

# **The centrality of energy retrofitting in the historical city as a challenge for the immediate future. The role of the representation as instrument for control and evaluation of the processes of transformation; case study for a sustainable regeneration.**

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*Abstract:* - In the range of the no-solved dichotomy between conservation and innovation, the thematic of regeneration of the historical cities can be located, in Europe as in other parts of the world, in functional and energetical terms. In an age during the which the social practice evolution becomes more and more united with the daily utilization of technology, once used exclusively by elite circles –scientific and professional community- the historical city, harbinger of a cultural, sociologic, iconographic and mnemonic heritage, ancestrally rooted in the conscience of civilization, addresses the complex path of the research of an equilibrium between the own essence and the new modernity needs.

From the middle of the last century, the physical and social deterioration that for various reasons cause has influenced many urban areas, has expanded to a new suffering that showed a further condition of inadequacy of the public sphere. Individual buildings or entire urban and real propri pieces of city, have begun to deal with a new one (in terms of perception) and postponed requirement, established by the need to embark on a path towards a logic of sustainability in terms of functionality and energy. This path is not easy, especially in the pleasant setting of balance formal and architettonico in Italy and in Europe, recognized as a historical city; infact this path cannot be abstracted by the clear definition, from a verse, of the extraordinariness of historical heritage and, from an other verse, by just as important identification of imposed -or deriving from a contemporary historical place- needs, functions, conditions system. This contribution therefore aims to highlight the main procedural issues, planning and management authority relating to regeneration in the historic city, through the reading of an urban environment taken as an example, where specific and relevant formal features.

*Key-Words:* - Retrofitting, architectural heritage, historical cities, representation, knowledge, survey.

## **1 Introduction**

Many European historical towns show a number of features, peculiarities and common traits to each other which, although in different places, have often contributed to give a common identity and similar conurbation.

In such a state the architectural heritage often avoided every logic of performance, except of course from the gorgeous monumental, governative and noble buildings.

Taking into account the fact that some of these peculiarities are still important distinguishing features of the urban centres of a certain historical concern, their recognisability and cataloguing, made through a samples research, become the base and the cognitive heritage useful to gain with the

research for the best solutions, taking into account not only the extraordinary historical heritage but also the need to second that process of requirements, functions and conditions, forced or resulted by a contemporaneous fruition of the historical site.

## **2 Problem Formulation**

Approach with method the problem of dissipation of non-renewable energy and, in general, environmental pollution is now an imperative condition at the international level.

The awareness that most of the historical heritage or however built until a few decades ago are the true responsible for a high proportion of environmental pollution and releases of carbon dioxide in the

atmosphere, produced by their "lives passive", through the usual and daily use of domestic utilities and equipment has led to the attention of the scientific community and civil society in general the problem of retrofitting of the housing stock.

We can say that now there are already many technologies and procedures to be applied for this purpose in the new building, so the issue becomes very controllable in the event of new buildings. Likewise when it is possible to work in a decisive manner on the building, making necessary changes to the plant and architectural level, the action of retrofitting is a simple application.

But in the case of historic heritage as it becomes possible to operate?

What choices such as shares, such assessments must be implemented in urban areas characterized by historical or however formal and architectural balance structured in a different historical periods? The historic city, a harbinger of a cultural, sociological, illustrations and mnemonic ancestrally rooted in the conscience of civilization, addresses this complex process of finding a balance between the essence and the demands of a new modernity through a delicate balance in which the conflict between conservation and innovation take predominates. In fact, this path can not be abstracted from that and that a clear definition, on the one hand, the extraordinary nature of the historic and, on the other, the equally salient identification of that system requirements, functions, conditions imposed by or derived from a use contemporary historical site. How and in what way it can be considered "sustainable" if the historical place related to an ecosystem characterized by the current conditions?

How and to what extent can change the perception of the site in relation to the pursuit of these objectives in terms of sustainable energy?

It 'necessary to determine the priority of values, defining rules of conduct such as moderate, if not cancel, the resulting conflict that inevitably comes from the prelude and comply with the same, including the value of the past and expectations of the contemporary.

The identification of these "rules" and practices inevitably passes through the design of context that, as the primary instrument of knowledge and simulation, takes the value predominant in these specific transformation processes.

### 3 Problem Solution

In this direction, the "retrofit" of the historical city, as a sustainable regeneration, becomes an element able to initiate policies for restoration and urban

innovation of the historic cities, to secure the housing stock obsolete and implement the construction sector. Preliminary research activities will produce a report, resulting from a sampling of historic cities, about the status of the historical cities, analyzing the conditions of security, energy, environmental and quality of the urban habitat.

The district Giusso is characterized by buildings dating from the early '900 Art Nouveau style. Common themes in the architecture Neapolitan liberty are the massive use materials like iron and glass, the recurring presence of towers and pilasters the widespread use of stucco and decorative floral motifs and ornamental plants, the curved shapes of the cement .

The case study analyzes a portion of the area Giusso represented by a section of the road axis, via A. Maiuri / C. A. Pollione, fully exposed to the south for the entire development.

The main aim so, for the purpose of upgrading the energy efficiency of action, is to moderate the thermal dissipation due to the particular exposure and climatic conditions of the area especially in relation to the type of construction, if that does not achieve of significant architectural quality particular performances in terms of transmittance.

The main issue is that it does not negatively affect the view of the architectural features the neighborhood and define the right choices in this regard.

A valley so of the analysis phase is fundamental the ability to simulate, through the representation of some hypothetical transformations, the possible forms in order to control the transformations and analyze the right responses.

We have analyzed three different intervention solutions and simulated through the representation of the effect of the changes on the perception of the architectural heritage.

1 - Transformation implemented through the utilization of trees, positioned in a front and parallel to the curtain of buildings. In fig. 7 is simulated the change made to the visual perception by this change.

2 - Transformation implemented through the realization of solar greenhouses, working as thermal regulators. In fig. 8 is simulated the change made to the visual perception by this change.

3 - Transformation implemented through the installation of photovoltaic paneling of the new generation, with semi-transparent colored glass to 366 shades of color, positioned in a front and parallel to the curtain of buildings. In fig. 9 is simulated the change made to the visual perception by this change.

## 4 Conclusion

Finally it is evident that the issue of retrofit of the city, especially the European historical cities can not be further postponed. It is therefore necessary to identify, through research, the best practices, technologies and methods to be able to overcome the difficulties arising from the criticality between the necessity of implementing improvement measures and opportunities to preserve and enhance our architectural heritage. The search can, as this brief contribution, check through the techniques of simulation and representation, the effects on the architectural heritage procured by the transformations necessary, in order to evaluate their impact on the vision and analyze the fairness and sustainability.

This work is in the interest of PRIN 2010/PEA4H8.

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Fig. 1, Napoli, orthophoto of Giusso district in Bagnoli's area.



Fig. 2, A part of the plan of the district Giusso around the street Caio Asinio Pollione, buildings of interest are highlighted. Drawn from the architectural survey of the whole area.

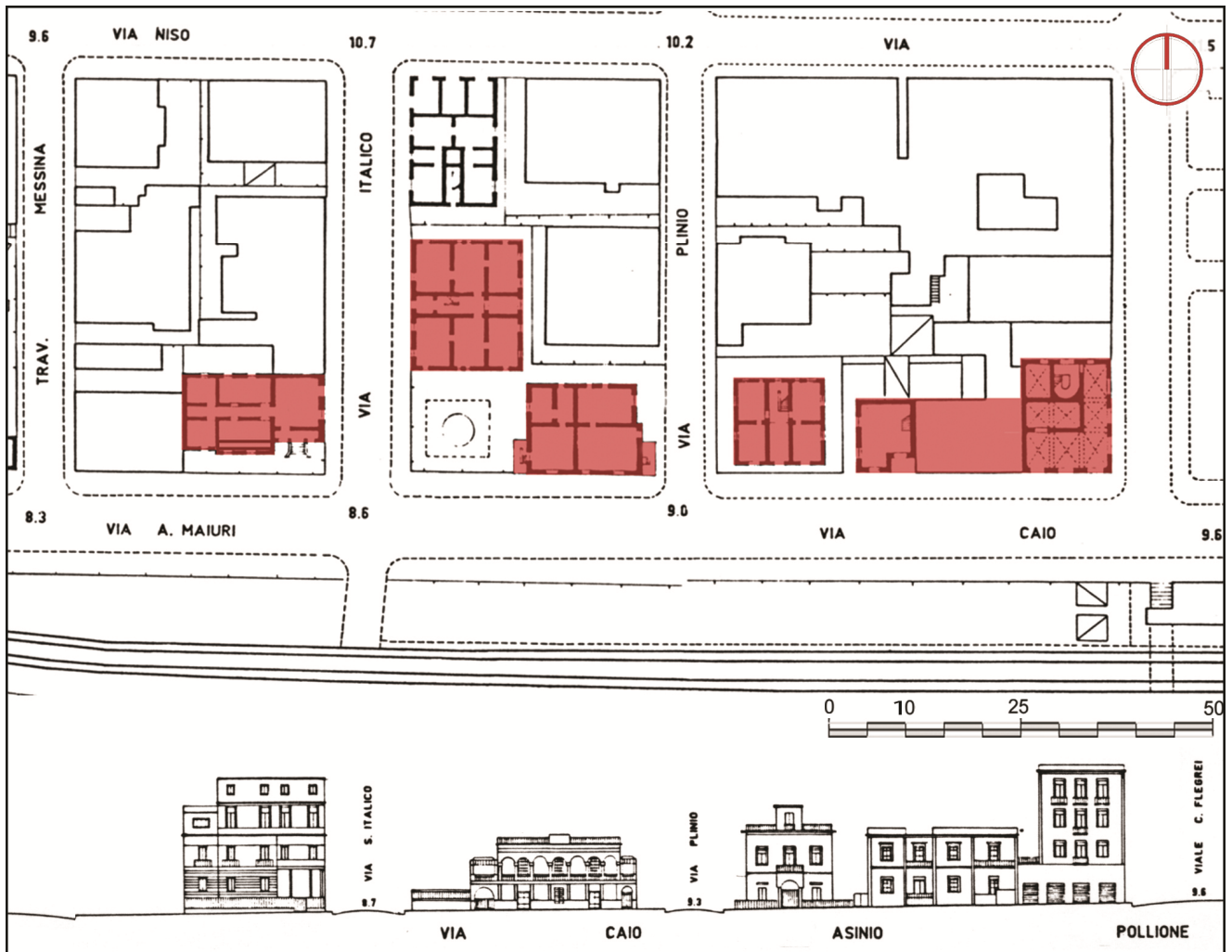


Fig. 3, Detailed plan (with ground floor) and fronts of the buildings. Drawn from the architectural survey of the whole area.

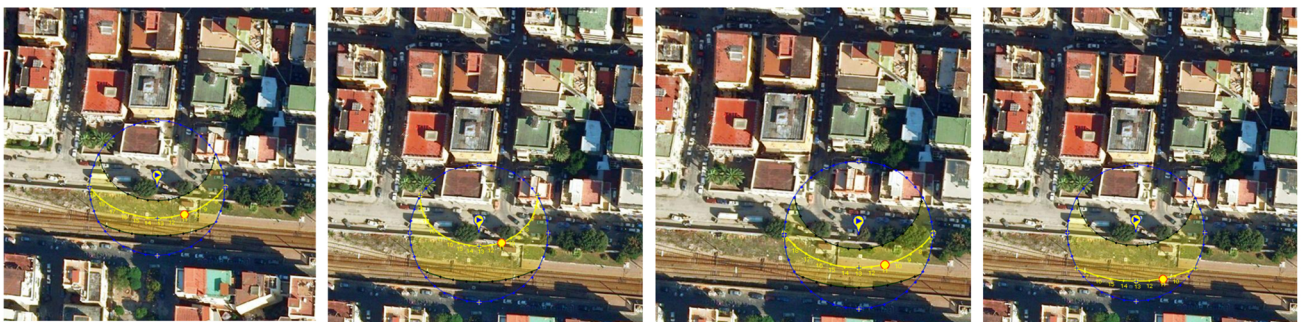


Fig. 4, Sun-path diagrams of Giusso district. The solar irradiation on the curtain of the buildings examined, particularly strong in the southern exposure

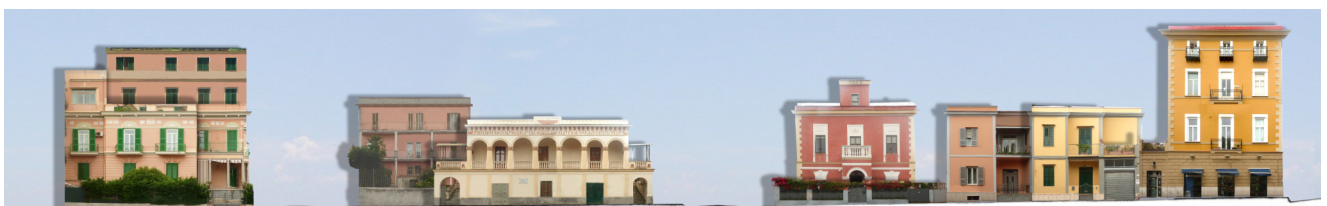


Fig. 5, Photoplan of the fronts of the buildings, so is evident also material and colorimetric aspects of the front of the buildings.



Fig. 6, Analysis and proposal for intervention n. 1/3; elements positioned parallel to the curtain of buildings (trees or photovoltaic panelling). Detailed plan.



Fig. 7, Analysis and proposal for intervention n. 1; shielding by tall trees, study of the visual perception of the site.

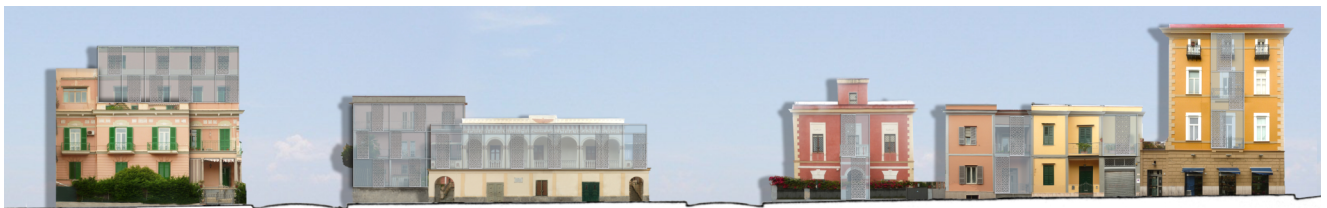


Fig. 8, Analysis and proposal for intervention n. 2; construction of solar greenhouses with screening panels, study of the visual perception of the site.

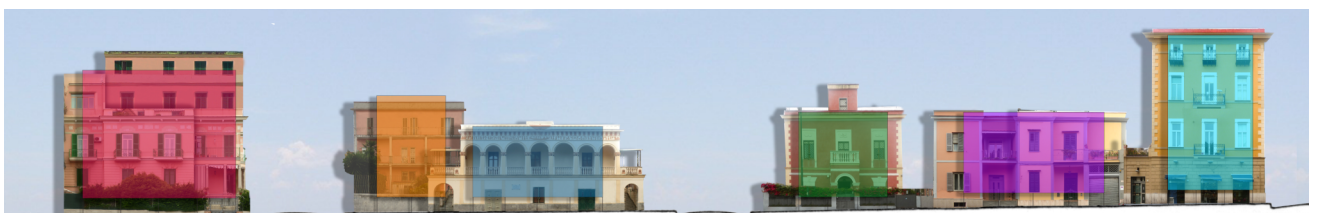


Fig. 9, Analysis and proposal for intervention n. 3; shielding by shielding by semi-transparent coloured solar glasses, study of the visual perception of the site.