

POLITECNICO DI TORINO  
SECOND SCHOOL OF ARCHITECTURE  
Master of Science in Architecture  
*Honors theses*

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**ECoffee – An impactless Lavazza factory, around the world**

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The research project ECOffee comes from the existing cooperation between Polytechnic and Lavazza, which is now planning to build new factories in two countries with hot climate: the first one in India, in the industrial suburb of Chennai and the second one in Queimados, nearby Rio de Janeiro, Brazil.

The whole study starts from an investigation of the climatic data of the two regions, then goes through a check of which technologies could be employed to reduce the impact of the factory on the surrounding microclimate and finally presents a preliminary project, referring strategies and technologies to tropical climates.

The analysis of the climatic conditions of both cities gives a series of indications useful for the site planning, from the level of guidelines till the details of technological systems.

Afterwards have been defined the general aims that should be reached within the project, divided into two categories: aims referred to the customers' comfort and aims connected to the reduction of the environmental impact; for each goal have been specified different subcategories and then for each one of these categories have been highlighted a series of specific aims, the strategies needed to reach these and the technological systems that could be practically employed.

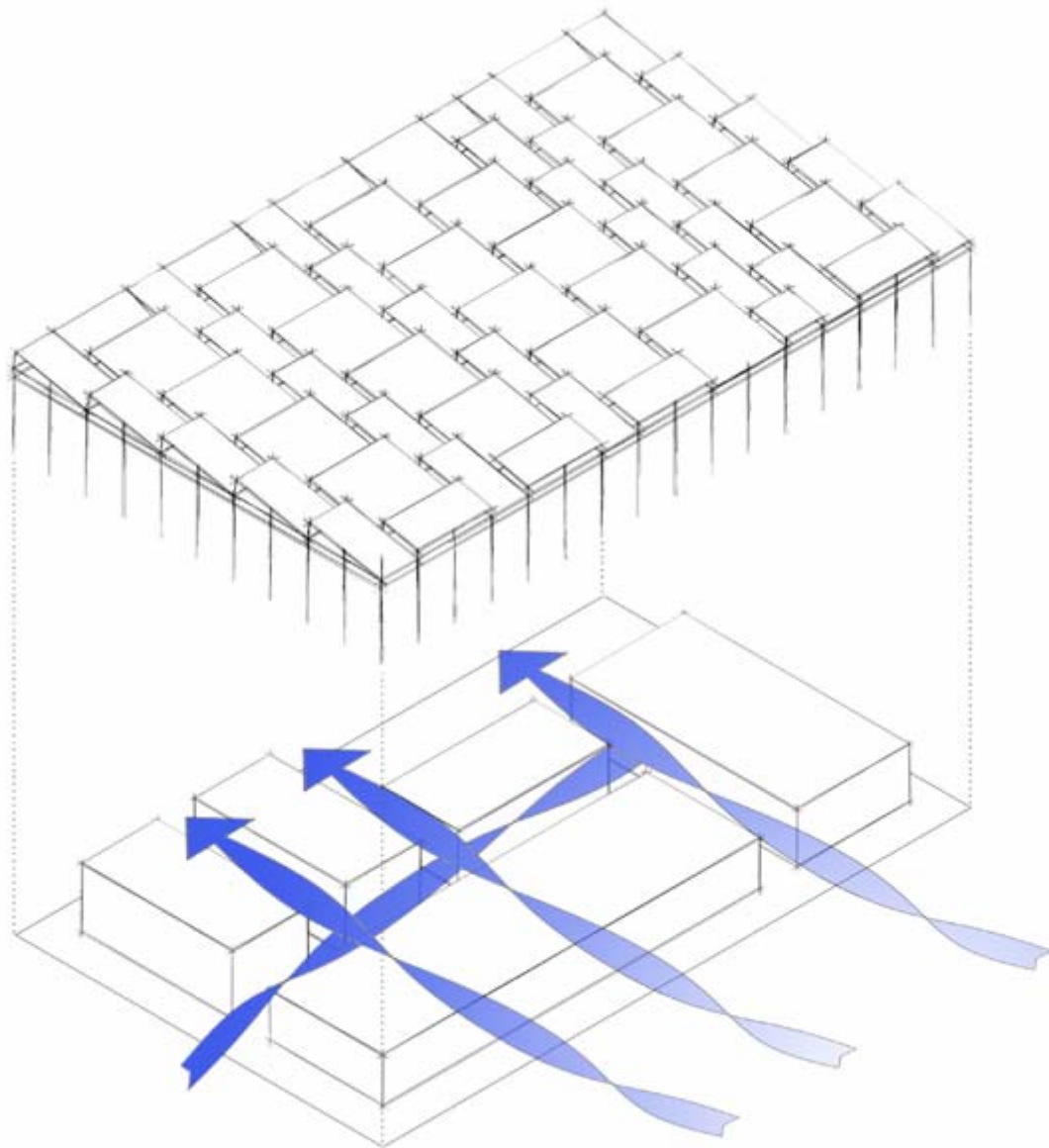


Diagram of buildings orientation following the main wind direction (India)

As a conclusion of the theoretical research, an outline project has been proposed and developed till technological details for the production area, while for the administration office blocks has been presented just a preliminary masterplan.

The site planning is characterized by:

- *correct orientation of factory buildings*  
in order to adapt to the microclimatic features, the factory blocks have been oriented so that the largest surface was exposed towards the direction of highest wind frequency, south and west in India, north in Brazil;
- *distance between factory buildings*  
different departments are 12 m one away from the other, with the aim of creating ventilation flows through the whole complex;

- *permeable pavement*

in order to reduce the heat island caused by the industrial plant, different pavements have been chosen to assure always the maximum permeability possible;

- *green shield*

a bamboo reed is placed in front of the façades exposed to solar radiation and acoustic pollution;

- *photovoltaic covering*

this is the most characterizing element of the whole project, and presents different functions: creating shadows, improving natural ventilation, collecting rainwater and hosting a photovoltaic plant 23.000 m<sup>2</sup> large.

It consists of a big expanse of modular sheds, having the transparent surface exposed towards north and the photovoltaic one towards south (in Brazil is the opposite); for the bearing structure have been proposed two solutions: a traditional one with reticular steel beams, covered by rigid photovoltaic panels; a second more innovative proposal with bamboo construction system, covered by photovoltaic film opaque and transparent.

The buildings design is lead by different structural and organizing aspects:

- *bearing structure*

realized using the steel truss designed by Lavazza according to the requirements of the industrial activities;

- *sheeting structure*

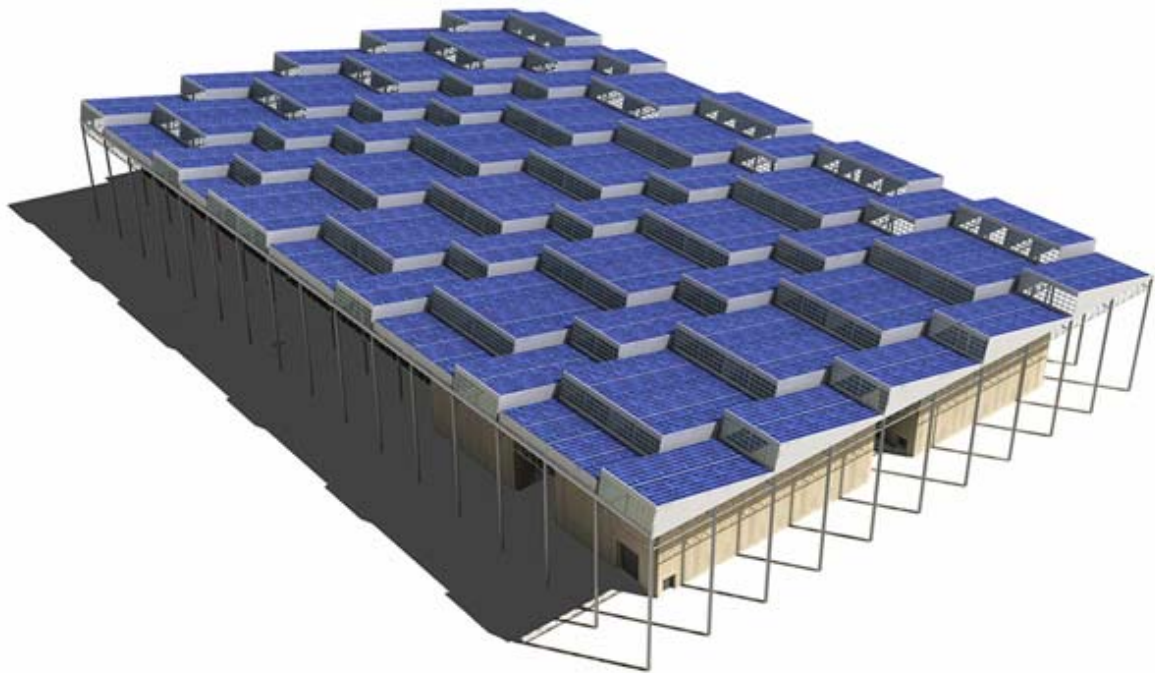
made of papercrete or paperclay panels, combined with kenaf panels for acoustic insulation;

- *correct dimensioning of windows*

in hot climates a good practice is to realize vertical and narrow openings to increase air permeability and improve internal ventilation; moreover glasses assure thermal control and acoustic insulation;

- *external sheeting*

realized with bamboo canes to reduce the aesthetic impact and avoid the thermal income from outside.



Assonometric view of the complex with steel structure



Bamboo bearing structure of the covering

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