenge is not to freeze Venice as an unchanging image of the past, nor to treat it merely as an object of material conservation. Resilience does not mean choosing between the stones of the city (*urbs*) and the community that brings them to life (*civitas*). Rebuilding Venice means ensuring that the city remains, sustainably and permanently, a place to live, study, work, and belong, preserving its inherited heritage by safeguarding the living community that will carry it forward into the future.

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