EDITORIAL

New "energy approaches" to architectural and urban design

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In recent years, international protocols on the safeguarding and the conservation of resources and environmental protection policies have totally and radically redefined our approach both to architectural and urban design and to territorial planning in the context of greater sustainability. At the same time, the technology at our disposal for solving energy and environmental problems through the use of renewable energy resources, while also guaranteeing comfort, safety and efficiency, has increased exponentially.

The "environmental issue" has now taken on vast proportions, and intervention has become a political, social, cultural, technical and scientific imperative. But it is also a somewhat vague and generic notion which may, paradoxically, be everything and nothing at the same time, depending on our point of view on how best to tackle the problem. As a result, although architecture, the city and the local territory are the undeniable protagonists of such intervention, they seem to be diluted in a macrocosm of knowledge, disciplines and larger, more diverse problems regarding geography, chemistry, physics, pollution, hydro-geological instability, economics, market fluctuations and so on.

What is more, a somewhat extreme conception of "the environment" has now swallowed up the building, architecture, the city and the local territory, removing all trace of their disciplines and identities. If our sole aim is to ensure eco-efficiency at whatever cost, we run the serious risk that some types of both small-scale and large-scale intervention may eradicate the identity of the places concerned. Instead, what is needed is that the latter be safeguarded and valorised through the adoption of opportune strategies. Sustainability should be achieved by means of "global" system approaches that take into account the enhancement of the historic and cultural identity of the local territory and city, with a view to upgrading the enjoyment and visibility of environments and implementing "innovative" technologies and organisational models.

When the latter have been used in the construction of new buildings or in modifications to existing ones, they have given rise to new forms and new languages, as well as saving energy and producing energy from renewable sources (photovoltaic, solar geothermal, wind, etc.). Indeed, our goals should also include comfort, psychological and physical well-being, the quality of indoor life, and so on.

This approach has also been extended to the city context with its consolidated historic centres, its more recent urban fabric, its outskirts and, in some cases, shanty towns that have sprung up randomly at the very edge of the urban area or in intermediate or residual areas that were formerly undeveloped urban and extra-urban voids.

In many towns and cities, above all in Central and Northern Europe, the local inhabitants and the population at large are invited to take an active interest in the energy issues of their towns, especially when it is a question of informing them that it is first and foremost about reducing their electricity, gas and water bills. The analysis and monitoring of energy dispersion from buildings is now carried out on a routine and city-wide basis, making it possible to draft theme-based maps and to identify urban "heat islands" through the use of sophisticated thermal imaging equipment mounted on light aircraft, helicopters and drones..

It is estimated that a standard Italian dwelling annually consumes about 20 litres of crude oil per square metre for domestic heating in winter. The Kyoto Protocol, the Fourth Report of the Intergovernmental Panel on Climate Changes (IPPC) and subsequent documents have outlined energy policies aiming to achieve a 30% reduction in current energy costs by 2020 and, from then on, every building must be classified as a "NEARLY 0 BUILDING", characterised by high energy efficiency and exploiting renewable energy produced on site so as to reduce consumption to nearly zero. All public buildings and/or buildings of public interest built or restructured must expressly comply with these provisions as early as 2018.

The urban ecosystem is a systemic aggregation of:

- structural relationships between buildings, districts, streets, squares, fountains, parks, green spaces, rivers, lakes, seas, farmland, infrastructure, bridges, highways, railways and so on;
- material relationships (mobility for pedestrians, road traffic, railways, trams and networks for water and energy distribution, sewer systems, data transmission, commercial trading and so on);
- immaterial relationships (tertiary, emergency and other services, education, professional training, leisure, sport and so on).

This is not the result of fortuitous circumstances. On the contrary, it is the result of complex interrelations and the implementation of material and energy flows. Understanding such flows (their dynamics) is essential and the end goal is to ensure the wise and virtuous control and management of this data. In

this framework we have witnessed the birth and the ongoing development of a veritable "sustainable language" which, in just a few decades, has yielded different ways of giving formal expression to technological systems and equipment:
a) from "hidden energy" (concealing plant systems);
b) to "evident and manifested energy";
b1) to giving monumental status to such systems (for instance, in Louis Kahn's Richards Memorial Laboratories in Philadelphia 1957-60).
b2) to the formal hyper-expression which becomes almost surreal (such as Renzo Piano and Richard Rogers's Pompidou Beaubourg Centre in Paris 1971, and Norman Foster's Lloyd's of London 1978).
b3) to Corrado Beguinot's "Wired Inter-Ethnic European City" of the 1980s;
b4) to the bestowing of sculptural qualities to technological structures (such as the chimneys on the terrace of Gaudì's Casa Milà in Barcelona 1905-12 and those on Le Corbusier's Unité d'habitation in Marseille 1947-52, which become an "objet a reaction poetique".
Nothing new if we compare these to the windcatchers created by the millennium-spanning Middle-Eastern architecture or to other structures man has invented to defend himself from hostile climatic conditions or to increase the comfort of his lifestyle. After the Modern Movement, architecture followed new formal and linguistic paths, bestowing aesthetic qualities on functions, structures and plant systems, dematerialising the outer skin and aiming at technological innovation while also redefining and enhancing the concept of aesthetics as expounded by Hegel and Croce.
Architecture enhanced its original Vitruvian constitution of the triad Utilitas, Firmitas, Venustas (Function, Structure, Form) to include other aspects, disciplines and components, such as ecosystem, environment, location, participation, sharing, energy, flexibility, fluidity, interactivity, and so on.
Underpinning the new "Smart City" of today are intelligent and complex systems and the buildings themselves are intelligent, comprising eco-sustainable hi-tech features which make the environmental syntax comprehensible.
The oil crisis of 1973, which followed on from the Arab-Israeli conflict, brought the developed and industrialised West suddenly to its knees after decades of easy, inexpensive abundant, uncontrolled and excessive consumption of oil on which it had almost exclusively founded its own development and its very life. This crisis, in conjunction with the end of the post-war construction boom shattered the West's capitalist model and brought about a rethinking of the whole question of energy dependence and hence the search for alternative solutions (nuclear, first and foremost) and the use of renewable natural energy sources such as the sun and wind as well as the waters and tides in rivers and seas.
The main challenge for the future of the quality of life on our sickening planet is being faced directly on the issues of saving energy, ensuring supplies, efficiency and true "eco-sustainability", also taking into account the interdependence of the world's various economic areas and the urgency of achieving sustainable growth in human activities.
Sustainable architecture implies content, substance and meaning but also know-how, technology, sign, message, form and language (style, as it was called when regarding a given collective culture in a given society in a given place at a given historical time).
Authoritative semiologists like Roland Barthes, Umberto Eco, Renato De Fusco and others have taught us the existence of parallels and points of contact between the language of speech and the language of architecture, both of which are primary requirements of man.
The signs are arranged on various scales:
- that of design and of the everyday object, whether manufactured on an artisanal or industrial scale, sometimes charged with a strong semantic or aesthetic value;
- that of the building, of architecture, of the well-defined personal dimension, of architectural space whether domestic and residential, religious, educational, or for other purposes;

the urban scale, i.e. in the complex scenario of the activities of external relations experienced by groups and communities.

Talking about an authentic language of sustainable architecture primarily means rejecting the ambiguity, the confusion and the mystification arising from an improper use or, at times, unequivocal abuse whether in good or bad faith, surrounding the prefix "eco-" .
Its usage is indeed varied: "eco-compatible", "eco-tech", "eco-organic", "eco-ornamental", and so on. In some advertising campaigns, even a simple automobile with low fuel consumption may be labelled as an "eco-car", regardless of its CO_2 emissions. The imitation leather of armchairs and sofas is "eco-hide" or "eco-skin", an advertising expedient to get around the obstacle or simply to avoid stating an obvious truth, namely that it costs less because it is inferior to real leather. When these forms of logic gain the upper hand, the first victim is the place in which architecture lies and the genius loci that, paradoxically, should be the initial input to the project ends up being excluded. When the architectural and urban project neglects the location and considers it merely as a physical site, an area of land like any other on which to superimpose a new volume (not unlike a surrogate uterus), when the construction system is insignificant and standardised on a planetary scale, then the result can only be a decontextualized one that now makes all the world's cities resemble one another, and not only in their outskirts but also in their residential suburbs, their city centres, their administrative and financial districts, their "downtowns", all their

hypermarkets and all the shopping malls, even those bearing the signature of prestigious and renowned names.

The concept of place and environment was virtually unknown or non-existent for thousands of years. "Nature" was counterposed to the city, albeit with different meanings and nuances but also rich in the meanings of the unknown, charm and mystery, before Positivism and Enlightenment mercilessly revealed every little secret to us. Certainly, the big bang of the building sustainability culture of the modern and contemporary age can be traced back to the studies of such German rationalists as Alexander Klein, Walter Gropius, who defined the correct orientation of a building with respect to the heliothermal axis, the sunlight falling on the building's facades, the correct amount of natural light in interiors, natural ventilation and building hygiene generally. Having been acknowledged and incorporated into the design and construction of renowned residential quarters in Germany, these teachings were then also held in high regard for the extraordinary INA Housebuilding Plan (Piano INA Casa) which brought about the construction of thousands of high-quality homes throughout Italy in two glorious seven-year periods between 1949 and 1963.

Subsequently, over the following decades, the overwhelming majority of construction projects in cities ignored these teachings and generated thousands and thousands of energy-guzzling buildings and complexes that needed heating in winter and cooling in summer, while considering neither the extremely high initial costs for the plant systems nor the equally high costs for their consumption, management and maintenance. Nowadays it would be inconceivable to design buildings while ignoring bioclimatic and eco-compatible principles and neglecting to use renewable energy sources, and we must now face a challenge of planetary dimensions, which opens up new scenarios and opportunities for intervention. The challenge in the coming years is to tackle, those political, social, economic, technological and industrial systems which, in the name of a presumed wellbeing and a certain conception of progress, have devastated or destroyed the environment and taken cities to the brink of collapse, and then to transform them into "other" systems in which technology is consistent with environmental conditions, where wellbeing and progress are achieved in a different and less harmful way. If we draw a simple parallel with other disciplines and other sectors where technological innovation has taken place in the last few decades in a decisive, exponential but, at the same time, silent way (electronics, information technology, chemistry, genetics, biology, medicine, bio-engineering, aeronautical and aerospace engineering, materials engineering, nanotechnologies, and so on), then we will realise that in the building, architectural and urban sector, despite the many positive signs we can see, there is still a long way to go.