

**Bronze 2008 Latin America**

**Solar water heating and rainwater tower, Florianópolis, Brazil**

**Project data**

**Type of project** Civil engineering  
**Estimated start of construction** October 2008

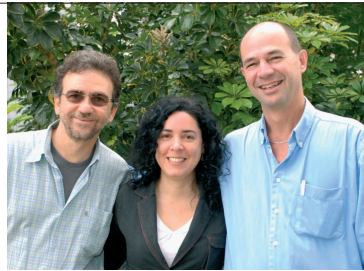
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**Comment of the Holcim Awards jury Latin America**

This project proposes an innovative and economical solution to a very common problem related to low income family housing. Due to the lack of public infrastructure, residents do not have ready access to drinking water, sewage systems and energy supply. The most serious shortcoming is potable and hot water, basic needs that are covered by the *sustainable tower* which provides a rainwater harvesting system, potable water storage tank and solar water heating device in an integrated structure.

The tower itself is composed of prefabricated rings made of ferrocement. The modular system, adaptable to different needs and local situations can be incorporated in new houses as well as in existing ones and allows for energy efficiency and rational use of water. The smart combination of existing and proven technologies has a great potential for industrial production and realizing the associated economies of scale to reduce costs of production per unit. Overall this is an innovative concept with a substantial impact on the daily living conditions of poor families and with a great potential for transferability.

**Project description by author**

Brazil has a housing deficit of 7 million residences and a large proportion of those impacted by the housing shortage are low income families. Many of these people are deprived of basic water, sewage and energy services. The problem requires an urgent solution, but the use of conventional methods may squander an opportunity for introducing sustainability concepts.

The main residential uses of electricity are: refrigeration, water heating, air conditioning and lighting. Water heating accounts for an average of 24% energy consumption and the best solution uses solar energy which is a renewable energy source. Rainwater harvesting is not yet considered as a water resource in most projects and less than 30% of residential consumption requires potable water. Companhia de Habitação do Estado de Santa Catarina (Cohab/SC), the state housing program of Santa Catarina (state in southern Brazil) has projects for low-income families. They work on projects that are considered standard for the whole state.

We have been asked to design a basic project of 36m<sup>2</sup>, to incorporate solutions that address energy efficiency and the rational use of water. A solution for energy and water with high transferability was developed using a prefabricated ferrocement tower that provides solar water heating and rainwater harvesting in a design that could be incorporated in new or existing dwellings. Although household water tanks are widely used due to the lack of supply from urban water systems, frequently water quality is compromised. Since the household tank supplied with the house is normally small, improvised structures are built near the house for larger tanks.

The *sustainable tower* solution utilizes rainwater to supply drinking water and heated water that is both sanitary and easy to maintain. The solar collector can be installed in many directions and inclinations toward the sun, depending on the local latitude. The volume of the rainwater storage tank can be sized in accordance to the local rainfall patterns. In addition, a space for a washtub is added.

The tower could also be designed for people in areas where water supply is critical. By incorporating a water treatment device into the system, a larger volume of water can be supplied, particularly in areas where rainfall is inadequate. Importantly, the solution can be fitted to new housing or retrofitted to existing houses; and low-cost of installation reduces economic drain of providing basic residential needs on low-income families. The solution is socially inclusive by providing residents with an economical and legal supply of both water and energy.

**Relevance to target issues by author**

**Quantum change and transferability**

The solution is transferable because it can be used in existing houses as well as new houses. The implementation can be adjusted to meet local climatic needs. Quantum change is apparent because the solution allows low income families to obtain a better situation, although it depends on social policy for it to be made possible.

**Ethical standards and social equity**

In this aspect, the families' social inclusion is considered, providing access to rational use of resources that is both safe in terms of human health, and legally compliant.

**Ecological quality and energy conservation**

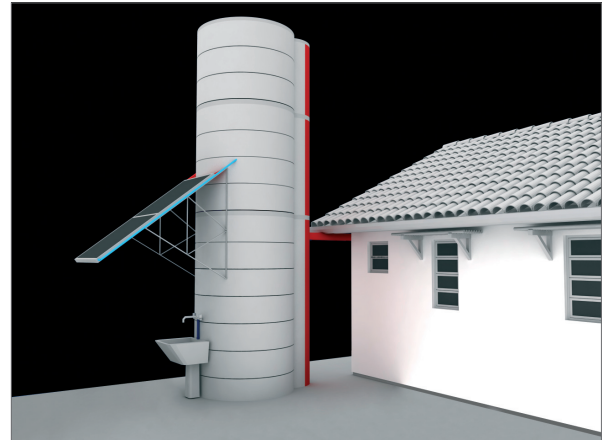
The main purpose of the project is to enable the use of renewable energy and rational use of water, also promoting water conservation. The energy system is adaptable in response to the position in which it is located and due to the panel inclination, in order to obtain an optimal solar use.

**Economic performance and compatibility**

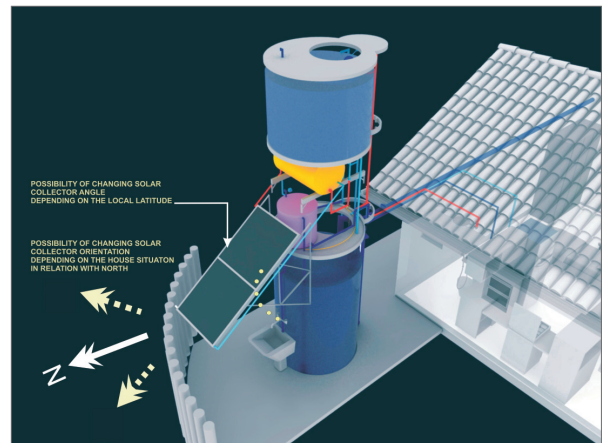
The implementation of the *sustainable tower* provides lower-cost access to basic residential needs of low-income families, thereby reducing economic drain. The economic performance of the system is apparent on a large scale implementation, rather than when considered on an individual basis.

**Contextual and aesthetic impact**

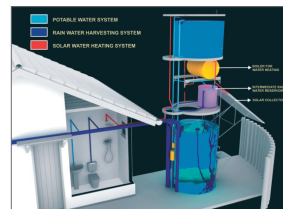
The tower could be adapted to any type of existing house. In aesthetic terms, the tower represents an innovative approach that emphasizes the importance of incorporating sustainability strategies in low-cost housing solutions.



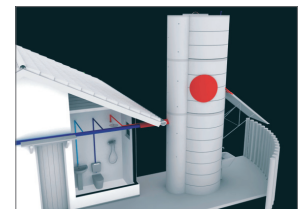
The sustainable tower combines the use of solar energy, rainwater collection and potable water storage.



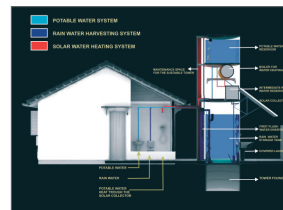
The tower structure can be modular, adapting to different needs and local situations.



Components of the tower.



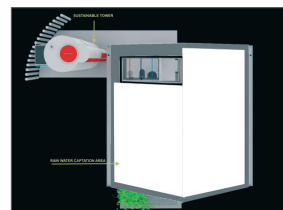
Allows for easy maintenance.



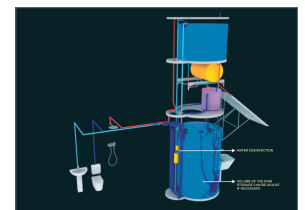
Overview of the system.



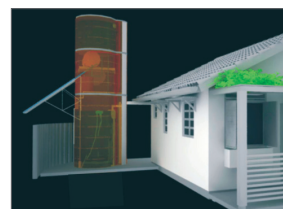
For new and existing houses.



Plant and location.



Schematic diagram.



Interior view of the tower.