H4A - ISOLAx

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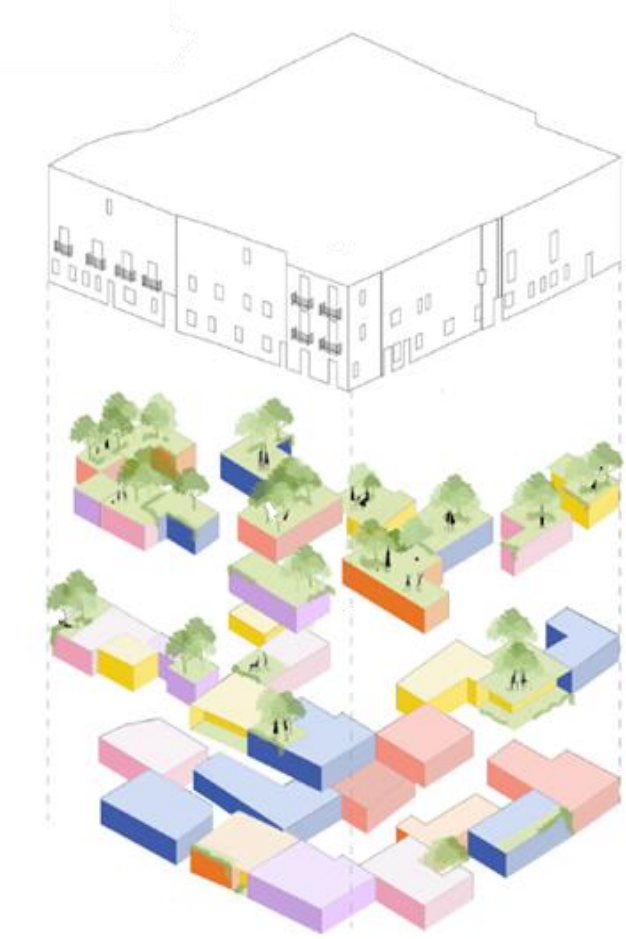
Executive summary

The ISOLAx project is an innovative urban regeneration initiative designed to tackle the intertwined issues of housing inadequacy, social fragmentation, and economic decline in Taranto's historic Old City, an area plagued by vacant buildings and precarious living conditions. The project's main objective is to establish a viable pathway to rehabilitate underutilized public buildings into inclusive housing for a diverse population. Key innovation drivers include a modular construction system using repurposed maritime containers and an innovative mixed-tenure rental model with cross-subsidization. This approach is expected to deliver approximately forty modular housing units, significantly reduce carbon emissions and construction times, and foster long-term social cohesion. Ultimately, ISOLAx offers a replicable blueprint for sustainable urban living that generates over €2.5 of social value for every euro invested.

Key Words

Urban regeneration, Modular housing, Social inclusion, Cross-subsidization, Sustainability.



Representative axonometric exploded view.

Project description written by the Principal Academic Tutor

ISOLAx is a collaborative initiative aimed at fostering social and urban regeneration in Taranto Vecchia. It builds on the groundwork of Isola che Accoglie, a project carried out with local partners and institutions, extending its collaborative spirit into a new phase of research, prototyping, and testing innovative housing solutions. Developed together with ASP students under the guidance of Fondazione Impact Housing and Homes4All, ISOLAx combines exploration, design, and field engagement with the community.

The project investigates how vacant and underused buildings can be transformed into a mixed social housing model that balances economic sustainability, social inclusion, and respect for cultural heritage. Through an innovative modular approach, based on off-site construction and adaptive reuse, ISOLAx experiments with flexible housing solutions designed to integrate different resident profiles: tourists, remote workers, local families, and people in vulnerable situations. A cross-subsidization mechanism ensures that market-rate rents help sustain affordable housing, creating a fair balance between financial feasibility and social mission. What makes ISOLAx distinctive is the way it blends evidence-based research with human-centered design. ASP students engaged directly with inhabitants, activists, builders, and institutions in Taranto Vecchia, turning fieldwork into a collective learning space. This highlighted how regeneration is not only about restoring buildings, but also about reactivating communities, trust, and shared visions for the future.

Finally, by adopting tools such as Social Return on Investment (SROI), the project demonstrates that housing initiatives can generate measurable value not only for investors, but also for families, neighborhoods, and public administrations. ISOLAx therefore stands as both a local experiment and a replicable model, an example of urban regeneration that goes beyond gentrification and becomes a driver of inclusive growth, resilience, and opportunity.

Team description by skill

The ISOLAx project was undertaken by a multidisciplinary team of Alta Scuola Politecnica (ASP) students and guided by academic and external tutors, ensuring a comprehensive approach to complex urban challenges. The team members and their respective areas of expertise include:

• **Daniela Antonelli**, from Construction Engineering at Politecnico di Torino, was responsible for the technical aspects of the project. Her work focused on evaluating the feasibility of modular solutions, including the use of repurposed containers as a sustainable and adaptable building system.

• **Alice Frigerio** and **Daniele Maccarrone**, both Management Engineers from Politecnico di Milano, handled the financial dimensions. Their contributions included economic analysis, assessing the Return on Investment (ROI) and Social Return on Investment (SROI), and defining the innovative cross-subsidization mechanism for the housing model.

• **Ana Claudia Ocampo**, specializing in Urban Planning and Policy Design from Politecnico di Milano, conducted the urban analysis. She developed the framework for seamlessly integrating the proposed housing model within the unique context of Taranto Vecchia.

• **Gina Pulcini**, from the Master of Science in Communication Design at Politecnico di Milano, managed the communication and dissemination strategy. She designed the accessible booklet and oversaw all visual communication to ensure the project's outputs were clear and engaging for a wide range of stakeholders.

This diverse skill set allowed the team to integrate financial sustainability, urban regeneration strategies, technical feasibility, and effective communication into a coherent and replicable model.

Goal

The overarching goal of the ISOLAx project is to provide a comprehensive and replicable framework for rethinking housing and urban regeneration, specifically targeting the multifaceted challenges evident in Taranto Vecchia, Italy. The initiative aims to address the severe depopulation, physical decay, social fragmentation, and economic fragility that characterize this historic urban center. ISOLAx seeks to reactivate abandoned spaces and transform underutilized public buildings into inclusive, sustainable housing that caters to a diverse population, thereby strengthening local communities and promoting collaborative forms of living.

A central objective is to balance affordability with financial viability through an innovative multi-tiered rental system and a social cross-subsidization mechanism, ensuring that regeneration efforts foster social cohesion without leading to displacement or gentrification. The project also aims to leverage innovative financial mechanisms and public-private partnerships to ensure economic sustainability, minimizing reliance on public subsidies. It endeavors to preserve and enhance the rich cultural and architectural heritage of the Old City, ensuring that interventions respect its historical value while introducing modern, sustainable solutions.

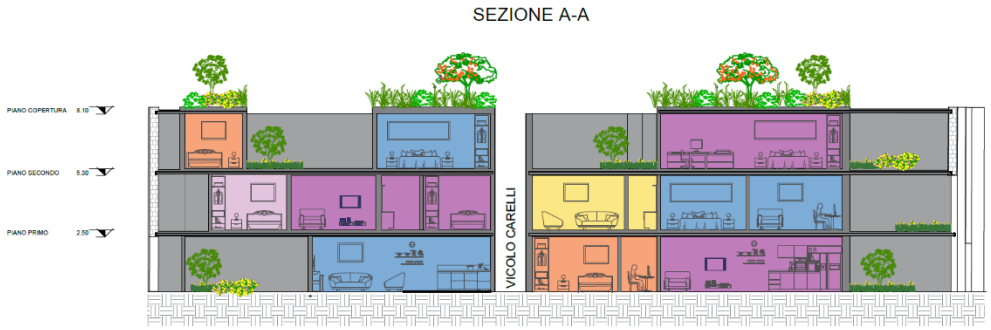
Ultimately, ISOLAx intends to serve as a scalable and adaptable blueprint for other cities confronting similar issues of urban decay and housing crises. By integrating architectural innovation with social inclusion and financial sustainability, the project strives to generate long-term impact and urban renewal, transforming Taranto Vecchia into a livable and sustainable district for future generations and providing practical tools for evidence-based housing strategies.

Understanding the problem

The Old City of Taranto, or Taranto Vecchia, stands as a stark example of the interconnected challenges facing many historic urban centers globally, encompassing severe depopulation, urban decay, housing inadequacy, economic fragility, and social exclusion. Once home to over 30,000 inhabitants in the 1940s, the population has plummeted to fewer than 4,000 residents today. A staggering 45% of its 145,500 m^2 building stock lies abandoned or underutilized, with approximately 13.65% of residential properties vacant. Many of these vacant properties suffer from significant physical degradation, structural instability, and legal complications such as uncertain ownership rights, undefined inheritances, and disputes among heirs, all of which severely hinder rehabilitation efforts. Over 20,000 m^2 of buildings are deemed unsafe, and about 45,000 m^2 are considered vulnerable, requiring massive investments for restoration.

This physical decline is compounded by deep social and economic fragilities. A significant portion of the population lives in poverty, experiencing low incomes and limited employment opportunities, which exacerbates housing insecurity and heightens the risk of eviction. Socially, the area is characterized by isolation, weak social ties, and an aging population, contributing to profound social fragmentation. Environmentally, many buildings are energy-inefficient, further reducing residential quality. Logistical constraints, such as the island's morphology and narrow access routes, limit the entry of construction vehicles, making interventions slower and more costly than in conventional settings.

Traditional regeneration approaches, which often focus narrowly on physical restoration, have proven insufficient to address these multidimensional issues. For instance, the local "Case a 1 Euro" program, despite its good intentions to incentivize private investment, faced substantial limitations, including bureaucratic delays, high restoration costs, and logistical difficulties, with cases like Anna Krivosheeva highlighting the practical unfeasibility for many participants due to structural problems and administrative hurdles. There is a critical need for an integrated model that combines affordable housing, social inclusion, economic sustainability, and cultural preservation in a comprehensive and replicable manner.



Typical sections.

Representative plans of the layout of the housing units for each floor.

Exploring the opportunities

Despite its challenges, Taranto Vecchia possesses significant inherent potential, which the ISOLAx project aims to harness for urban regeneration. Its rich historic heritage, strategic location between the Mar Grande and Mar Piccolo, and the resilience of its local communities provide fertile ground for experimentation with innovative urban regeneration models capable of generating social, cultural, and economic value. Recovering the island's extensive abandoned building stock, which amounts to 45% of its total, represents a strategic opportunity not only for historical preservation but also for repopulating the island, strengthening social cohesion, and stimulating the local economy. Projections indicate that redeveloping 45,000 m^2 could create approximately 2,870 housing units, bringing in around 4,300 additional inhabitants.

Opportunities also lie in applying successful urban regeneration strategies and co-housing models observed internationally. Case studies like Ortigia in Syracuse demonstrate how the recovery of historic heritage and the introduction of new cultural functions can revitalize an area. The Manifattura Tabacchi in Florence showcases how gradual and participatory processes, including temporary uses and cultural programming, can effectively reactivate degraded spaces and guide long-term planning. International co-housing examples such as Stacken in Sweden and Melfield Gardens in England illustrate how collaborative living can combine affordability, social cohesion, and sustainability. These precedents, along with modular construction projects like Keetwonen in Amsterdam and Container City 1 in London, provide valuable lessons in governance, design, financial mechanisms, and the potential for replicable models, all of which inform ISOLAx's approach. The modular design itself ensures adaptability to different local needs and scalability across urban contexts.

Generating a solution

The ISOLAx project generates an innovative solution embodied in a "Tetris" building design, a metaphor for its modular, flexible, and adaptive construction system that alternates full and empty spaces. This concept merges technological, typological, financial, institutional, legal, and social innovations to address housing market inequalities and revitalize Taranto's Old City. The solution targets an underused public property of approximately 700 square meters, proposing about 1,800 square meters of living space distributed across forty modular housing units, alongside shared green and communal spaces.

A core component is the adoption of a modular construction system utilizing repurposed maritime containers, typically measuring 12x3 meters. This off-site prefabrication approach allows for fast, sustainable, and cost-effective building methods, significantly reducing construction times by up to one-third (projected 11 months) and costs by up to 30% compared to traditional techniques. The design respects the historic tuff stone façades, which are statically consolidated and deliberately separated from the new self-supporting container structure by elastic joints, ensuring preservation of architectural identity while enabling reversible interventions.

Beyond the architectural solution, ISOLAx develops an innovative mixed-tenure rental model, strategically allocating units among Global (25%), Glocal (25%), Local (30%), Social (10%), and Very Social (10%) residents. This diversity is supported by a cross-subsidization financial mechanism where higher-rent units fund affordable accommodations, ensuring economic accessibility and fostering a balanced, inclusive community. The project also commits to environmental sustainability, with buildings designed to meet Class A4 energy certification standards, projecting a 40% reduction in CO2 emissions compared to traditional construction. This integrated approach leads to an estimated annual Return on Investment (ROI) of 4.7% and a Social Return on Investment (SROI) of €2.5 for every euro invested, demonstrating both financial viability and significant social impact.

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