

# ELEMENTAL

Andres Iacobelli / Alejandro Aravena

Director  
Elemental SA

Unamuno 826, Las Condes  
Santiago, Chile

phone: + 562 550 9445  
e-mail: aiacobel@uc.cl



## Abstract

ELEMENTAL is a Doing Tank building low cost Housing projects throughout Chile, within the framework of the current housing policy, bringing together the best practices in architecture, engineering and social development. Projects are using a US\$ 7,500 subsidy that has to pay for the cost of land, construction and infrastructure, which in the best of the cases allows for just around 30 m<sup>2</sup> of built space. When the given money can afford just half of the house, the key question is: Which half do we do? We chose to provide the half that a family will never achieve on its own. Our point is that social housing should be able to become a public investment, not just a public expense. We have identified a set of design parameters that allow a housing unit to increase its value over time. So far we have designed and built projects with a middle-income standard genome, able to gain value over time. That is how we have transformed the housing subsidy into a tool for a family to abandon poverty and that is how we expect to use more efficiently the US\$10 billion that Chile will spend to overcome the housing deficit.

## Context

Chile has developed an efficient housing policy that has allowed reducing the housing deficit. In general terms, it is a demand and property oriented policy, where the private building industry builds housing projects using, until very recently, a combined scheme of a government subsidy (voucher), family savings and a low-interest loan.

Following this model, 1 million units were built in the past decade, at an average cost of US \$ 12.000 per unit. Though this can be acclaimed as a huge achievement in a country with a population of 15 million and approximately 5 million families, some criticism have risen:

(i) the policy's incapacity to effectively focus on the poorest and (ii) the low quality of the built units and neighborhoods. The subsequent rapid process of deterioration has had 2 consequences: (iii) the high level of dissatisfaction has affected loan re-payment; (iv) the low quality of the units and its neighborhood has had a negative influence on health, education and crime. Most of these housing units will be neglected and soon will become part of the housing deficit, resulting on an economic disaster for the families and the government.

In a way, social housing today looks more like providing cars than houses; every day they are worth less. (fig.1)

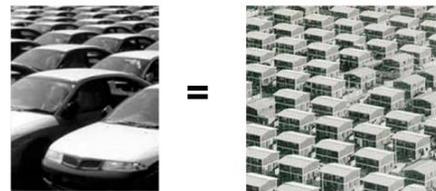


Figure 1

## Framework

In 2001, the Chilean Housing Ministry launched a new policy to correct some of the criticism. To avoid an "invisible extra subsidy", consequence of the unpaid loans, but also to focus more effectively on the

poor, the government implemented a new program “Dynamic Debtless Social Housing”, which consists in a government subsidy (\$ 7.200 US Dollars) plus family savings (\$ 300 US Dollars) but with no debt.

Considering the current values in the Chilean building industry, \$ 7.500 US Dollars allow for just around 30 m2 of built space. This means that beneficiaries, although don't have to pay back a loan, have to “dynamically” build in time, on their own, the second half of the house (hence the program's name).

Figure 2: current product of the US\$ 7,500 voucher



## What’s our point?

We identified the set of conditions and design parameters required to produce housing units able to gain value over time. We wanted to replace the treatment of social housing as a public expense by treating it as a public investment, all this without increasing the voucher value, or, what is the same, without having to reduce the amount of units built yearly.

For a poor family, the housing subsidy will be, by far, the biggest aid ever. If that subsidy can add value over time, it could mean not just a very efficient way to guarantee loan paybacks, but also the key stepping stone for a generation to overcome poverty. For the government, it might mean a 10 billion dollar investment able to assure social (and financial) profitability. The evidence to prove this statement on the value of design can be found on one of ELEMENTAL's early projects: The Quinta Monroy.

## For example



Figure 3: existing condition

In 2003, hired by the Government’s Chile-Barrio Program, ELEMENTAL was asked to resolve the following equation: to develop a project for Quinta Monroy, the last informal settlement in Iquique, a city in the desert, that for 30 years has had no solution. We had to settle the 100 families that illegally occupied a 5.000 m2 site in the core of Iquique's downtown. Although the families lived under very bad environmental conditions (60% of the rooms lacked natural light and ventilation, and drug dealing was facilitated by a labyrinthine layout), the first priority was to maintain the families in the same site, because their proximity to an extremely valuable network of opportunities (transportation, jobs, public education and health facilities). This proximity to opportunities was actually reflected in the high price of the land: 3 times more than what social housing can normally afford.

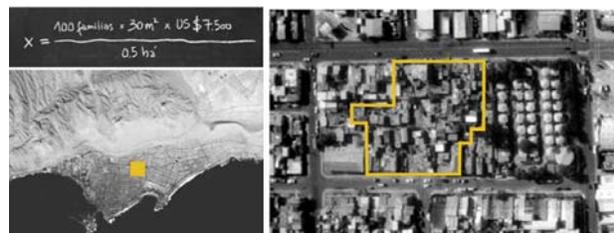
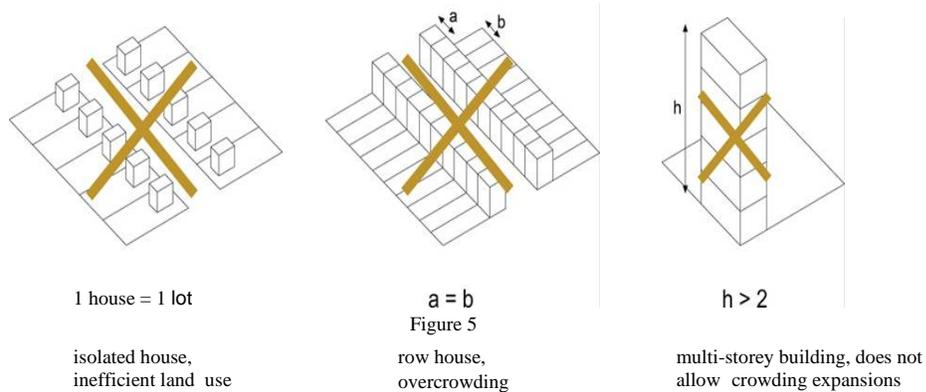


Figure 4: Quinta Monroy location and aerial view before project

We tested all the typologies available in the market and in our best scenario, just 60 families were able to be re-settled in the site; this would not just provoke a social conflict for 40 families (and the local democratic authorities), but it meant that we had to spend all the money in buying the land, with no resources left for an acceptable initial built space.



### So, what to do?

**US\$ 7,500 X 100 (families)  $\neq$  US\$ 750.000  $\div$  100 (families)**

We started by reframing the question, shifting our mindset from the scale of the best possible US \$7,500 unit to be multiplied 100 times, to the scale of the best possible US \$750.000 building capable of accommodating 100 families and their expansions.

We knew though, that high buildings block expansions. That is true, with the exception of the ground and top floor; ground floor units can expand horizontally and those on top floors, vertically into the air. What we did then, was to conceive a building that had just the ground and the top floor.

Or in other words, "Parallel Building", having a house in a lot and then an apartment on top of it. With 2 families per lot, we doubled the efficiency of land use, before even going into the design. This density allowed us to accommodate all the 100 families, pay for the land, and therefore, to keep the social and economical network that was the first condition to expect an upgrade in their living conditions.

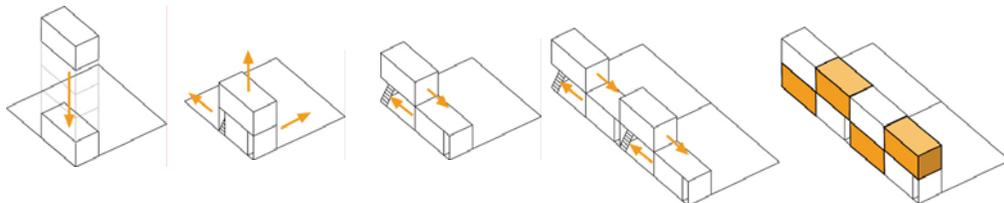


Figure 6: parallel building

## Self construction as customization, not deterioration



Figure 7: Dec 2004, May 2006

We have to bear in mind that around 50% of each unit's volume will be self-built. This "Parallel Building" was made porous enough to provide a supporting, unconstrained framework for improvised construction. Each family's space for growth, was framed by solid structures, so that expansions could be done in an easy (low-tech) and safe way. That "initial" building was placed in the lots' edges, to guarantee the quality of the urban front after expansions occur. Framed self-built expansions, can temper, characterize and customize the historically criticized monotonous and repetitive housing block (brought about by efforts to achieve economy) and thus its inability to respond to the diversity and particular needs of families; on the other hand, monotony and repetition, may be the only way to introduce some order in that 50% of unpredictable future construction.



Figure 8: Dec 2004, May 2006

## From the nuclear family to the extensive family

A key issue in the economical take off of a poor family is the provision a physical space for the extensive family to develop. Multifamily lot occupancy is not just incapacity to have one's own house; it is also an economic device that provides the place for "the extensive family", an intermediate level of association that allows gaining some economies of scale and a support network to survive under fragile economic conditions.

In the current conformation of the urban fabric, we either find private spaces (nuclear family) or public ones (that nobody takes responsibility for).

In this case, we introduced the collective space, conformed by 20 families around a common property with restricted access, that proved to be a way to successfully take urban living beyond the private realm and ensure its maintenance and in the end, its value.



Figure 9: collective space layout

### **From a small housing unit to a middle income house half built**

Instead of thinking in terms of a tiny unit that will add more bedrooms in time, we designed a middle income house, out of which we were giving just a small part now.

This meant a change in the standard of the design. Kitchens and bathrooms had to be designed for a final scenario of a 72 m<sup>2</sup> house. Bathrooms should consider the possibility of having a tub and not just a shower, kitchens should be able to become a separated room, some bedrooms should allow for queen size beds. The standard of the house had to be prepared both for a future more exigent dweller and to become a valuable good.



Figure 10: interior self built upgrade

### **From beneficiaries to clients**

We also interacted with our clients through a community participation process. Our goals were threefold:

First, to communicate restrictions and constraints. We wanted them to understand the hierarchy of what to do first and what, if necessary, is acceptable to be sacrificed.

Second, whenever possible, we wanted the families themselves to choose and prefer among equivalent choices.

Finally we wanted to survey local resources and strategies. Actually the "Parallel Building" was not completely new for them. Originally there were just 50 families illegally occupying the 0,5 hectare site. As years passed by, those families built illegal apartments on top of the original illegal houses, with direct access to the passages network, subletting them illegally to other families. So they had already spontaneously developed the parallel property idea. They just wanted us to guarantee good partition walls, solid structures and well ventilated and lighted rooms.



Figure 11: community participation process

### **From the structure as bones to the structure as body**

The usual Structure/Finishes ratio in a building is around 30/70. In Social Housing it changes to 80/20. This means that all the savings made on structure are fundamental; but it also means that its design defines very radically the conditions of the dwelling, from the way occupations are going to happen to the urban presence of the building. The structural skeleton has to provide therefore a supporting, unconstrained framework for improvised construction, but will also perform as the skin of the final built body.



Figure 12: self construction can double the initial built space

### **From a proposal to an equation**

The design parameters that can add value to social housing project are:

a density high enough able to pay for sites that are well located within the network of opportunities in cities, conforming neighborhoods, using architectural types that, by being strategically positioned in the lot, can have some role in guaranteeing the future quality of urban space. That architectural type should also allow easy and safe building expansions. A good design (and therefore a good public policy) should provide all those important elements that any individual homeowner (no matter how much money, time, or energy spent) would never be able to produce.

**ELEMENTAL** has managed in its first months of life to revitalize to a large extent the interest in the problem of housing for the poor. Nevertheless, the greatest challenge in validating the initiative will occur during the next months when the proposed ideas must be constructed within the restrictions imposed by the tight economic and cultural context and within the **ELEMENTAL** system. The confidence that the government of Chile and the different partnering institutions have placed in the initiative reinforce our conviction that **ELEMENTAL** will make a difference in this relevant problem.



Figure 13: Dec 2004 first half cost US\$ 7,500, May 2006 second half cost US\$ 1,000