

ISSN 2385-1031 [Testo stampato]  
ISSN 2385-0671 [Online]

# Housing Policies and Urban Economics

HoPUE

Vol. 6 - Giugno 2017



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**Cover making and Content Pagination**

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Housing Policies and Urban Economics – Vol. 6 (Giugno 2017)

ISSN: 2385-1031 (print)

ISSN: 2385-0671 (online)

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## Preface

In the current issue of HoPUE the role of public space in the contemporary city is analyzed, since it is a key element for the improvement of urban connections and usability of open spaces. The use and transformation of these spaces has recently been debated within the Biennial of Public Space (2017), aimed at discussing and activating innovative processes of sustainable urban development.

The first section includes two contributions: the first one, by Bosco, Rinaldi e Chiribiri, describes regeneration projects for historical urban areas characterized by loss of identity and lack of public spaces. The authors underline the role of architects and urban planners in guiding urban changes, highlighting the importance of the involvement of city users in defining the urban redevelopment projects, so to consider ways and times of use of urban space. They also report recent urban experiences such as bike sharing or guerrilla gardening, conducted to address climate change and improve air quality in cities. In the second paper, Barbara Di Vico analyzes the ancient and contemporary public space, underlining the need to give back to it the role and functions within the urban organization through the participation of citizens in decision-making processes aimed at redevelopment.

The contribution of the authors Carmen Rauccio and Antonella Della Cioppa is focused on the physical and social changes of the contemporary urban areas. In particular, the paper addresses the gentrification processes in some historic Catalan neighborhoods and in the case of Naples. Gentrification can be a question for the contemporary city; however, an adequate public intervention can guide the socio-economic dynamics, favoring sustainable urban policies, respectful of the residents' requests and aware of the specific character of the places.

The section on energy saving is focused on the contribution of Michele Lepore who describes the technological system Barra-Costantini. The author presents the applications to the cases of an agricultural settlement in Egypt and a housing complex in Marostica (Italy).

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*Questo numero di HoPUE è incentrato nella prima parte sui temi della qualità urbana e della rigenerazione degli spazi pubblici. Il ruolo dello spazio pubblico nella progettazione della città contemporanea è analizzato come elemento determinante ai fini del miglioramento delle connessioni urbane e della fruibilità degli spazi aperti. La questione dell'uso e della trasformazione di tali spazi è stata recentemente dibattuta in seno alla Biennale dello Spazio pubblico 2017, finalizzata a discutere ed attivare processi innovativi di sviluppo urbano sostenibile.*

*L'articolo di Bosco, Rinaldi e Chiribiri presenta casi di rigenerazione di tessuti urbani storici caratterizzati da perdita di identità e mancanza di spazi pubblici. Gli autori sottolineano come architetti e urbanisti giochino un ruolo essenziale nel guidare*

*i cambiamenti urbani, offrendo alla città il disegno di nuovi spazi. Al progetto urbano è riservato il difficile compito di cogliere i valori dei luoghi su cui esso interviene, definendo appropriate strategie di riqualificazione. Il contributo sottolinea altresì l'importanza del coinvolgimento dei city users nella definizione del progetto di riqualificazione urbana, al fine di considerare i modi e i tempi effettivi di uso dello spazio urbano. Infine, si rimarca l'esigenza di affrontare la progettazione dello spazio pubblico attraverso una lettura orientata ai problemi concreti della città contemporanea, tenendo conto della vivibilità degli spazi di vita quotidiani, e offrendo spunti di riflessione su recenti esperienze urbane come il bike sharing o il guerrilla gardening, condotte per far fronte ai cambiamenti climatici e al miglioramento della qualità dell'aria nelle città.*

*Nel secondo articolo, Barbara Di Vico analizza lo spazio pubblico contemporaneo, sottolineando la necessità di restituire ad esso ruolo e funzioni nell'organizzazione urbana attraverso la partecipazione dei cittadini nei processi decisionali volti alla riqualificazione. Le logiche speculative hanno spesso compromesso il carattere culturale e simbolico dei luoghi urbani, e la tradizionale organizzazione funzionale della città non ha consentito una risposta sempre efficace alle dinamiche della società moderna. L'introduzione offre un breve excursus storico teso ad evidenziare come oggi lo spazio pubblico abbia perso l'originario carattere di centralità nel sistema urbano, configurandosi sempre più come spazio di attraversamento. Tuttavia, in alcuni casi esemplari di urbansitica partecipata, i cittadini contribuiscono attivamente alla gestione e alla salvaguardia dello spazio pubblico, il quale torna ad essere luogo di identità e di aggregazione degli abitanti anche nel caso di ambiti urbani periferici, degradati o dismessi.*

*Sul mutamento fisico e sociale delle aree urbane contemporanee è incentrato il contributo delle autrici Rauccio e Della Cioppa. L'articolo è focalizzato sui processi di gentrificazione in atto in alcuni storici quartieri catalani e con riferimento al caso di Napoli. Gli effetti di tale fenomeno sociale, economico e culturale - ormai diffuso in molte città - sono rintracciabili in una sorta di omologazione delle aree urbane interessate, con riqualificazione edilizia e ridefinizione funzionale degli immobili, conseguente aumento dei prezzi di compravendita e affitto degli alloggi, allontanamento degli abitanti originari verso zone periferiche carenti in servizi. Tuttavia, un adeguato intervento pubblico può orientare le dinamiche socioeconomiche, favorendo politiche urbane sostenibili, rispettose delle richieste dei residenti e accorte rispetto al carattere specifico dei luoghi.*

*La sezione sul risparmio energetico è focalizzata in questo numero sul contributo di Michele Lepore che descrive il sistema tecnologico Barra-Costantini, muro solare passivo ad alte prestazioni termiche. L'autore presenta le applicazioni del sistema ai casi della realizzazione di un insediamento agricolo in Egitto e di un complesso abitativo a Marostica (Italia).*

Barbara Ferri

## **Redeveloping public spaces in the consolidated city**

A. Bosco<sup>1</sup> S. Rinaldi<sup>2</sup> G. Chiribiri<sup>3</sup>

**Abstract.** A redevelopment project of public spaces in the consolidated city has to meet two contradictory needs: the first is linked to the dynamics of the social and anthropological change that is conveyed to the evolution of the city; the second gathers the impulses of settling that make the city the place in which the majority of the urban community is recognized. This work discusses those southern Italian towns that have originated from the unplanned growth of rural villages and have subsequently assumed an urban nature that is more similar to a metropolitan suburb than a small traditional Italian municipality. A systemic reading of these micro-contexts considers space to be structured in environments and invasions, while also analysing the architectural, environmental, and microclimatic aspects along with the perceptual relationships that arise between the inhabitants and the public space.

**Keyword:**

Public space, Environmental reclamation, Fruition quality

### **Introduction**

When interacting with architectural design tools on the living tissue of the city, the insidious territory of the “urban project” is addressed. It has been a cause of contrast or at least a heated debate between urbanists and architects for many years. The problem exists and is not elusive when considering that the urban project, by its nature, does not propose only the physical transformation of a space but inevitably defines new patterns of coexistence among people. An intervention on a part of the city proposes the redefinition of the urban function of the place, with town planners having always considered it to be their discipline. However, from the point of view of an architect, this appears to be a flawed problem when considering that the project of architecture, even when it intervenes on limited small lots, always ends up establishing new social relationships as well as creating a new use of the surrounding space. This results in the boundaries between the disciplines become blurred and forces the designer working on the urban scale to consider with equal attention both the formal aspects of the project as well as the behavioral consequences it creates. In conclusion, it can be argued that both

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architects and urban planners play a role of orientation and governance of urban change with specific and distinct ways and methods, but which, in some cases, tend to overlap each other without this necessarily causing a depletion of the respective disciplinary statutes.

## **2. The analysis strategies and methodological references for interventions on public spaces**

Antonio Bosco

This paper describes the intervention strategies on the built historic fabric of some towns in the province of Caserta, characterized either by the loss of urban identity or the lack of public places capable of inducing a resident population to have a real consciousness of belonging. The city consists mainly of people as well as of roads and buildings and if these people do not share places to exchange ideas, sell goods, and discuss the fate of the city itself, then they cannot become a community. It is not by chance that the crisis of modern metropolises arises primarily from the social disintegration of the inhabitants as well as the loss of identity and awareness of the role that each citizen assumes within the community.

Much of the existential discomfort that can be found in the contemporary city derives from the changing social dynamics that regulate the relationships between the inhabitants and the changing lifestyles of individuals and groups. The distorted concept of modernity that derives from the use of new media is inexorably changing the way people relate to and between them as well as the physical environment in which they live. The frequenting of public places is for this reason increasingly compressed into a “utilitarian” use, whereby urban space is no longer a meeting place but a simple crossing space to reach a service, a friend or a job. Every part of the city, whether it is within a multi-layered historical centre or belonging to the most squalid suburbs, condenses inside it meaning and symbolism that descend directly, though not always immediately intelligible, from the care with which it was designed, realised and maintained as well as by how much intelligence has been incorporated.

The urban project must be able to recognise the explicit or implicit features that characterise the different spaces and define, from time to time, appropriate strategies to either return the quality or invent new ones.

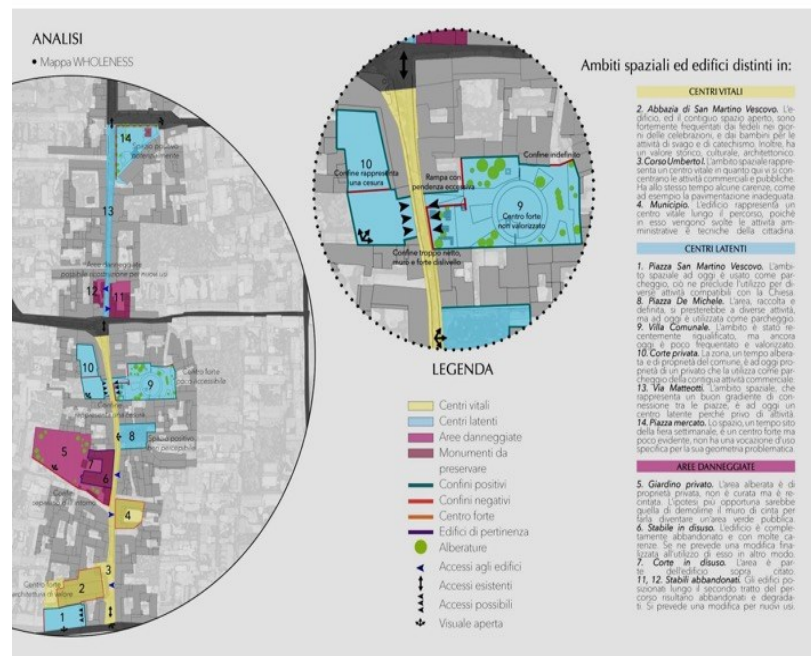
For each case dealt with an urban centre analysed, common and shared approach strategies are adopted that allowed to compare analogies and differences between various sites. In setting up the study to assess the quality of public spaces, it has been attempted to combine Kevin Lynch’s perceptive approach (based on the recognition and attribution of a symbolic value to the elements of the urban scene by of the users) with the sociological analysis proposed by Jan Gehl (oriented to describing the ways of fruition of the city). Finally, for the synthetic representation of the urban value of the constituent elements of each neighbourhood, the method proposed by Christopher



Alexander has been adopted, which identifies, according to a well-defined scale, the actual or potential value of the constituent elements of the urban landscape by distinguishing them as *vital centres*, *latent centres* and *damaged areas*.

The analysis primarily focuses on the state of the sites, aiming at a more detailed description of the plots of architectural and urban surfaces for the recognition of materials and their suitability for use with respect to local tradition. The significance of material degradation and the functional obsolescence of the equipment and urban furniture elements are an integral part of this first cognitive step.

Public and semi-public urban voids (streets, squares and courtyards) are represented by applying a straightening of the photographs of the architectural scenes that define them, thus obtaining a synthetic and realistic view of the places where the chromatic and formal aspects can be captured evaluating their recurrences and singularities.



(Fig. 1) Analysis of the wholeness, according to the method of Ch. Alexander, of a historical urban compartment.

Maria Rosaria Carpinello: Eco-oriented redevelopment of public spaces in Macerata Campania. University of Campania "Luigi Vanvitelli" Master's degree in Architecture, thesis in architecture technology, supervisor prof. Sergio Rinaldi co-supervisor prof. arch. Antonio Bosco academic year 2015/16

The analysis of the state is completed by realising an accurate abacus of the architectural elements characterising the building curtains (portals, windows, balconies, etc.) and decorative elements that define the nature of the public space (pavements, kerbstones, benches, street lamps, fountains, etc.). This stage of the analysis includes a

detailed survey of the urban greenery (typology, consistency, location) accompanied by a detailed description of the tree species found in the urban area studied.

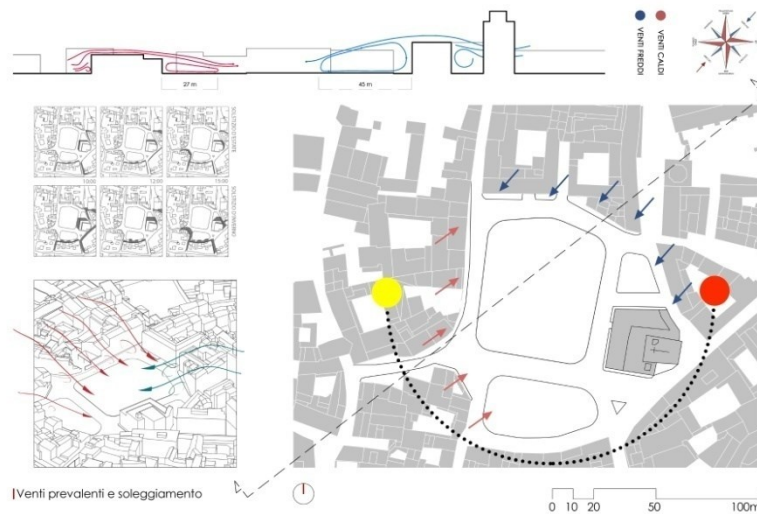


(Fig. 2) Survey of the architectural surfaces and urban furniture elements.

Angela Morlando: Redevelopment/reconfiguration of Largo Don Diana in Aversa. University of Campania "Luigi Vanvitelli" Master's degree in Architecture, thesis in architecture technology, supervisor prof. Sergio Rinaldi co-supervisor prof. arch. Antonio Bosco academic year 2015/16

The knowledge of the site is completed by evaluating the local microclimatic conditions, with a graphical, qualitative verification of the ventilation of the open spaces according to the direction of the prevailing winds, the direction of the road axes, and the position and conformance of the obstacles. The size of the shaded areas during the various hours of the day in the extreme conditions of summer and winter solstices was also noted and crossed with the ventilation and sunshine data so as to map the comfort zones during the different seasons of the year.

The mapping of the objective physical and environmental data is accompanied by a mapping of the use of the public space during the day and at night. The aim is to identify the crowding levels of each corner of the urban sector analyzed in order to predict the locations of equipment and services according to the actual needs of the users.



(Fig. 3) *Microclimatic analysis of an urban void*

Luigi De Cicco: student residents in the redevelopment of Largo Marconi in Aversa. University of Campania “Luigi Vanvitelli” Master’s degree in Architecture, thesis in architecture technology, supervisor prof. Sergio Rinaldi academic year. 2015/16.

The quantity and detail of the information and data processed in the analytical-cognitive phase will provide a significant basis for guiding project choices in the direction of respecting the vocations of places and the needs of the residents. The transformations planned during the design phase can be calibrated in relation to the pre-existing features of the site by enhancing its present qualities without ignoring the possibility of incorporating new elements that can improve the overall urban quality.

## **2. Loss and reconquest of the centre in urban areas of the territory of Caserta**

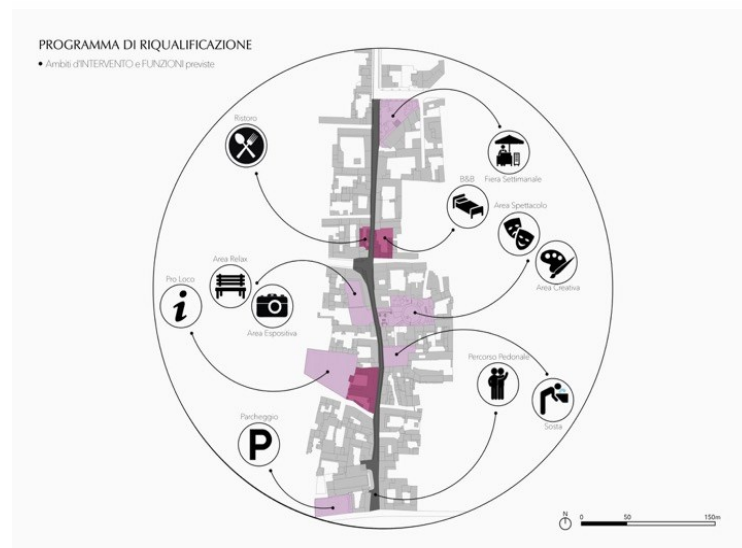
Sergio Rinaldi

The proposed case studies cover two different urban realities, both due to extension and number of inhabitants, as well as the wealth of the historical and cultural testimonies. Macerata Campania is a small town in the municipality of Capuano and Aversa, an ancient Norman town located in the southern part of Caserta, borders the Neapolitan metropolitan area.

In the case of Macerata Campania, the lack of a central square capable of constituting the pole of attraction and aggregation of the residents has made the high street, that crosses the historic centre from north to south, the only place of socialization in the town.

The design proposal first reconsidered the ways and times of use of the road, which, by becoming exclusively pedestrian, allows for the re-appropriation of a slow travelling time by the citizens who, at present, have to contend with the use of the road with cars in transit due to the absence of a pavement.

In addition, there is little interest along the high street for the local residents and potential visitors, due to the almost complete absence of attractors and points of interest, excluding the parish church at the south, decentralized compared to the high street, which is attended only on occasions of worship. The problems posed by the starting condition of this part of the city go from the constituent aspects of public space (road width and absence of pavements) to those of use determined by the absence of attractive destinations for the users. As in other cases, the urban project cannot consider improving the quality of life of the citizens by acting solely on the material and formal aspects of a place, but must coordinate with all the actors who use, manage and govern the public space to determine, together with the morphological adaptation of places, the conditions for its new use.



(Fig. 4) *Planned transformations for the high street of Macerata Campania*

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In this sense, the transformations proposed for the new usability of the road regard: the defining of the new profile of the road section exclusively for pedestrians but with the possibility for motor vehicles to access in case of need; the restoration of the building curtains through the elimination of overwhelming buildings incongruous with the original layout of the buildings and the application of a colour plan in opposition to the current anarchy of interventions on the façades; a new accessibility to the courtyards

of the buildings, making it possible to place public-interest activities without interfering with the private uses.

The new poles of attraction and aggregation were identified, in the north with a new square intended to accommodate the authorised street trade in addition to exhibitions and events to be performed in the evening and/or on public holidays; to the south, in the opposite terminal of the road axis, through the redesigning of the forecourt of the church, now largely used as a car-park.

A public park is planned in a barycentric location, which is crossed by the reconstructed road and formed by liberating and reconverting the green areas of two spaces enclosed between the courtyards of the buildings on opposite sides of the high street.

In summary, the proposed interventions aim to create an urban “core” whose functions are orientated towards a slow and sustainable use by the local citizens. It is also anticipated that the new use of the high street will stimulate a stream of casual visitors attracted by the new established activities, the architectural redevelopment of the building curtains, and the urban re-functionalisation of the public and semi-private spaces at the ends the high street as well as along it.

In the historic centre of Aversa, there are valuable historical architectural examples and degraded urban realities characterised by the presence of spaces resulting from incongruous urban planning interventions. The two case studies described refer to two squares that in spite of their location and history are now mainly used as car-parks, more or less authorized, for the vehicles of people who during the day are in the nearby offices and in the evening in the bars and restaurants.

The first case regards Piazza Marconi dating back to the early twentieth century after the demolition of the medieval insula of S. Girolamo, which took place in 1924, to make way for a market area. The area is that of the founding city near the Cathedral and the complex of San Biagio in a context full of pre-existing monuments. The demolition carried out in order to make the square has cancelled the original plot of the paths and determined the appearance of the building facades that are different and distant in space and time.

The only remaining trace of the previous layout is church of S. Girolamo, built in a recent construction to be used as a school, now abandoned, inaccessible and dangerous.

The project proposes the redevelopment and reconfiguration of the spatial invasion with interventions aimed at the realization of green areas to stop and walk, integrated by removable micro service architectures connected with the use of the new square, capable of providing shelter, along with new trees, from the sun during the summer.



(Fig. 5) *Piazza Marconi in Aversa, aerial photo and project plan*

Luigi De Cicco: student accommodation in the redevelopment of Largo Marconi in Aversa. University of Campania “Luigi Vanvitelli” Master’s degree in Architecture, thesis in architecture technology, supervisor prof. Sergio Rinaldi academic year. 2015/16.

It is also planned to remodel the ground with the formation of a pedestrian ramp linking the part of the square with the covering at a height of 4.00 m of the new two-faced workshops that contribute to the reconstruction of the invasion that recalls the original urban plot before the demolition.



(Fig. 6) *Piazza Marconi in Aversa: Remodelling of the ground with the formation of a pedestrian ramp.*

Luigi De Cicco: student accommodation in the redevelopment of Largo Marconi in Aversa. University of Campania “Luigi Vanvitelli” Master’s degree in Architecture, thesis in architecture technology, supervisor prof. Sergio Rinaldi, academic year 2015/2016.

For the abandoned school building, which incorporates the ancient church of S. Girolamo, it is planned to be demolished and reconstructed with the realisation of student accommodation destined to serve the university campuses in Aversa. The church is to be used as a conference room and coated with new weathering steel.



(Fig. 7) Aerial view of the urban continuum with Largo Don Diana in the centre

Angela Morlando: Redevelopment/reconfiguration of Largo Don Diana in Aversa. University of Campania “Luigi Vanvitelli” Master’s degree in Architecture, thesis in architecture technology, supervisor prof. Sergio Rinaldi co-supervisor prof. arch. Antonio Bosco, academic year 2015/16

Largo Don Diana is at the centre of the urban continuum and consists of three squares; the first is Piazza del Municipio, the terminal point of one of the city’s main streets, a place of commerce and night-time entertainment for the local young people. Piazza Principe Amedeo is, in fact, the city’s public gardens with the Cimarosa theatre.

Largo Diana is a car-park at the service of the council offices, by day, and the local night-life during the evening. The space is bordered by an abandoned school building and the cloistered wall of the cathedral.



(Fig. 8) The new urban centre - the lounge piazza

Angela Morlando: Redevelopment/reconfiguration of Largo Don Diana in Aversa. University of Campania “Luigi Vanvitelli” Master’s degree in Architecture, thesis in architecture technology, supervisor prof. Sergio Rinaldi co-supervisor prof. arch. Antonio Bosco, academic year 2015/16

The project proposes the pedestrianization of Largo Don Diana and the adjacent Piazza Municipio as well as the replacement of the school building with a multi-storey car-park delimited along the south and west faces (towards the square and public gardens) by “equipped walls” that define a small “urban centre” with attractive uses such as: shops, bookstores, bars ending, at a height of 9,50m, in correspondence to the multi-storey car-park, in a public square for stopping, entertainment and bars inserted in the underlying equipped walls. This new public space is equipped with passive bioclimatic control systems (pergolas for summer shading, evaporative cooling water walls, photovoltaic canopies).

The new configuration of the space consists of “slopes” with different gradients and a gradient leading to a height of -1.50; the concept is that of a “lounge piazza” for stopping, meeting and entertainment.

### **3. Reference areas and operational tools for the public space project**

Gianmarco Chiribiri

In the vast and complex set of contributions available for the public space project in urban areas, there is a need for orientated readings that favour some of the problem areas involved, for this reason, there is a selection of tools and proposals developed by scholars and designers who refer to the environmental and territorial aspects, microclimatic and technological aspects, as well as compositional aspects.

From an environmental point of view, the need to react to new situations such as the effects of climate change is leading to innovative spontaneous actions by the community located in the marginal sites of the city, often degraded and forgotten. These spaces then occupy a new value of use, capable of interpreting the story that determined them, weaving different social relationships and creating new opportunities for regeneration and development for the city. There are numerous collective experiences dealing with climate change. Actions to reduce greenhouse gas emissions by promoting alternative means of transport (*bike sharing, car sharing, carpooling, pedibus*) to raise awareness about environmental issues against energy depletion, (days of energy silence), for the improvement of air quality in urban environments (*depaving, white roof, guerrilla gardening*), and the creation of support communities for disastrous climatic events are evidence of the public’s interest in global climate themes. These initiatives, which through punctual and *low-cost* practices are able to contribute to the reduction of the phenomenon, and which are mainly developed through web 2.0, often have significant repercussions on the quality of public space and the public. They are not limited to the mere denunciation and sensitisation of a thought, but act actively



through initially virtual intentions, and then turn into real and concrete transformations – not by chance – in public spaces.

The aim is to bring attention to the quality and viability of the city, both in its entirety as well as its micro dimensions (neighbourhoods, districts). It interests the quality of the ordinary, the livability and quality of the daily spaces.

Environmental sustainability requires greater attention to pedestrian and cycling **mobility**. Crossing a city on foot or by bike is in Italy difficult and unsafe. The lack of interest in pedestrian and cycling mobility as a rebalancing strategy towards driving, for a better, more eco-friendly, healthier city is linked to a cultural absence as well as the detachment of urban policies in relation to the basic needs of the population (commuters, residents, tourists, students, children, the elderly). Crossing the city safely on foot and by bicycle helps to recover the sense of urban narrative, opens up to meeting, socializing and inclusion. Making the city accessible through sustainable mobility is a significant functional cultural project.

Among the contributions that refer to the microclimatic and technological aspects, there are regional guidelines, which, following the publication of new European legislation on land management, regulate and direct public space projects. Most of the solutions proposed to regenerate the existing city, both for mitigation and adaptation to climate change, are related to the use of green and water management.

First of all, it is believed that the concept of *ornamental green* is to be considered superior to that of *functional green*, or rather *multi-functional*. A well-conceived and properly connected green system that connects with continuity the urban and extra-urban contexts with the green spaces, parks, gardens, tree-lined rows, simultaneously satisfies several objectives: improve air quality (reduce greenhouse gases and capture fine dust), improve water cycle management, increase people's well-being in open spaces (shade and evapotranspiration areas), provide attractive and viable streets and squares.

The regionally developed guidelines<sup>1</sup> refer to five thematic areas: **choice of soil/flooring materials** depending on their properties to improve the microclimate; **use and management of water** as an element of climate mitigation and reduction of *runoff* and increase in soil permeability; **green trees and infrastructures** for improving thermal *comfort* and mitigation of pollution; **strategies to improve the attractiveness** of public spaces to make them comfortable and multifunctional.

For the compositional aspect, it is worth mentioning *creative cities*. *Over the last twenty years, the expression creative city has become an omnipresent locus for architects, urbanists, scholars of the social sciences and economists. Its formulation identifies light actions, fast solutions, alternative tools. It includes innovative and heterodox aspects, with it being an expression of originality and dynamism, a promise of the future and as such a stimulus to action. At the same time, the creative city seems to be one of the most popular contemporary rhetoric, capable of understanding aspects such as sustainability, progress, development and democracy, which have now become such widespread terms that there are no longer any definite outlines*<sup>2</sup>. What can the

concept of creative city offer to address city problems? On the occasion of the 2017 Public Space Biennial, *a call for papers* asked this widespread question and re-launched it to authors from various fields. This has given rise to a critical approach and multidisciplinary dialogue, starting with the relationship between public spaces and creativity.

The workshop led to a multidisciplinary dialogue among scholars from various fields, such as architects, lawyers, engineers and sociologists.

As pointed out in the workshop, the emerging outcomes can be summarized in key concepts that revolve around: the centrality of the project in sustainable urban regeneration strategies; the relationship between creativity and innovation; the role of creativity as a catalyst for social practices, expressed through temporary, informal and flexible actions.

## Notes

<sup>1</sup> Dessì V., Farnè E., Ravanello L., Salomoni M. T. (2016) *Rigenerare la città con la natura – Strumenti per la progettazione degli spazi pubblici tra mitigazione e adattamento ai cambiamenti climatici*, Maggioli Editore, Santarcangelo di Romagna.

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## **Social participation for the recovery of urban suburbs**

Barbara di Vico<sup>1</sup>

**Abstract.** The existence of public space as a place freely used by citizenship has ancient origins and over time has changed its meaning and role in the urban context. With the industrial revolution, the urbanization and the property speculation, equipped public spaces have been confined in many cities to peripheral areas or considered as a surplus. In Italy, social participation is still confined to local interventions, even though some regions are working to institutionalize it, and it is being spread at different scales and at a different pace.

**Keyword:** public space, environmental laws, sustainable development, participatory urbanism, urban suburbs.

### **1. Public spaces over time**

Public space has always been considered as a place where the community has the right and freedom to circulate, talk and spend their time as long as they want to. A place characterized by a prevalent percentage of green such as parks and gardens.

The quality of a public space depends on its adaptability to different uses over time, its accessibility to all kind of people favouring social relationships and sometimes on having the ability to promote the symbolic identity of a place.

Already at the time of ancient Greeks, the main centre of the city was the *αγορά* (agora), a large and open gathering place. It was first born with the political purpose of educating citizens on new laws and as a place to accomplish military duties. Later on, it became a marketplace, which attracted artisans who built workshops nearby, or a space where to discuss current topics and used by philosophers to discuss their thoughts and spread them.

The Romans welcomed what positive there was in the Greek culture once they conquered the nation, creating their version of the agora. The so-called Roman Forum had the same function where citizens spent their day-to-day life, surrounded by religious temples and political buildings.

Passing through the Medieval and Gothic squares, through large tree-lined boulevards organized by Haussman in Paris of the nineteenth century and one of the biggest green areas known as Central Park by Olmsted in New York City, the industrial revolution marked a turning point in the conception of public space.

The cities, or at least some of its parts built in the twentieth century, are quite different from the cities of the previous century: they are the representation of a new society that wants illuminated streets, hygienic spaces and innovative proposals on materials and spatial relations between different areas of the city.

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Since then the *welfare state* has become the basic point to develop cities, based on the principles of equality of opportunity, equitable distribution of wealth, and public responsibility for those unable to avail themselves of the minimal provisions for a good life.

Architects, engineers and urban planners began to collaborate to study, organize and encode the growth of the city in this respect. The town planning becomes a multidisciplinary sector that seeks to provide all the social strata equal opportunities to take advantage of quality infrastructure and green spaces. England can be a great example of the importance of green areas and the strong will of the citizens to protect them from urban expansion.

In England, green public spaces draw their origin in the ancient *green* and *common*, indicating the common green spaces typical of the villages that were then embedded to bigger cities due to the urban expansion. These two elements have a substantial difference, though often used as synonyms.

The *green* was an irregular green area in the center of villages, overlooking the local church and surrounded by houses. Originally born to protect cattle overnight from the wild animals living in the forests, they were then used to hold assemblies, celebrate festivals, welcome the local lord.

With the urban growth some of them disappeared, others were embedded. The merit of their protection is to be found in the strong will of the villagers themselves: often there were real urban battles to protect these places from building speculators.

The issue of the ownership and management of these public spaces is still unclear, because it is not based on acts noting them but on the simple will of British citizens to have open spaces in which to spend their time playing cricket.

The *common* differs from the green because it was a green space tied to community use, but without a specific position and usually outside the village. Their existence seems to date back to the early colonies of the island that used these lands for pasture and agriculture. The main feature was that there were no enclosures or built perimeters, their use was simply governed by a common right to use these from the community of a village, town, or a small group.

Common fields had to struggle as well to survive the privatization and parceling processes, especially in the first half of the nineteenth century, when not only the small farmers but also the inhabitants of the peripheral slums, who were deprived of the only recreational places available to them, were protesting.

However, these phenomena cannot be considered exclusively Anglo-Saxon. From the Latin term *pratum*, many green spaces have been named throughout Europe: the *Prater* in Vienna, the *Prado* in Madrid or the many *prés* in Paris. These common spaces are located at an entrance of the city; in fact, they were often also called *exido* in Spain, deriving from the Latin *exitus* (exit). Green spaces adjacent to the city, informal in setting and use that could simply be used as a “walk” outside the city. Nowadays, these spaces are still in total activity with different uses such as the amusement park open 24 hours each day for the whole week in Vienna, and a museum that kept the name of the “prado”, the meadow, where it was built in Madrid.

Examples can also be found in Italy where these places are commonly identified by the proximity of a door: for example, Porta al Prato of Florence, Montepulciano and Pienza.

## **2. The need of sustainable and involved public spaces**

Today, the role of the city, and of living in the city, have different meanings than in the past. The logic of building speculation has often led urban developments under the lies of modernization.

The obsession with functionality and formalism has led the urban sciences to focus attention on the physicality and forms of space and to put in the background the cultural and symbolic character, its images and its symbols.

The action of *zoning* is the process of dividing land in a municipality into zones in which certain land uses are permitted or prohibited. On one hand, it helped to functionally organize the city; on the other hand, it did not allow a malleable development in accordance with the constant changes of modern society.

A trend reversal has occurred thanks to how citizens organize their daily routines. The increasing flexibility of their time –the one spent in the house, the one spent at work, the one dedicated to their free time- creates an unprecedented situation where they no longer can be divided.

Aspects such as “amount of public green spaces per inhabitant”, “public parks” and “recreation areas” are often mentioned as important factors to make the city liveable, pleasant and attractive for its citizens. [1]

It is the quality of urban life, its vitality and its symbolic representation that need to be used and exploited economically to re-create cities as new arenas for the consumption of a cultural and commercial product linked to urban life itself.

In antithesis, a real attention to the way inhabitants experience the city is often lacking, and the social and anthropological realities of urban contexts have long been ignored. There is a dimension of public space typical of many contemporary urban expansions that, far from contributing to the construction of identity, has created 'non-places' of just crossing.

In fact, in Italy 18 mq of public space per inhabitant must be guaranteed, of which 9 mq dedicated to greenery.<sup>2</sup> However, this does not occur in many Italian cities, especially the small ones.

This is accompanied by the pressure from European regulations for a sustainable development of public spaces and the importance of involving citizens in the decision-making process and giving them, the ones who live the city a prominent role.

The United Nations' *Agenda 21*<sup>3</sup> dates back to 1992, which consists of a comprehensive planning of actions to be undertaken at global, national and local level by United Nations organizations, governments and administrations in every area where human presence has impacts on the environment. [2]

Besides the principle of transversality – which involves the inclusion of sustainability in every planned action –each local authority should create a constructive dialogue with the citizens who are the most competent in knowing in person the needs of the area they live in on a daily basis.

According to one of the articles:

“Each local authority should enter into a dialogue with its citizens, local organizations and private enterprises and adopt “a local Agenda 21”. Through consultation and consensus-building, local authorities would learn from citizens and from local, civic,

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<sup>2</sup> D.M. 1444/1968: urban standards

<sup>3</sup> United Nations Conference on Environment & Development Rio de Janeiro, Brazil, 3 to 14 June 1992

community, business and industrial organizations and acquire the information needed for formulating the best strategies. The process of consultation would increase household awareness of sustainable development issues. Local authority programmes, policies, laws and regulations to achieve Agenda 21 objectives would be assessed and modified, based on local programmes adopted. Strategies could also be used in supporting proposals for local, national, regional and international funding.” [3]

The issue is that there is no national law in Italy that guarantees the implementation of these objectives and that obliges to pursue sustainable development of cities. Even less there are regulations that foresee and maintain a real participation of citizens, in collaboration with technicians and the public administration.

The refusal of citizen participation is usually based on different motivations:

- the conviction that social stability must be based on a centralized power;
- the concern that a citizen's involvement could undermine the efficiency and pace of the process;
- technocratic reasons for the skills considered necessary to express a meaningful opinion;
- political, social or ethnic contrasts within cities that hinder the common good and subordinate it to their own interests;
- the apathy of the citizens themselves convinced that the decision has already been taken and the requested dialogue serves only to define unimportant details. [4]

The institutionalization of participatory processes has actually been defined only in some regions with their own law, as in Emilia Romagna, in Lombardia and in Toscana.<sup>4</sup>

Although, a concrete social participation in Italy is often associated with extraordinary, exceptional and experimental policies. A real commitment and a concrete involvement of the citizens are still confined to local interventions.

### **3. The community weight and its social participation**

A successful public space is a well-used space and many are the associations created by the citizens themselves who care about the quality of city life and wish to make their environmentally friendly vision a reality. Such interventions are considered successful when citizens actively contribute to the management and maintenance of these urban spaces.

In Italy, a sustainable approach is still at a slow pace compared to others European countries, but many conscientious citizens with the help of advocacy planners (urbanists, architects, designers) are working to regain parts of their territories.

Taking some of these interventions as an example, it will be clear how a strong citizenship can bring good results especially because citizens live in first person the lack or total absence of facilities and green spaces.

In Molise a group of students and ex-students of the University of L'Aquila founded VIVIAMOLAq and transformed the empty spaces caused by the earthquake that shook the city in 2009. They created a low-cost playground next to the MAP (Moduli Abitativi Provvisori-Provisional Housing Module) of Santa Rufina. They also

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<sup>4</sup> Emilia Romagna, L.R. 20/2000; Lombardia, L.R. 12/2005; Toscana, L.R. 3/2010



requalified an urban space in the historic city center creating street furniture using the earthquake rubble as a symbol of rebirth.

In other scenarios, citizens have taken action against the local government that does not listen to their needs, as it happened in Rome where in 2015 began the phenomenon of “DIY cycling routes”.

The first one was made in the railway underpass of Santa Bibiana, which connects two neighbourhoods where bikes are the main form of transportation. Citizens had already asked the administration to make a bicycle track with an online petition and offering to give their project for free with no result. After the abusive operation, the administration removed it, but it fueled a huge debate and controversy increasing the phenomenon. The proposal of Legambiente and the VeloLove circuit for the realization of the GRAB –a great ring junction dedicated to bicycles presented at a public meeting in 2016– is to be considered as an outcome of the public debate fueled by these clandestine actions.

More often, temporary interventions are needed to stimulate the curiosity, increase the interest and inform the citizens who are involved in workshops. On the 5<sup>th</sup> of June 2010 in Turin the group IZMO, welcoming the example of the PARK(ing) day born in the U.S.A., created a Parklet with the help of passers-by which consists in transforming the stall of a parking lot into a relax area with seats, tables and lawns. [5]

The so-called “pocket parks” respond to these features: they are small-scale urban open spaces mostly born as a result of the will of community groups, private entities or foundations reclaiming their right to have spaces where spending their time outside of their own houses. However, these spaces are heavily used by a large amount of people and are difficult to maintain at their original form. This does not change the fact that they do represent opportunities for increasing the amount of permeable surfaces throughout the city and could also function as patches for some animals, particularly birds.

Small interventions like these are needed to provide a major involvement of the community. Streets run daily by students, workers, tourists or whoever walk by the city must provide facilities that ensure them the right amount of relaxation and recreational areas within the city.

#### **4. Urban suburbs are no more the appendix of the city**

Civic interventions take place in those abandoned or peripheral places of cities that are not considered the same as the main streets or city centres. The hierarchy of the various urban areas in time has led to an inevitable difference in importance conferred to each area and, consequently, to a difference in the amount of public money spent on urban maintenance.

This has led to the confinement of the lowest social class in places where basic infrastructure is lacking for a dignified quality of life. Urban suburbs are not considered as an integrated part of the city, but as an appendix that is not necessary to the well-being of the whole urban body.

Recovery is a strategy that aims to recreate links in the fabric of the city. Suburbs are the place where most of the city's lives are held and therefore must be enriched with public places for sharing to prevent possible social emergencies.

What would happen if one of the greatest architects on the national and international scene shared such conclusions?

The answer can be found in the person of Renzo Piano who has always been an active supporter of the sustainable aspect of architecture. This interest was taken on a major level when he was nominated senator for life in 2013 by the then President of the Italian Republic Giorgio Napolitano. He decided to combine his role as a politician and as an architect by creating a team of six young and talented Italian architects, called G124, which will work concretely to requalify urban suburbs.

According to his idea the Italian landscape and the cities are fragile, especially the suburbs while being the future at the same time. Suburbs are the engine of society, the propulsion where multi-functionality needs to be placed. If historical centres were donated by our ancestors, we have the moral obligation of saving the suburbs and leaving them in inheritance to those who will come after us.

These ideas should be developed alongside the theme of participatory processes. Involving locals in self-construction works, called “lightweight shipyards” that do not imply the removal of the inhabitants from their homes but rather to make them actively participate in the work. [6]

The awakening of the collective consciousness is the basis upon which to build the awareness that the word suburb must stop being characterized by a derogatory meaning. The problem is not architectural; it is not a mere physical recovery of places, but a matter of building a strong identity and a will for social redemption.

The three cases of Turin, Rome and Catania—as representatives of North, Centre and South Italy respectively—were thought to act with punctual interventions to inspire the relaunch of local economies through the involvement of the inhabitants in the transformation processes.

The most interesting intervention as for citizens’ participation has been the recovery of Quartiere Librino in Catania, Sicily. Here the designers were impressed by the strong will of the volunteer associations, such as Briganti di Librino or the centre «Talità Kum» of Caritas to remove kids from the streets by engaging them in sports and leisure activities.

In the dialogue and in the relations with citizens, the motivation to give better living conditions has increased helping to recover this place in a way to interpret and innovate the identity of the Catania suburbs.

The realization of new social spaces were already born thanks to the action of Briganti Rugby Librino, which occupied, or better released, the sports facility of campo San Teodoro. This action was done to give to the near school “Vitaliano Brancati” a space for physical education that couldn’t have been done previously, due to the lack of a gym.

The association gave to the community a large open room for various activities, a library, a rugby camp and social gardens; with G124's intervention, the retraining operation has transformed the face of the structure and strengthened the social ties already existing.

From the beginning, the designers who worked on the area, architect Roberta Pastore and urbanist Roberto Corbia, made it clear that children would be the main recipients of the project and nowadays children have been re-admitted to a public space so far denied.

Young architects, who involved colleagues, designers, students and artists through a “call”, listened to the needs of the citizens with the sociologist Carlo Colloca, and

decided to build a street playground along the linear 400 meters of the asphalt strip linking the school to the field and social gardens.

Through the workshop "Street Games ", it became clear that the games must be non-removable and not vandalized, so painted games on the ground were made with scratch-resistant paints for a total of eighteen games.

Games were painted both on the asphalt and on the school wall: a sundial in which kids' shadows will mark the time; the game of the "universal pelota" where kids will have to hit one of the planets painted on the ground by throwing a rock on the wall; cartoons to be completed with erasable and renewable sentences, and many more. [7]

An added value is that the area represented one of the many waste of public money of the Italian government: a structure built for the Universiade<sup>5</sup> of 1997 and never completed.

This intervention is a great example of low-cost urban recovery thought for and with citizens, a reality to set a methodological and practical example.

#### **4. Conclusions**

The purpose of listing such set of examples is to show how architecture and, in this case, mainly urbanism are collectors of tools to reclaim areas of cities and giving them back to citizens.

Being these either large-scale projects or small interventions, decided by the government, the local administration or supported by private entities, created by the citizens themselves with or without a professional help, it doesn't matter as long as they all become part of a much bigger plan to guide the future global development towards greener standards.

In recent years, the awareness on the condition of urban suburbs is becoming the basis to set an alarm and give a voice to those citizens who live in what is actually the most extended part of cities nowadays.

This awareness has then become the will to change the degrading condition through recovery actions promoted by locals and associations, which have shown how it can be possible to turn citizen participation into an urban instrument recognized by the law.

Experts should collaborate more with those who will actually live the requalified areas, making it a multidisciplinary intervention combining technical knowledge with the daily experience of the place.

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<sup>5</sup> The Universiade is an international multi-sport event organized for university athletes by FISU (International University Sports Federation).

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## **Gentrification: phenomena that favor the process**

Carmen Rauccio<sup>1</sup> - Antonella Della Cioppa<sup>2</sup>

**Sunto.** La gentrificazione è un fenomeno che a vario titolo interessa tutte le città, condiziona fortemente il mercato immobiliare e le scelte di indirizzo del soggetto pubblico. Negli ultimi anni stiamo assistendo ad un aumento del divario fra le esigenze espresse dalla società e le soluzioni adeguate offerte dalle Istituzioni. Nel contempo un sistema resiliente possiede un'intrinseca capacità di adattamento sia ai mutamenti dovuti alla naturale evoluzione sia a shock improvvisi e imprevedibili.

**Parole Chiave:** gentrificazione, resilienza, recupero urbano, rigenerazione, rivitalizzazione.

**Abstract:** The gentrification is a phenomenon that interests every city in a different way and influences the real estate business and the choices of the common people. In the last years, there is an increasing gap between society needs and the solutions offered by the Institution. In the meanwhile, a resilient system has an inner ability to adapt itself to changes due to the natural evolution and to the sudden and unpredictable shocks.

**Keyword:** gentrification, resiliency, urban recovery, regeneration, revitalization.

### **1. Introduction**

Gentrification seems to be an apparently inevitable process in which change and evolution are becoming very important factors. Inputs coming from other cultures, which link up to this global network, feed this hungry for change, to the expense of the small local realities which characterize the identity of a place. Cities change according to the new needs of the new inhabitants, with a glance at the styles of the new millennium. Gentrification is an inevitable process, result of a social change which powerfully invades the place where we are living . Moreover, a city which transforms itself, which changes, is the direct expression of the intrinsic change of the inhabitant himself, aware to need new spaces which are "suitable to the vicissitudes of the new "2.0 citizen".

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It is a process of transformation of the urban space, often degraded, through its redevelopment and regeneration/social substitution, due to residential delocalization of social groups with poor purchasing power, substituted by other social groups with a higher purchasing power. From a physical point of view it expresses itself as a regeneration, but it is the mirror of the deep change of the present society and in a way it identifies not only the new requirements, but also the modern styles and tendencies.

This process causes numerous consequences which cannot be generalized, as it is a dynamic flux which inevitably assumes different aspects, forms and consequences due to the economy of the place where it is generated.

For example, the socio-cultural change can be promoted when a group of higher economical level people settle down and is able to invest. The neighborhood assumes valuable characteristics, with infrastructures, facilities and commerce, and causes a radical increase of land rents in the gentrified neighborhood. The neighborhood identity is transformed rapidly! This phenomenon assumes a significant importance especially in cities with a high touristic and economic potential.

## **2. Barcelona as an example of gentrification (by CR)**

At the moment, the biggest cities in the world are invested by this urban and social phenomenon, difficult to control and inevitable. It is various and chaotic and can assume different forms according to the place where it is situated and how culture and history can contrast/promote it. In other words : history, tradition and local culture represent the homeostasis level of the urban social system and define its resiliency threshold.



Fig.1 MACBA- Barcelona Museum of Contemporary Art - “El Raval” neighborhood.

For example, we take Barcelona, where this phenomenon has reached interesting levels of development and has invested above all the historical neighborhoods, such as the “Gòtic” and the “Raval” (Fig. 1). Barcelona is the perfect example of how this phenomenon can be complex and various. Different development plans have encouraged a high touristic rate and a considerable industrialization which have converted it into a city with a high quality of life where a lot of people have decided to emigrate. An important effect of gentrification, especially in the last 3 years, has been the incredible rent increases, among the most expensive in Spain. Consequently, the considerable rise of the real estate market have encouraged “home sharing”. This has caused the abandonment of houses by local citizens who felt somehow invaded by a wave of tourists.



Fig 2. Agbar Tower and Museum of the Decorative Arts. Poblenou, Barcelona.

Neighborhoods such as “El Raval” or “El Barrio Gòtic” which are the most typical/historical neighborhoods, have been invaded by big architectural works so that the image of the place and the sense of community has been changed. The plan “22@Barcelona” is well known, it is the most important project of urban innovation of the city which has definitely increased the process of gentrification in the Catalan capital. The “economic reorganization” occurred in Poblenou neighborhood at the beginning of this decade, has determined a change in the productive structure, with a clear impact on existing activities in the neighborhood (Fig. 2). The plan 22@Barcelona, which interests about 200 ha, has got the objective to change the urban and economic structure of this space, with a clear orientation towards the “new high intensity knowledge economy”. In this example we cannot talk about simple gentrification but productive gentrification.

In this case, indeed, the relationships between the economic-productive activities and the urban space make us understand how big industries and services provided by the

plan 22@ Barcelona promoted a new economy which caused a delocalization of some existing companies in the area towards different ones or their closure.

### **3. When gentrification clashes with tradition (by CR)**

A basic requirement in order that a process of gentrification can take effect in a city, however, is the presence of a large percentage of its population who enjoy middle high income and are willing to invest in a socio/cultural growth in the place where they live. If the propulsive factors are missing the results are partial and not socially totalizing.

An example is Naples, a metropolitan city which, in recent years, has undergone a cultural revival thanks to the regeneration of some of its urban areas and its architectural and artistic jewels. Like every big city, Naples is also affected by the effects of gentrification, above all governed by globalization. The small traders in the Old Town shops are disappearing, to make room for the “coolest” business: bio foods, vegetarian and vegan restaurants, vintage clothing and underground music. The small local economy is moving towards “alternative” user basins which, complicit the socials, constitute the current “mainstream”. Adapt or succumb!

“Home sharing” is also transforming housing policies with negative effects on the hotel industry. Many residential spaces, once destined for students or families, are reused as tourist residences for short periods of stay. The less wealthy families are forced to leave the property due to the rise in rental prices, even the traditional players in the hotel industry are affected by this form of competition which can be said unfair.

The popular and residential neighborhood of the old town turns into a “tourist village” from which the inhabitants are cut off.

But Naples, in spite of everything, still looks resilient to change and retains its identity while giving up some undoubted economic benefits.

### **4. Urban resiliency: processes that promote the development (by ADC)**

The modern city struggles to know its own identity values, it is more and more multicultural and multiethnic, and there is no delimitation among cultural identities

The increasing gap between the needs of the contemporary city and the lack of an adequate solution foments the crisis we have been living for a long time, but they urge the stimulation of the adaptation ability of the system to endogenous and exogenous events.

The reduced earnings, the consumer consumption and the birth of suburban malls, which attract the main brands, cause the decreasing renting requests and the increasing number of vacant space.



Moreover, the unsafety, degradation and diseconomy are the main cause of increasing gap between city and society.

It is necessary to answer to the silence of Institutions with meetings and “round table discussions”. This to be aware of the crisis that the towns and cities live and face to promote actions of remedy.

The decreasing of the market values in the city centers starts building restoration processes and the development of private initiative to invert the situation.

Cities need new leaps to give strength to the economy and the development, considering new needs.

Raw materials of the new industrial era are culture, talent and creativity applied on the new development strategy aiming to a higher internationalization and competitiveness. This is due to develop urban policy to pay attention on art, culture, music, literature, undisputed heritage of mankind, the only things to pull human economy [5] towards a higher and long lasting economy growth.

Urban, social and economic changes on the scale of the quarter (a phenomenon that belongs to gentrification) involve private capitals, but also public, giving a contribution to modify the whole city.

All this happens without the total substitution of the people who live in that area, as Slater says [6].

Even Hackworth about the same topic defines the gentrification as “the production of space for progressively more affluent users” [7].

Therefore, gentrification can't be considered just a change phenomenon of a neighborhood but a larger phenomenon of urban rebirth [8].

In the meanwhile, “a resilient ecosystem has an inner ability to adapt and renew itself both in case of changes due to its natural evolution and in case of unexpected or unpredictable shocks” [9].

Gentrification has had to do with different cities since '60s and it has influenced resiliency, even if there is not a clear way and cause that determine and favour the development.

“If economic activities in an area- for business or not- determines revitalization activities, it is necessary to get involved also other present interests, first of all the real estate property”[10].

The interest of every owner and of the public administration is needed for a real regeneration of an abandoned area.

Just a real and adequate gentrification can encourage an owner to spend the own money for restoration and support companies, with the use of public money to improve safety, public transport and services to give value to all the territorial elements to ensure people flow (residents, regulars and tourists).

“This is the starting point to underline the theme of the real estate property's role in managing and giving value to the abandoned urban areas. The importance of the local authority- as address and warranty of the interest - develops a policy that defines the

“tool box” of the investors and that involves these ones in the governance of the urban requalification process”[10].

The gentrification favours for sure the resiliency if it is controlled by the Public Institutions (districts and regions) and it isn't managed in the private real estate interest (Fig. 3).



Fig. 3 Malmö - Sweden (2014).

## 5. Indian cities as examples of resilient cities (by ADC)

Among the cities with lots of climatic, safety, hygienic problems and missing of planning, there are for sure the Indian cities, as Kolkata (14 million of inhabitants), Mumbai (20 million of inhabitants) but also towns as Surat (4,5 million of inhabitants) (Fig. 4).

Surat, that has a weak and vulnerable economy about the flood risks because built rapidly on the riverside, joined to the Asian Cities Climate Change Resilience Network, a Rockefeller Foundation Institute, adopting new measures to become resilient.

The needs are mainly two: not building on the riverside to avoid floods and improving urban growth through a suitable planning.

“The Strategy of Resiliency in Surat is organized around seven key pillars and contains 20 objects and 63 ventures, as: Urban links, thanks to the transport service that makes safe and easy moving in the city, to the accessibility to the real estate heritage, thanks to the evaluation of the living needs of the city and a better correspondence between locals' demand and offer, to the availability and quality of water, thanks to the improving of the hydraulic supply of the city with the use of new technologies, to the environmental regulation, aimed to face the climatic changes' challenge. About the occupation and economic development the strategy requires encouraging a well-balanced growth and a widespread entrepreneurship, while about the social cohesion and the health safeguard the involvement of the inhabitants for what to do is crucial[11].

In resiliency process, Surat is helped by the World Resources Institute (WRI) that, with the 100RC (100 Resilient Cities) are working to create methods to get resiliency into action involving the local authorities.

This permits the gentrification of hard quarters without the total substitution of residents, who moving elsewhere could bring problems with them without solving.



Fig. 4 Surat city, located on the western part of India in the state of Gujarat

## 6. Conclusions

Both Resiliency and gentrification condition the urban development: they are two faces of the same medal, needed to avoid the abandon of the historic centres on the one hand, and the ghettoisation of some areas on the other hand.

Even if the positive and the negative aspects of gentrification are topics of a considerable discussion that tries to establish in which way they have consequences on people, it isn't possible to deny that this process is showing positive results for the requalification of different areas, with a higher efficiency and speed than the results obtained thanks to recovery plans made by local authorities in different cities.

If there isn't an equal control in every neighborhood by the local authorities to distribute services of collective interest, there will be elite neighbourhoods, where every need of the inhabitants are satisfied, and ghettos where people who have a lower purchasing power will have to settle forced by the market law. Resiliency doesn't have to be cause of adaptation to endogenous and exogenous events that reduce cultural, social and safety needs, but it has to tend to make possible a widespread gentrification.

The results of this process, also negative ones, can be mitigated by a long series of variables, which constitute the identity of the place, and by facts that make the gentrification a process that is carried out in different ways and is adaptable according to the context. Therefore, it makes difficult to operate unique and definitive features of those urban changes.

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## **The passive solar system Barra-Costantini: performance and applications**

Michele Lepore<sup>1</sup>

**Sunto.** Si descrive il sistema solare passivo, sviluppato in Italia e denominato Sistema Barra-Costantini, dal nome di Barra che ne ha concepito la fluidodinamica e da Costantini che ne ha concepito la parte meccanica ed applicato come prototipo sperimentale alla sua casa di Salisano (Rieti). Il sistema costituisce un avanzamento del sistema Trombe-Michel del quale risolve tutte le criticità, sia migliorandone le prestazioni per il riscaldamento degli ambienti sia permettendo anche il raffrescamento degli stessi.

**Parole Chiave:** Bioclimatica, Sistema solare passivo integrato, Termoventilazione solare passiva

**Abstract.** It describes the passive solar system, developed in Italy and called Barra-Costantini System, from the name of Barra who conceived the fluid dynamics and from Costantini who conceived the mechanical part and applied it as an experimental prototype to his house in Salisano (Rieti). The system constitutes an advancement of the Trombe-Michel system, which solves all the critical issues, both improving the performance for heating the rooms and also allowing the cooling of the same.

**Keyword:** Bioclimatic, Integrated Passive Solar System, Solar Passive Thermoventilation

### **1. Introduction**

It is a passive solar system that uses air as a heat transfer fluid and is based on the principle of natural convection (Izard, 1982). The system constitutes an advancement of the Trombe-Michel system, which solves all the critical issues, both improving the performance for heating the rooms and also allowing the cooling of the same. In fact, Orazio A. Barra, analyzing the below mentioned critical issues of the Trombe-Michel system, not only solves them but also considerably broadens their performance, conceiving one of the most performing passive solar systems.

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The triple function of the absorber, accumulator and heat transmitter attributed to the south wall of the Trombe-Michel system sometimes leads to serious difficulties essentially summarized in three points:

1. the hot south wall causes significant thermal losses to the outside during the day and high at night, except for difficult and expensive nocturnal mobile insulation;

2. the thermocirculation and the energy yielded from the wall to the habitat affect only the areas of the habitat close to the south wall, making it impossible to air-condition double or triple-body buildings;

3. the export of heat from the wall (resulting in the subtraction of energy available for the initiation of natural convection) and the fluid-dynamic simplicity of the path profile make the phenomenon of natural convection low, which leads to moderate ventilation summer; nevertheless, since the hot air is directly introduced into the environment, there is the risk of overheating even in outdoor winter conditions with the waste of energy, which in such cases must necessarily be rejected outside by opening the windows ( Barra, 1981).

The “Barra-Costantini” system, the first prototype of a passive solar system with solar collectors applied on the façade, is born from the study to overcome these difficulties.

## **2. Description and operation of the system**

You can distinguish different system configurations that depend on the seasonal operating period. It consists of specific technical-architectural components with the function of solar collectors, leaning against and integrated with the external wall of the building most exposed to the amount of sunshine.

The collected solar radiation is absorbed by the collector and converted into thermal energy, as well as subsequently distributed in the environment in the form of hot air flows and, in part, by re-heating by a specific thermal mass integrated into the floors, able to absorb and re-irradiate part of the heat absorbed by the heated air flows.

The main components of the system are: - the thermal insulation on the entire external surface of the building (thermal coat), including the south wall, such as to constitute a real trap for the thermal energy that once entered the building for convective transport by the air coming from the chimneys does not find easy way out; the thermal coat also makes it possible to consider the entire mass of the building (distributed storage) as the heat capacity for the accumulation of energy, no longer obliging the construction of large masses concentrated in the south wall like the Trombe-Michel system.

The absorber, decoupled from the storage, consists of a thin metal plate with a small thermal capacity placed in the gap between the glass and the south wall; the introduction of this absorber in the path allows to double the air-absorber exchange surface (since the air laps the plate on both sides) and, if suitably shaped from the point

of view of fluid dynamic, facilitates the start of air turbulence in the chimney with consequent increase of the convective exchange coefficient: all this translates macroscopically into a strong extraction of heat by the air of the chimney and in a good efficiency of the system.

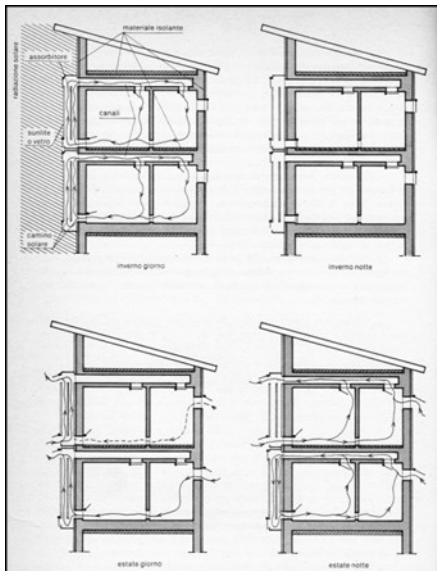


Fig. 1 Functional schemes of the system.

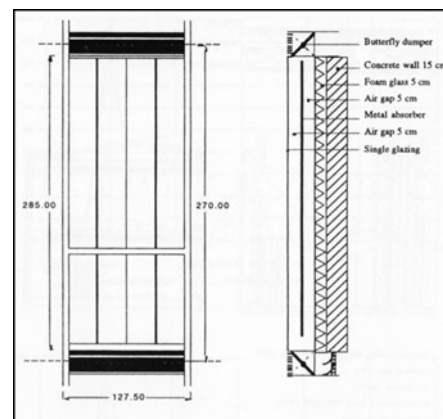


Fig. 2 Front view and section of the solar chimney

The system operates as follows: on winter day, the air heated in the solar panels rises and enters ducts in the concrete ceiling. The hot air warms the concrete structure and becomes cooler before entering the room. Here it mixes with the room air and returns to the panel through the low opening. At night, a backdraft damper closes the return, preventing reverse air circulation. The return air openings were reduced to one per solar panel, allowing greater freedom in furnishing the living space. The heat stored during the day is radiated from the ceiling to the room. During the summer, upper and lower seasonal butterfly dampers are manually shifted to vent the hot air to the ambient.

The collector is a thermo-circulating solar air panel integrated into the south facade; this consists of single panel of glass, an air space, a dark coloured aluminium sheet, a second air space in front of 60 mm. insulation and the load-bearing wall. The net collector area is 16.5 m<sup>2</sup> and the yearly solar contribution is 100 kWh/m<sup>2</sup>. The air flow is 30m<sup>3</sup>/h for square meter of air panel. Dimensions are based on a module 30 cm wide and a floor to ceiling height of 270 cm; the collector depth is 18 cm. Dimensions can be easily modified on demand.

The storage is a passive charging and discharging thermal ceiling. It is a modification of traditional prefabricated concrete slab. Galvanized steel duct are substituted for polystyrene forms. The typical dimensions of the thermal ceiling are 120x30x70 cm; ducts dimensions are 40x16 cm. The thermal capacity of the ceiling is 4.17 kWh/K or 0.25 kWh/Km<sup>2</sup> net collector area. A special connection was designed to

minimize the resistance to the air flow from the vertical collector to the horizontal ceiling ducts.

The distribution follows the following loop: through the thermal-ceiling inlet into the room, mix with room air, return via the opening in the solar air panel. Efficiency of distribution depends on the friction of the loop. It is advisable to have, as far possible, constant cross-section for the air ducts, the vent section and all chimney section.

In the winter-night set-up the communication channels of the ceiling-path (upper) and interior-path (lower) are closed and the warm ceiling acts as a large radiator for the interiors. The summer-daytime configuration benefits from ventilation and insulation of the south wall, which reduces the entry of energy and thus reduces the summer heat load, ventilating the rooms with the outside. Finally, the characteristic of the present system is the summer-night configuration, in which an inverse circulation is activated between path, channels and internal environment, obtaining a night thermal decay of the structure, which appears “cold” the following morning, opposing its thermal capacity, in addition to thermal resistance due to general insulation, to overheating of internal environments (Lepore, 2016).

Regarding the detected air velocity profiles inside the chimneys, in various geometric configurations of the chimney itself and particularly for non-high insulations: the configuration that provides a double air gap of 4.5 cm (glass-absorber, absorber-wall) is preferable and the presence of the desired turbulent regime of air motion can be supported by the following arguments: a) the velocity profiles, although in natural convection and with asymmetrical boundary conditions, are similar to the profiles valid for turbulent regimes in forced convection and symmetrical boundary conditions; b) the calculable values of the Reynolds number are in the range 2000/4000, which in natural convection means almost safe turbulence; c) it has been shown that the laminar regime may be established by air recirculation and, from the results, no evidence of such recirculation appears.

About the efficiency of the paths in relation to the insolation and the glass-absorber-wall distances: the results show that, in a climate with frequent and long-lasting low insolation levels, longer distances give better results due to lower losses of load presented by the chimney, where higher absolute values of efficiency are obtained for shorter distances, if the insolation levels are sufficiently high (Barra, 1981).

About the analysis on the dependence of the performance of the path from the type of absorber; four absorbers were tested, consisting respectively of: a) flat iron plate with density  $2.35 \text{ Kg/m}^2$ ; b) flat aluminum sheet with a density of  $0.53 \text{ Kg/m}^2$ ; c) corrugated aluminum sheet with a density of  $0.67 \text{ Kg/m}^2$ ; d) aluminum venetian blind with a density of  $0.49 \text{ Kg/m}^2$ . The results were recorded on the Salisano house, considering the increase and decrease in temperature that the air undergoes passing respectively in the solar chimney and in the storage channels in the ceilings, the average air speed in the solar chimney, the efficiency of storage, that is the relationship between the energy



released by the air to the ceiling as it passes through the channels and the solar energy incident on the floor of the chimneys.

It is seen that the chimneys performance appears generally good with any absorber, and a qualitative classification of the absorbers appears dependent on insolation and specific design requirements. Thus, for example, the aluminum flat absorber is capable of reaching the highest peak efficiency value, but with medium insolation the venetian blind appears preferable. On the contrary, the corrugated aluminum sheet shows the highest accumulation efficiency probably due to the lower values of the air outlet velocity from the chimneys.

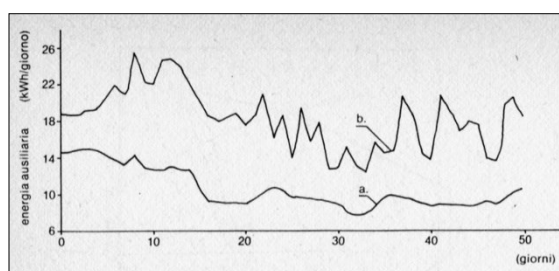


Fig. 3 Influence of thermal coat on system performance

The figure 3 shows instead the importance of the external thermal coat for the Barra-Costantini system, as in reality for any other system: it shows the evolution of the auxiliary energy (supplementary to the solar) required by the system (in the prototype of Salisano) in cases of external thermal coat (curve a) and of the same thermal coat (same thickness of the insulator) placed inside the wall (curve b), which represents the opposite limit case (being all the other possible intermediates between the two), and that causes the contribution by the walls to the thermal capacity of the general accumulation of the house to be null. The difference is noticeable and the much greater energy required in case b is due to the continuous overheating of the house, which is unable to store the thermal energy from solar energy and is forced to reject it outside. Moreover, the case is very dependent on the external helioclimatic variability, being vice versa in the case a, evident the effect of thermal flywheel by the high thermal capacity of the house (Barra, 1981).

Finally, figure 4, describes in the most complete way the overall thermofluidynamic behavior of the solar chimney of the system in relation to all parameters from which it depends: it, for two possible values of the vertical plane insolation 700 (a) and 350 (b)  $W/m^2$ , provides the net thermal power, extracted from the chimney of width 1 m and height 3 m, transferred inside the building, according to the glass-wall distance (with absorber always supposed to be the center of this distance), of the air flow rate, of the type of laminar or turbulent regime that the geometry of the absorber is able to establish (and it has been seen that except for particularly unfavorable geometries, the regime is

almost always turbulent), and of the total load losses presented by the chimney + ducting system in the ceilings + air intake vents in and from the solar chimney.

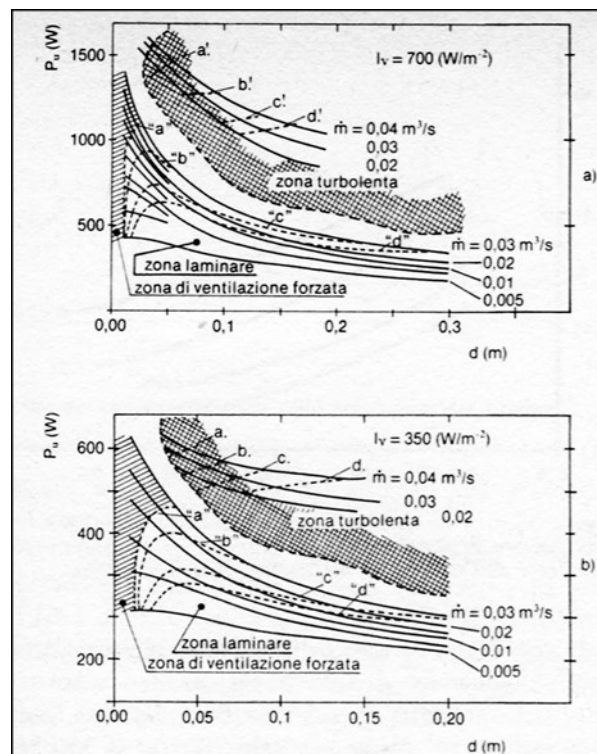


Fig. 4 Complete picture of the phenomenology of the system

The four dotted curves a, b, c, d refer to four possible values of the load loss, respectively equal to  $R_h = 0$ ,  $R_h = 10xv^2/2g$  (with  $v$  = air velocity in the chimney),  $R_h = 50xv^2/2g$  and  $R_h = 100xv^2/2g$ .

### 3. System sizing

The general sizing of the system, naturally passes through the optimization of thermal performance, obtainable in relation to the costs of realization of the various design assumptions. It will be necessary, therefore, to calculate for each design solution, the relative energy saving, compared to a similar non-solarized building, for the months of heating (or throughout the year, if you want to also take into account summer air conditioning). This final result can be calculated either through a meticulous dynamic simulation, hour by hour, of all the phenomena of heat transmission and fluid dynamics that are established in the system or through a rough assessment, which takes into account the average values of the parameters involved. The first procedure will have a much higher level of accuracy than evaluation, but will necessarily require the use of a computer and the use of a complex calculation program, where the latter can be easily completed with manual calculations and in very short time.

### Basic simplified method

Reaffirming that the dynamic simulation method is the only rigorous way to proceed with the sizing of the system, since it is the only one able to consider the transient phenomena, important in solar systems, we point out the usefulness of a approximate but simple and rapid methodology, which allows a general sizing to evaluate the feasibility of an intervention.

This simplified procedure, however, contains a profound conceptual error: it is implicitly assumed that all the thermal energy supplied by the solar collectors is effectively used by the user to cover the thermal requirement. This is true only in the theoretical hypotheses of an enormous thermal capacity of the building, to the infinite limit. The finite values of the real thermal capacities of the storage and of the rest of the structure instead involve two dissipative phenomena:

a) the thermal storage is brought to a temperature higher than the desired room temperature and therefore the thermal losses of the structure are greater than those calculated in the evaluations;

b) during the operation of the system, at certain times (especially during long sequences of days with good insolation or with a mild external temperature), overheating of the internal environment can occur and therefore part of the energy must be rejected outside.

It has been seen, however, that these effects are moderate if a thermal storage capacity is realized is at least 613 kJoules/°C for each square meter of transparent surface in direct gain systems, of at least 900 kJoules/°C for each square meter of chimney solar in the south wall of the Trombe-Michael system, of at least 800 kJoules/°C for each square meter of solar chimney in the Barra-Costantini system floors and a general thermal capacity of the rest of the structure of at least 2000 kJoules/°C for each square meter of collecting surface of solar radiation. By following these indications, acceptable solutions are realized in relation to the relationships between performance and size and the cost of storage and structure, but it is advisable (since these thermal capacities are considerable but not huge) to increase the values of S previously found in 10-20 %.

Moreover, sometimes, considerations outside of what has been said so far make the pair of values determined for storage capacity and for  $s$  unworkable; for example, it may happen that it is less expensive to increase the thermal capacity of the storage than the surface of the solar chimneys, or that the determined S/V ratio is impossible to be achieved within acceptable costs in specific architectural or environmental conditions, even with the smallest value of hypothectable G, or even a type of intense but very occasional use advise against the adoption of large thermal capacities, which introduce great thermal inertia in the initial response of the system.

#### 4. Two different applications

The system has been applied on several occasions, but by way of example, we mention briefly two different applications: the first involves a determining use of the solar chimney in an extreme condition such as the Sahara desert in Egypt; the second in a housing complex in Marostica in Italy.

##### Progetto EIRES

Italian and Egyptian governments have decided to implement a Large Development Project (LDP), 12 hectares in area, accordingly to the Nairobi United Nations 1981 Conference results, finalised to the design construction and operation of an agricultural settlement in Egypt, based on the exploitation of renewable energy sources (EIRES: Egyptian-Italian Renewable Energy Settlement). The gross design of a complex project which aims to get several purposes. It comprises:

- solar-assisted passive residential housing;
- solar passive thermoventilation of swine stables;
- solar-assisted maize dryer.

The last two elements are joined in a sole aggregate, and work together, with functional links. The stable waste heat works as the heat source for the dryer, being the draft ensured by solar chimneys. Such an aggregation is a new concept, which allows noticeable advantages and savings, minimising the energy path. The passive system used is the experimented and well-know Barra system, in this case complemented by a high-performance solar absorber (Coppersun).

A very interesting feature of the project is the evidenced flexibility of the solar passive system used, reliable for housing as for agricultural and other purposes, with slight adjustments (Barra, Conceptual design).

The project will define, set-up, realize and test on significative interventions a system for the building thermoventilation, exploiting the solar energy available on site, with is:

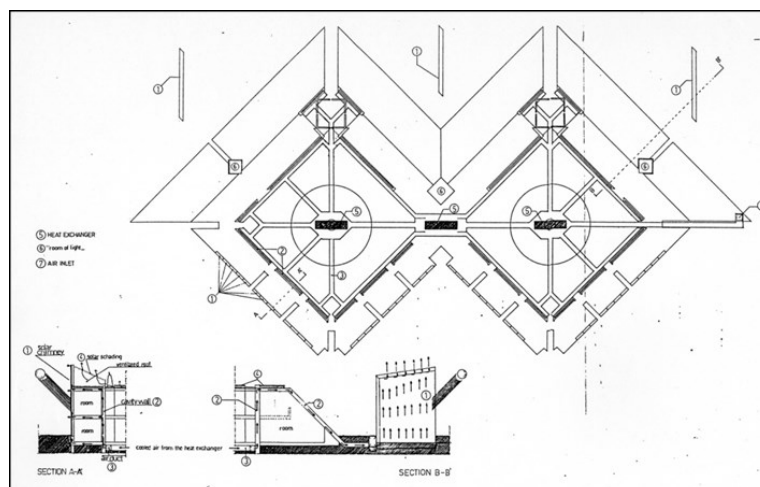


Fig. 5 Functional schemes of the Main building (project. M. Lepore)

1- The technical synthesis of the “Barra Solar Passive System” with the photoconverter “Coppersun”. It is known that the Barra System is formed by solar chimneys located on the building south walls (the chimney are composed, sequentially from south to north, by a transparent surface, an air gap few centimetres deep, a low thermal capacitance solar absorber, a second air gap few centimetres deep and few centimetres of insulating material) and by a channel network inside the building horizontal (and sometimes vertical) structures where the hot air coming from the chimneys, flows in; in this way the massive structures of the building become simultaneously heat storage subsystems and heat distribution grids. The photo converter Coppersun, as it is known, can be considered as a diode for the photothermalconversion, formed by two different sides, the first one (exposed to the solar radiation) with high level thermooptical characteristics and specialised in the selective photoabsorption, the second one optimised for the thermoemission in order to allow a good heat transfer from the Coppersun to the fluid (air or water) flowing around it. In the project the Coppersun it has been planned in the solar chimneys of the Barra Systems, as photoabsorber element, will simultaneously allow: for the Coppersun to get advantages from the high fluidodinamica characteristics of Barra system, which is able to introduce a continuous turbulence in the chimney enhancing in this way the Coppersun properties; for the Barra system to get advantages from Coppersun selectivity and diode characteristics not easily available elsewhere in the commercial market; for Barra system to reach also greater total efficiencies, specially in low insolation conditions and in the upper zones of the solar chimneys - i.e. when the employment of selective surfaces is more suitable - with increases in the cost of the whole system.

2- the reliable candidate for a large scale solar assisted passive residential housing, without storey, shape, or prefabrication of this basic components, such as the absorbers, the solar chimneys, the building horizontal structures with channels inside, the passive control devices, etc. (Barra, Lepore, Artese, 1985).

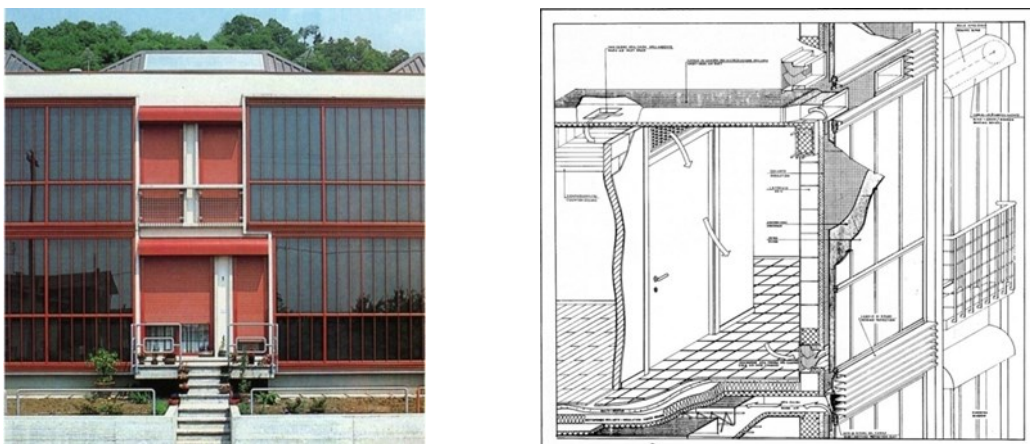


Fig. 6/7 Facade and split of the system

### **Progetto a Marostica**

This project consists of four separate buildings; three terraces comprising 24 dwelling in all, and one four-storey housing block containing 16 flats. The principal objective was to build low-cost housing in which innovative passive solar components could be incorporated at cost acceptable for public housing schemes (maximum 10% of the overall cost). The open-loop passive system, developed by Barra-Costantini, was chosen. Warm air produced in the solar air panel circulates freely in the storage ceiling, into the rooms and back to the bottom of the air panel by gravity. The system supplies 30% of the net space-heating load (European Commission, 1987). Starting from a craft-made solar air panel, the team of designers and manufacturers build a prototype solar system (Salisano project), which was subsequently mass-produced at low cost (by Industry Secco, Treviso). The system is modified seasonally and daily with dampers. In Marostica, controls are user-dependent: a lever connected to the dampers is pushed down for winter operation and up for summer operation. Reversal circulation at night is prevented by a plastic film damper, which opens by itself when the sun shines and warm air begins to flow. It is closed against a grid by the cold air of the solar panel when the sun is not shining (Scudo, 1984).

Efficiency is defined by the ratio between the heat delivered by the system to the heated space (by convection through the inlet and by radiation from the thermal ceiling) and the solar radiation incident on the collector. The efficiency increases quickly during the morning, stabilizes around midday at 35% (on a sunny day) and then declines to zero in the evening. On the cloudy day the efficiency is around 15%. The ceiling fraction is the quantity of heat transferred to the heated space through the concrete ceiling, which is the ratio of the heat delivered by ceiling to the total heat delivered by collector. The ceiling fraction is around 14% on sunny days. The overall performances of Barra System was 10-15% lower than simulated values and the misused data from the Barra-Costantini experimental house in Salisano. This is due to the concentration of the air return damper for each air panel; originally dampers were distributed along the full length of the wall, giving a better air distribution. Furthermore, storage efficiency was diminished by negative thermal flow during the night from the front part of the ceiling (Hastings, 1999).

## **6. Conclusion**

The work wanted to define the salient features of the Barra-Costantini system, pointing out, in addition to some scientific data, also two applications for example. The deepening of these projects will be dealt with elsewhere. What we want to define is the original conception of the system, (in our opinion the passive solar system that performs more energetically), also because they have been, on several occasions, recently published incorrect and misleading technical information about the concept and the functioning of the system itself.

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**Editore:** Accademia Piceno - Aprutina dei Velati in Teramo (APAV)

Via del Concilio n. 24, Pescara, Italy

Codice Fiscale: 92036140678 Partita IVA:02184450688

**IBAN:** IT 73 E 02008 15413 000104232062 – BIC Swift: UNICRITM1RM4

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Autorizzazione n. 16 del 17/12/2013 del Tribunale di Pescara

ISSN: 2385-1031 (testo stampato)

ISSN: 2385-0671 (online)

Stampato a Pescara il 15 settembre 2018

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# Accademia Piceno - Aprutina dei Velati in Teramo

ACCADEMIA DI SCIENZE, LETTERE, ARTI E TECNOLOGIA  
Ente accreditato dal MIUR per la formazione del personale della scuola  
(Decreto del 24/07/2009 e Direttiva 170/2016)