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Design tools for a sustainable architecture

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“Sustainable Development is that which fulfils present needs and does not affect the possibility of future generations to fulfill theirs”.¹

Sustainable development has become a key subject in the present debate. Global warming, dwindled biodiversity, soil erosion, air and water pollution; these are topics that have turn out to be part of our ordinary life.

The **City** along with the **Architecture** does not stand apart from this situation since the construction industry is one of the most unsustainable fields in the world.

SUSTAINABLE ARCHITECTURE makes reference to a field within architecture that seeks to reduce to the minimum the natural impact of construction on the environment and on the people living within a certain area by making the most of natural resources. SUSTAINABLE ARCHITECTURE also seeks to ensure that future generations will have uninterrupted access to natural resources.

From the theoretical point of view of this thesis, the literature used as reference gave way to the selection of the guidelines for the study and analysis of sustainable development.

Besides, the development of the CITAR Project, Centro de Investigación y Desarrollo de Artes Digitales (Research and Development of Digital Arts Center), represents the graphic testimony of this thesis.

¹ Cumbre de la Tierra, Rio Declaration, Principle 3, Rio de Janeiro, 1992.



Firstly, we may quote Ken Yeang, who defines CITAR-type buildings as “intensive building”, i.e. a building with a complex and thorough technological development with a high number of users, services and mechanical gadgets.

Aware of the fact that this type of building will not vanish despite the colossal environmental issues our planet is going through, the author appeals to our ecologic consciousness instead of to denial.

We designed a **technological-ecological box** as a kind of sensitive machine. It offers, through three “pillars” essential to the CITAR designing, a new space within an urban area that is still on the process of characterization. These pillars are as follows:

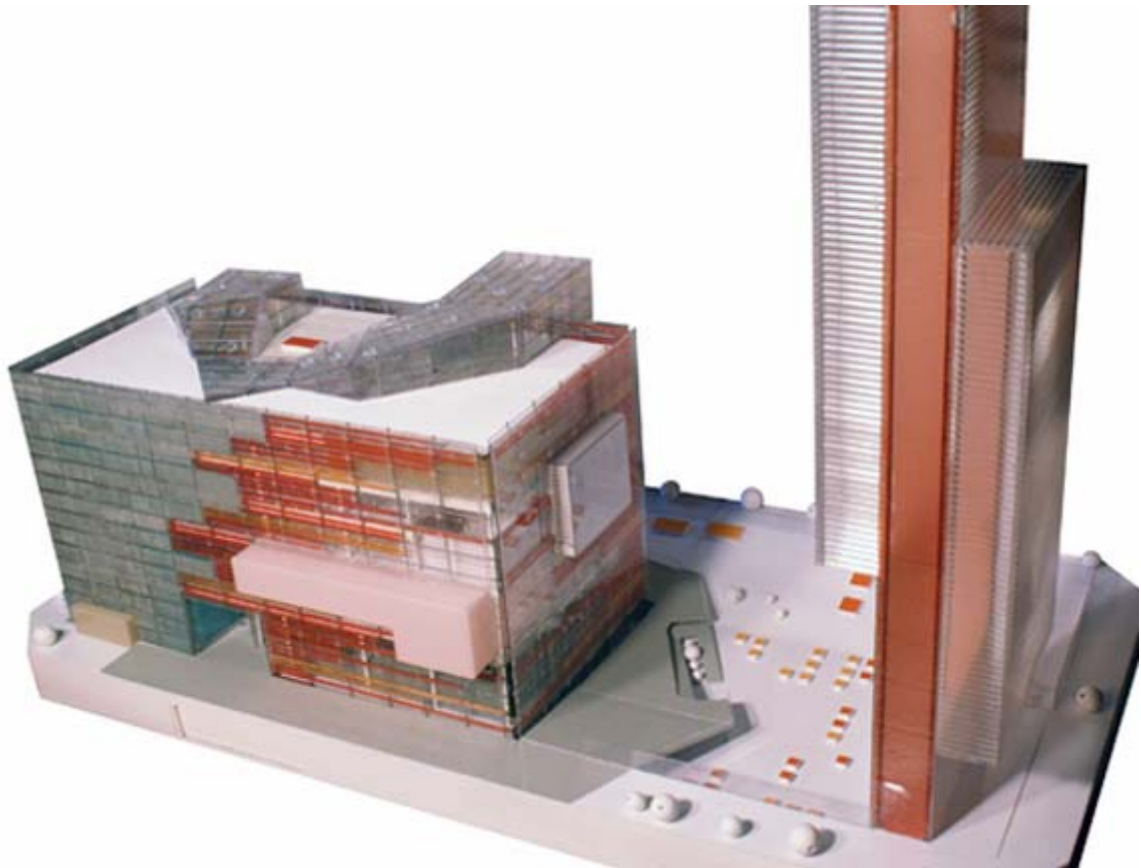
1) MINIMUM BUILDING FOOTPRINTS

The models in which the ground is used have a great negative impact in the emissions of carbon dioxide. For this reason, and making reference to the urban quality of the skyscraper, we designed a building with minimum use of ground with the intention of preserving it.

2) MULTIFUNCTIONAL BOX

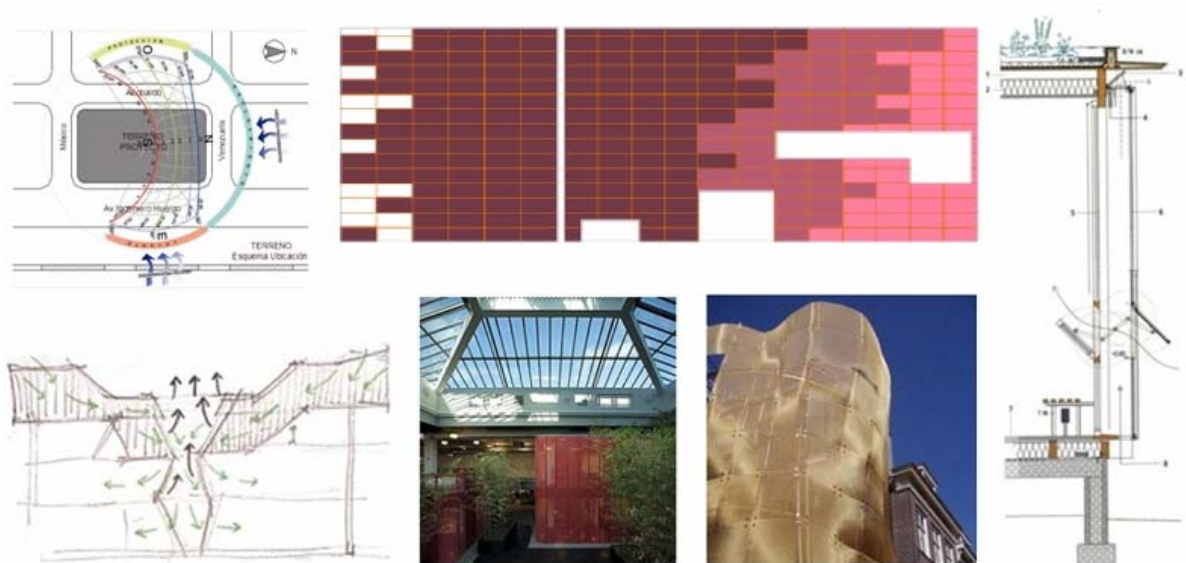
The language chosen for CITAR makes reference to that of the “drilled container”, and it saves boxes scattered throughout the area which contain different programmed activities.

The decision of choosing this shape was based on the grounds of flexibility and adaptability of the space, as well as on the idea of providing air circulation as an ecological solution.



3) PASSIVE MEASURES

The passive project is essentially a low energy project that may be accomplished without using electromagnetic means; this is possible by making the most of the morphologic organization of the building itself. The various passive measures used in the CITAR project and developed in this thesis are the following: *Location and Orientation; Solar Energy Control; Double Skin Façade; Natural Ventilation; Green Materials and Terraces.*



To sum up, we may find it easy to understand the advantages offered by architecture based on non environmental destruction and by architecture that is fully committed to future generations. However, we are aware that by applying a sustainable architecture we will not completely solve the complex global environmental problem.

As designers, we try to impart a real environmental awareness and not a temporal or “fashionable” one resulting from propaganda or marketing. For this reason, we must bear in mind that the legacy of future generations is not only built from environmental quality, but, and specially as far as architecture is concerned, as a formal expression worthy of respect.

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