

# WHEN THE FLOW OF OIL STOPPED: CUBAN EXPERIENCES

*How the crisis called the special period affected Cubans after the collapse of socialism in Eastern Europe is the focus of reflections upon those times by Fernando Martirena and Kurt Rhyner, both key players and motors of the EcoSur Network.*

Over the years the Swiss architect Rhyner, a founder of Grupo Sofonias, and the Cuban engineer Martirena, a founder CIDEM, have kept up a systematic and friendly interaction in the process of technology development and implementation, an interaction that has progressed as “learning by doing”. Practical applications in the area of housing are a result. Connecting science with practice is a path...a path toward the sustainable Habitat.

The EcoSur Network wishes to share these experiences in celebration of its 20<sup>th</sup> anniversary and will publish their reflections as a website series.

## 1 - PRELUDE

By Dr. Fernando Martirena



If current estimates are accurate, at least by 2030 our planet will reach the so-called “peak oil”. Although encouraging progress has been made in research and development of renewable energy, especially fuel, medium term there are no products envisioned that could compete with the flexibility, multi-use, massive availability, and high quality of oil. The dramatic increase in price that is expected when availability of oil drops significantly will lead to a crisis that shall affect most countries in the world in a way similar to how the crisis called the special period affected Cubans after the collapse of socialism in Eastern Europe.

The end of the 1980's was an uncertain time in Cuba. The drastic changes in Eastern Europe were making headlines in national and international media and many were concerned about the future of the revolution.

Cuba had undergone many positive changes since the revolutionary triumph in 1959, which were reflected in improvement of the economy and the quality of life of the population in general. Through cooperation with socialist countries in Eastern Europe many of the required imports were secured, as well as an international market for national products. This trade contributed greatly to the progress that enabled the country to profoundly improve education, health and infrastructure.

However, in a breath-taking series of events socialism collapsed in Europe and the trade benefits were automatically lost. All of a sudden about 80% of Cuban imports vanished, which harshly struck many sectors of the economy, above all the energy sector, where oil imports fell from 13.8 million tons a year (1989) to just about 6.6 million (1993). Cuba ceased to have access to cheap oil and had to source it in the expensive world market. This had a direct impact –amongst others- on the construction sector.

### Direct impact on construction sector

At the time of the revolution Cuba tried to tackle the housing deficit with a model based on high productivity and energy intensive technologies

and, therefore, created a network of 65 industrial plants to produce precast concrete panels. The country also invested in a vast infrastructure to manufacture cement, with a production capacity of nearly 5.5 million tons of Portland cement a year; further, it created a large network of stone crushing mills to respond to the rising demand for concrete for the prefabricated elements.

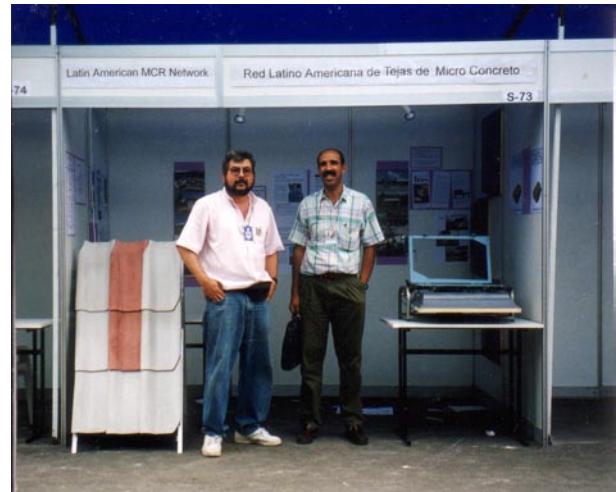
The high cost of oil to power, these plants as well as petrol to transport the elements, together with the scarcity of financial resources, led to a decline of production. Many of the spare parts for the plants and vehicles that had come from Eastern Europe disappeared or became scarce or extremely expensive, and the impressive road network quickly deteriorated because of high costs and absence of maintenance. This had an enormous impact on the infrastructure created for the housing program, especially the prefabrication plants, that became abandoned facilities like taunting ghosts in the rural landscape.

### A fortuitous encounter

A way to cope began coincidentally in 1990 at the International Conference on Urban Planning and Housing held in Havana, where Martin Melendez, at that time vice president of the international non-governmental organization Grupo Sofonias, met Ruben Bancrofft, who at the time was the visionary director of the Centro de Estudios de Construcción y Arquitectura Tropical (Center for Studies of Construction and Tropical Architecture, CECAT), a Cuban research and development institute. That encounter marked the beginning of a fruitful relationship between Grupo Sofonias and Cuban academic institutions that later gave birth to an international movement to shift from centralized, highly industrialized manufacture, to small-scale, local production of construction materials, based on a new connection between science and practice.

In 1993 the Centro de Investigación y Desarrollo de Estructuras y Materiales (Center for Research and Development of Materials and Structures, CIDEM), followed the steps of CECAT, and integrated into the network of institutions developing technologies for the decentralized manufacture of materials and systems for low cost housing construction. This networking had begun in 1991 during a regional conference in the Dominican Republic where key players from eleven countries launched the Red Latinoamericana para la Teja de Microconcreto (Latin American Network for Micro Concrete Roofing Tiles). This enthusiastic and coherent

endeavor to join efforts to develop and introduce appropriate technologies under new and sustainable social, economic and technical paradigms continues to be coordinated by Grupo Sofonias. In 1996 in Ecuador this network evolved into EcoSur, la Red para el Habitat Ecológico y Económico (EcoSouth, the Network for an Ecological and Economical Habitat) [www.ecosur.org](http://www.ecosur.org).



*Melendez and Bancrofft at Habitat II in Istanbul*

The EcoSur network triggered an intensive exchange among academics and researchers, mainly based in Cuba, and experienced practitioners who worked in social projects throughout Latin America. While the scientists previously had been involved in development of high-tech, innovative technologies for industrial applications and concentrated on the scientific and technological aspects of the new emerging technologies, the practitioners, many of them spiritually and practically engaged in the appropriate technology movement of the 1980's, strongly defended the social aspects of the new technologies and their grassroots implementation. Merging these two approaches, the elevated scientific capacity of Cuban scientists and the wealth of social and practical experience of the specialists, led to significant contributions in the field of innovative construction materials and housing. Tens of thousands of citizens from the developing world have benefited from this new type of collaborative engagement, which itself has become a milestone in development cooperation.

### The writings

The backbone of the writings is the experience of both authors in the area of housing and this topic will be the subject of continued analysis. Other areas such as transportation, food provision, environment and job creation that are intrinsically

connected with the Habitat will be discussed as well.

The writings have several focuses. One portrays the great changes undergone by Cuba during the last fifty years: the period shortly after the revolution triumphed in 1959, and the impact of the unprecedented series of economic and social measures introduced.



*Rhyner and Martirena in a creative discussion*

Another depicts the period that followed the collapse of socialism in Eastern Europe, its tremendous impact on the life of the Cuban people and how the country dealt with the new situation. It highlights the attempts to cope, and the errors and lessons learned when oil became a scarce and expensive commodity, and how the Cubans have corrected their course and continued to live and develop in a sustainable manner.



The reflections also reveal concepts, principles and paradigms that have emerged from the new interaction between scientists and practitioners: how scientists should jump out of their glass

domes at the universities and reach out into the communities through grassroots endeavors; the importance of small scale in order to have a greater impact on economics and social welfare; the role of local governments, especially in circumstances where energy becomes extremely expensive; the increased burden of natural disasters boosted by the damage inflicted by human civilization on Mother Nature; the impacts that we are creating on natural ecosystems and how they will affect us in the very near future; and the urgent need to shift from considering these new initiatives as pilot or romantic projects to accepting them as economically, socially and environmentally sound endeavors.

Case stories illustrate real life applications of some of the construction materials employed under the umbrella of EcoSur: a local roofing tile that can either shelter a poor family or beautify the roof of an up market dwelling and yet withstand powerful hurricane winds; a locally produced alternative cement that can partially replace Portland cement in most applications and thus reduce energy consumption as well as improve its performance, especially in buildings located in aggressive, marine environments; bamboo, that can provide a strong and ductile material for certain uses while, at the same time, the plant protects and heals the soil where it grows; innovations in local production of fired clay bricks that can replace firewood with recycled wastes as a means to revert the depletion of tropical forests; a pioneering mortgage system that provides families with access to affordable credits to buy their houses; the experiences of a massive housing program where the Cuban government gets deeply involved at municipal level; how the impact of local projects is significantly multiplied by several orders of magnitude through such collaboration; and local initiatives to implement sanitation and hygiene measures without compromising the scarce sources of water.

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