

# Manifesto for a living architecture !

*Architecture Center for regenerative materials – European 16 - Brussels*

## 0. Construction faced to uninhabitable risks

How could we think Architecture in a world where resources are limited ?

We are all responsible on the impact of our conceptor's choices. This is about materiality. By the choice of materials, each line that includes a chain of production, from birth to grave, including transport, our choices are about politics. What is certain is that, now, the architect must face his responsibilities and being conscious of the emergency, and struggling for an engaged practice.

*The "Architecture Center for regenerative materials" is thought as an ecosystem, a place to experiment, sensibelize, teach, produce, test and analyze around regenerative materials.*

## 1. Through a post-carbon economy !

The construction sector is responsible for 30 to 40% of greenhouse gas emissions, including 4 to 8% for cement alone, the consumption of 50% of raw materials and the production of 75% of wastes. It is becoming urgent to try to bend the curve of these emissions, which is rising exponentially, despite the announcements and fables of green growth.

It is important to remember that a sustainable practice requires the use of a multiplicity of solutions, localized, constantly readjusted to avoid falling into the "rebound effect". It is fundamental to ensure that a resource advertised as virtuous is not blindly perverted by overexploitation which would cause a mode of production to fall into the same pitfalls as those it nevertheless wished to criticize. Indeed, the overhaul of the economic system towards a carbon-free economy requires rethinking the primary and secondary sectors, leading a comprehensive policy in the productive sectors.

*We propose, as a first step, to substitute industrial materials by, as much as possible, natural materials, which require less carbon during their production. The overhaul of construction production methods must accompany a broader agricultural policy, on a national or even transnational scale, with the North of France and the Netherlands. As a congested European metropolis, integrated into the network of the European megalopolis, Brussels is highly dependent on supply circuits for raw and, above all, processed materials. Within the metropolis, only high added value economy is generated. We would suggest that the metropolitan area could accommodate production sites for materials based on plant fibers and mycelium, in order to be able to supply the entire built fabric of Brussels. These are the issues that are addressed in the "Architecture Center for regenerative materials", in particular in the "Micro-Factory", laboratory and place of production. We could guarantee a national production of hemp, a virtuous plant in the rotation of crops and provider of local jobs. The locally produced hemp could arrive via the existing freight network within the metropolitan territory in order to be transformed locally into construction materials, prefabricated or to be used on Brussels building sites.*

## 2. Should we still build?

It is obvious that the stakes and problems mentioned above do not find their answer in a binary affirmation. As the saying goes, the best resource is the one that you don't use. Thus, before building new, which consumes a lot of resources, there are many possibilities. First of all, we should work with what already exists. In his book "Offices of the past, inhabitants of the present", Pierre Laconte tells us that in 2016, 1.6 million squaremeters of offices were empty in the Brussels Region. We could consider using this available land as a resource, within the Brussels metropolis itself, transforming empty platforms into places of production of building materials.

*Indeed, it is to this reflection that the "Micro-Factory" responds, located in the CIVA building of the 2000s. This one proposes the installation of a laboratory on the ground floor, structure which will accompany the production of building materials in the basements of existing buildings. Thus, it is the 2500m<sup>2</sup> of basement that is transformed into a large production hall, lined with incubators and pasteurizers of the raw material. This could be replicated on a larger scale.*

### 3. Starting from what is already there ?

We must conduct a policy of rehabilitation and renovation. Regarding this last point, regularly mentioned as a major issue at the beginning of our century, it is fundamental to reduce the energy waste generated by the poor insulation of 20th century buildings, which have less inertia than old masonry buildings. However, this condition is not sufficient and is quickly confronted to the limit of the computational model. We have to struggle for making people understand that the « passive » made from polystyrene is not « zero carbon ». If architects do not take a position, we will see the entire housing stock, a few million homes, covered by ready-to-use facades, anti-architecture and material disaster

*The "Micro-Factory" makes it possible to respond to these multiple challenges. The materials produced in the "Micro-Factory" are ready-to-use bricks or insulating panels. All the interior insulation of the "Architecture Center for regenerative materials" is carried out with its panels, produced in the basements of the building, in a logic of short circuits and circularity. This system could be generalized and we could see buildings under renovation producing, within their vacant floors, their own "growing" insulation. Materials based on mycelium and hemp have good insulating qualities, thanks to plant fibers and their very low density, and acoustics.*

### 4. For an architecture of the living!

Through the choice of materials, the architect has a key role to play in reducing the impact of the construction sector. To do this, we campaign to resort, as much as possible, to natural materials, for new or renovation. These materials are available in abundance and have intrinsic qualities that make them perfectly suited to the multiple challenges of construction. They can be used as a carrier, as a filling, as a coating, as an insulator, as a roof. These natural resources make it possible to ensure healthy air and natural breathing in buildings. We must find a proximity with the materials in which we live, and with which we build.

We must start thinking our projects from these resources. However, beyond the received ideas about their constraints, these are multiple and give free rein to the expression of the project. These materials each have their own particularity, which guarantees the range of expressions available to us. Beyond a constraint, it is a wide possibility, and a beautiful expressiveness to which we can resort.

*To concrete-plastic-ventilation machine, we wish to oppose a construction in wood-earth-hemp-mycelium... and natural ventilation... The mycelium, central resource of the program that we propose, is the root network of the fungus. This has huge stakes in reducing the impact of construction. It is a living matter, which works by proliferation. In fact, unlike most other construction materials that work with a binder whose production requires excavation, cooking and whose setting is chemical and irreversible, the mycelium works as a growing network. From a cloned cell, the mycelium is inoculated into a sterilized plant substrate, hemp, within a mold in which the shape and growing conditions are controlled.*

*Moreover, wanting to be a place of large-scale experimentation, from matter to material, the Center does not only use "static" but "dynamic" insulation, which means that we imagine an insulation of the building that could "grow" by itself, controlling the proliferation process, from the panels already produced, taking literally the name of "living architecture". Indeed, the mycelium could encase the ladders fixed to the masonry, on which would come to fix cladding, plaster ...*

### 5. Training

In order to respond to the challenges of the aforementioned points, a central notion in any society should be fully embraced, and that is the notion of education and training. In order to be able to carry out the operations necessary for the transformation towards a post-carbon economy, we must be able to have access to scientific and technical knowledge shared and transmitted within training and education institutions. It is through these places of transmission of knowledge, from laboratories to learning centers, that architects, engineers, craftsmen, town planners and scientists will be trained, who will have the keys to think about post-carbon territories.

*The "Macro-Factory" is conceived as the "Grands Ateliers du Benelux", with refer directly to the « Grand Ateliers de l'Isle d'Abeau », in France. It is an experimentation hall for building on a real scale, around organic and geo-sourced materials. This infrastructure, located in the CIVA 19th century old electric fabric, is part of a vast regional or international network of Schools of Architecture, from the "Faculty of Architecture La Cambre Horta" in Brussels to "TU Delft" in the Netherlands. This basin requires an ambitious infrastructure in order to be able to carry out a european educational project, capable of structuring everyone in living and natural construction, integrating all sectors and all actors, in a logic of exemplary circularity.*

*In addition to this large hall, there are classrooms and changing rooms / showers, in connection with the new central building, the «Forum », which connects all the functions of the "Architecture Center for regenerative materials". In fact, to the programs of the "Macro-Factory", which integrates the experimentation hall and the classrooms, and of the "Micro-Factory", which integrates the laboratory and the material library, are added a refectory, which overlooks the double height of the entrance and affirms the public aspect of the place, and of the dormitories on the last two floors, in order to be able to accommodate individuals in training.*

## 6. For a permanent experimentation

We must assert a culture of "soft" instead of a culture of "hard", to use the words of Patrice Doat of CRAterre, the earth-research specialized lab in Grenoble. It is necessary to think of our constructions from what resources can, to improve our architectures through our designs in addition to an improvement in the properties of the materials. To do this, we must be able to question the standards which, as they are, operate on the logic of « hard », performance and result. The standard is necessary, but we must be able to work on the margins. To achieve a real "ecological transition", we cannot keep the same logic by changing only a few sliders, in this case the materials. With natural materials, by working with living things, we cannot universalize processes that all have their specificities, with variations that are also intrinsic. We must defend a logic of permanent experimentation.

*Let experiment ourselves in the « Macro-Factory » !*

## 7. Low-tech/High-tech or Proliferation/Excavation-cooking

We must take a stand against fallacies of all stripes, which are suddenly turning « green ». No, illusory invocations, although attractive, cannot ignore the physical reality of the resources necessary for their implementation. No, the energy renovation of buildings cannot be done with insulating materials derived from petrochemicals. No, this is not "zero carbon". No, a machine to ventilate a space, if not unbreathable, is not a solution. No, a software cannot, by a red or a green, tell us that this system works or not.

We must work to develop as much low-tech as possible in the buildings we construct, in order to guarantee the sustainability of the materials used as well as the reversibility or scalability of the techniques used.

*One of the main qualities of organic and geo-sourced materials is its reversibility. Beyond their carbon impact upstream, these materials can return to the earth without polluting or be reused. An earth plaster can be reused endlessly without chemical stabilizer. Likewise, the mycelium-based materials could, the fungus being asleep in a controlled manner, be reactivated to produce new shoots on new supports, with the same reference material. All these materials are analyzed and processed within the "Micro-Factory". In addition, all materials are tested in the "Macro-Factory", a large open experimentation hall for training on natural and living materials. This is accompanied*

*by a material library integrated into the "Micro-Factory", which presents the joint results of the research carried out in the laboratory and the experiments built in the "Macro-Factory".*

## **8. Substituting a comfort logic to a performance logic**

It must be said loud and clear that with green building, we will never be able to be "compliant". We will never achieve the "performance" of industrial materials, for which production lines have been optimized by a global division of soil, people and resources. It is in this desire to achieve the same performance that we pervert the virtuous models advocated by the use of natural materials.

We must go beyond the structuring concept of "performance", often static and which is based on objectifying data to be questioned, by the concept of "comfort", more relative. This could encourage less energy-consuming and off-scale responses. For example, through thermal correctors installed indoors, we can act on the feeling of heat in the wall. Thus, with the same indoor temperature, the space with a heat corrector would feel more comfortable. We can substitute this logic to a logic of systematic packaging, which is accompanied by ventilation machines, themselves quickly obsolete.

*On all the existing building, we have worked on thermal correctors based on plant fibers and mycelium, plastered with earth to improve hygrothermal comfort. Working on these correctors allows us to improve the thermal comfort of interiors without enveloping the entire building. For the new building, all the insulation is made with the same hemp-mycelium resource, filling in wooden frames.*

## **9. For a high human inertia construction !**

The use of local resources must also lead, by supporting the construction industry, to local labor. For a designer, choosing a local resource induces a choice of society and a development model. More generally, there is a strong stake, beyond the environmental aspect, in the local development of territories. In the current economic model, for the moment, local labor costs more than energy. Thus, it is cheaper to have a material that has traveled thousands of kilometers than to extract, transform and use it locally. The workforce has also been "optimized" by globalizing, thanks to the price of energy, production chains or by resorting to foreign labor, which has become more often made up of installers than craftsmen. Indeed, the implementation methods have also been optimized. Faced with this, we must guarantee relative energy independence, in order to be able to achieve the so-called "energy transition". This should support local construction sectors, which provide employment. Architects should not see these dimensions as beyond their scope. It is indeed a global system that is summoned here!

*To the production of hemp and the agricultural policy which results from it, already mentioned, are added the skills and know-how in connection with the other resources implemented, from the least transformed to the most developed in technological competence, such as production of mycelium-based panels. This should make it possible to guarantee a quality local workforce, a guarantee of the sustainability and strategic independence of our production methods.*