CONTRIBUTION TO THE PANEL DISCUSSION (10-27 JUNE) ON "ISSUES AND FUTURE OF ECOCITY DEVELOPMENT"

First of all I would like to express my heartfelt thanks for being invited to join this panel discussion. I am doing my best to represent Brazil, although my true country is the whole Mother Earth. Here we are to discuss and take actions to guarantee there will be Paradise on Earth soon.

In The Habitat Agenda, Part IV: Global Plan of Action: Strategies for Implementation, E.4 Technology transfer and information exchange from the **Preparatory Committee for the United Nations Conference on Human Settlements (Habitat II)**, one reads:

151. *The use and transfer of environmentally-sound technologies which have a profound impact on consumption and production patterns is one of the pre-requisites for sustainable human settlements development.* ***Advanced and appropriate technologies and the knowledge-based systems which support their application offer new opportunities for more efficient use of human, financial and material resources, more sustainable industrial practices and new sources of employment. International agencies have an essential role in disseminating and facilitating access to information on available technologies and options for their transfer.***

They highlighted especially the role played by cost-effective global human settlements information networks in the form of permanent "electronic conferences" which will contain updated information on the Global Plan of Action, best practices, as well as progress reports on the implementation of national plans of action.

Hence my contribution is exactly within this context. I do hope you will perceive that human-centered knowledge based systems are not only great fun to deal with, but also ease the accomplisment of our tasks we have to develop alone as well as in groups.

I was very worried with the conceptual complexity of my ecodesign model entitled *The Model of Primary, Secondary and Tertiary Waves to design and plan sustainable cities*, an application of catastrophe theory and inspired by developmental biology built by Zeeman.

I used to explain its generative nature through the xylograph *Butterflies* from Escher (Figure

1).

Figure 1. Butterflies from Escher.

Of course despite its beauty, it is not operational but it gives us a glimpse of how the ecodesign model generates autopoietically ecoarchitectonic objects, econeighboods, ecoboroughs, ecocities, bio-regions, the whole Planet if one wishes!
I have been striving to find something more operational and especially that could be understood by computers. To the contrary of the opinion of the overwhelming majority of people, computers are quite simple and only understand very simple concepts.
Yet a complex system demands sophisticated concepts as the one from Butterflies, an application of hyperbolic geometry. Escher was concerned with expressing the infinite! Hence evolutive things!

I was amazed when reading *The Savage Mind* the anthropologist Claude Lévi-Strauss that not only did he compare the complexity of the savage mind to the level of the mind of the philosophers in medieval times, but also he grasped the quintessence of it manifested in its totemic operator (Figure 2).

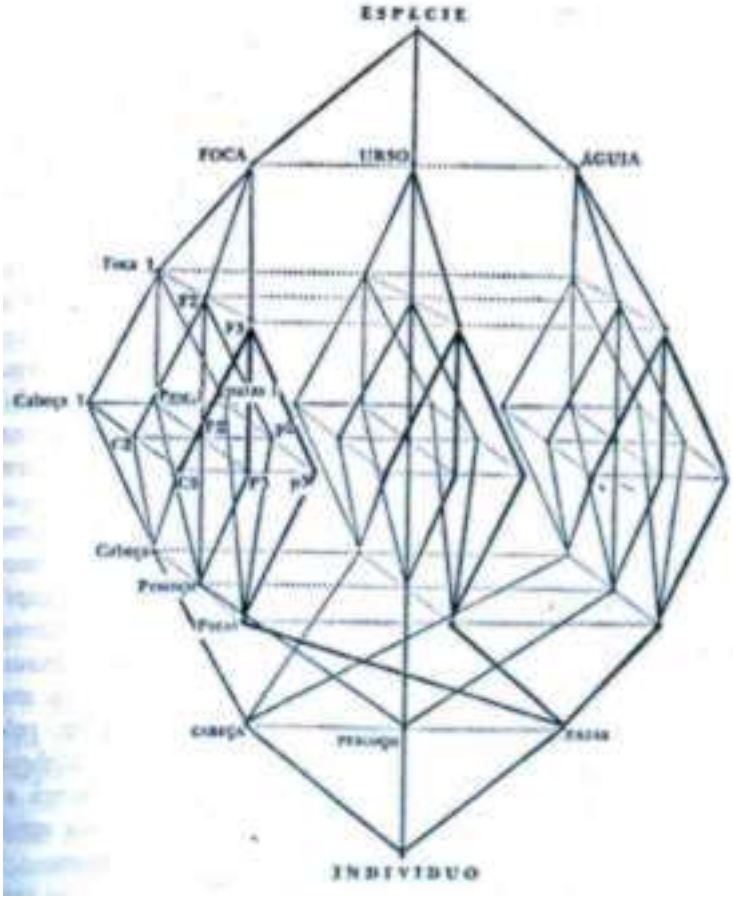


Figure 2. The totemic operator from Lévi-Strauss.

It orbits around the sophisticated notion of category developed by the Indians. It introduces a system of two axes, one for the diversities, other for the similitudes.
The analytic process allows one to change from the categories to the elements and from the elements to the species. In the highest apex, it deals with the notion of species, here bear, eagle, etc. The lowest apex deals with the animal while analyzable in its parts: head, neck, paws, etc. Next step, in sets, all heads, all necks and so on. A last rearrangement entails the model of the individual in its rebuilt integrity.
The set filters the unity through multiplicity, multiplicity through unity, diversity through identity and identity through diversity. It is absolutely evolutive in his middle and apices.
After having read this, it dawned on me that my ecodesign model had this same nature.
Figure 3 shows the nine "bases" of my ecoarchitectural DNA that generates autopoietically the whole Planet mimicking the DNA that generates the myriad of forms of life on the Planet.

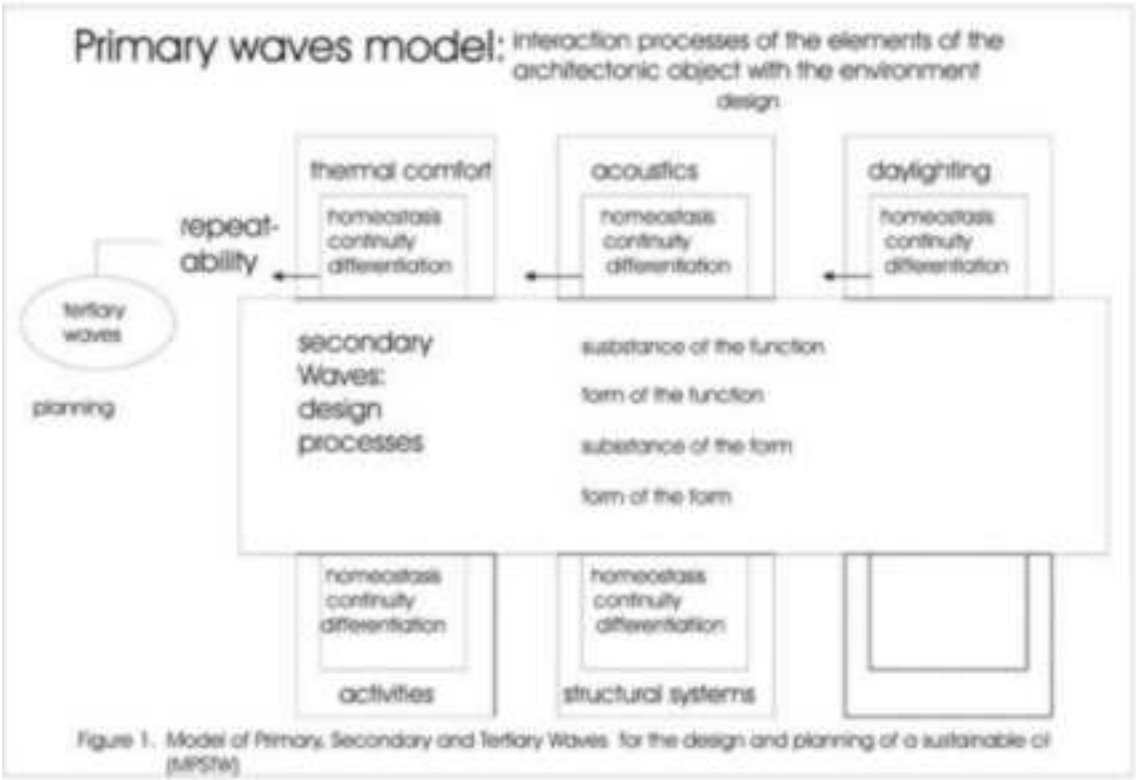


Figure 3.

Likewise my ecodesign model behaves as an alive organism or eco-system with hyphen, a term introduced by the ecologist Joergensen to designate the basic generative unit of an ecosystem. Or a unity that is defined by the ecosystem and also defines it. Like the notion of species, it differentiates as an ecotype, namely houses, buildings, greenhouses, factories, schools, etc. Similar to the notion of gender, it differentiates into an urban eco-object such as neighborhood, boroughs, ecocities, bio-regions and so on.
I hope the next three figures (4, 5, 6) are self-explanatory.

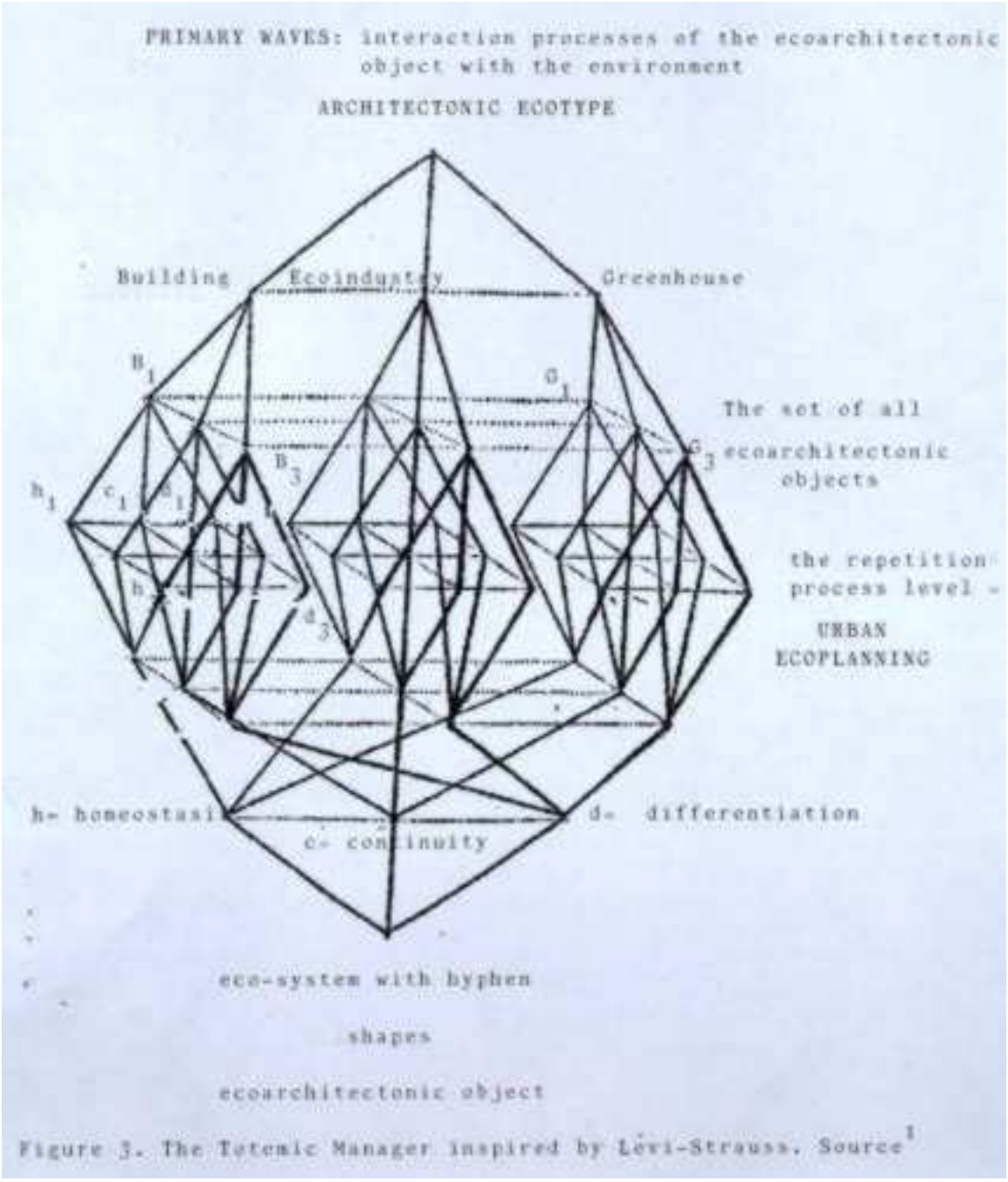
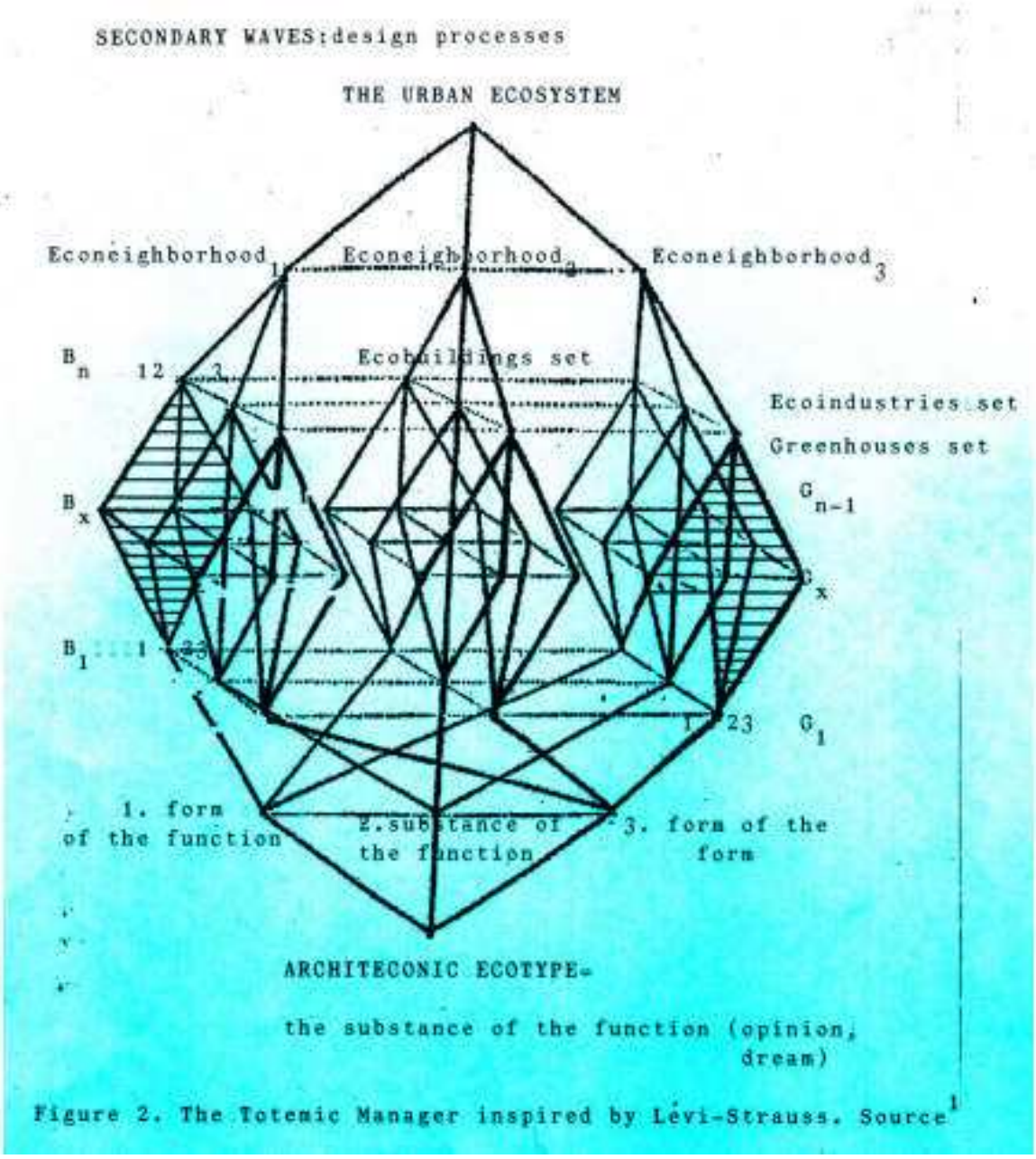


Figure 3. The Totemic Manager inspired by Lévi-Strauss. Source[1]



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TERTIARY WAVES: processes responsible for urban ecodesign and planning

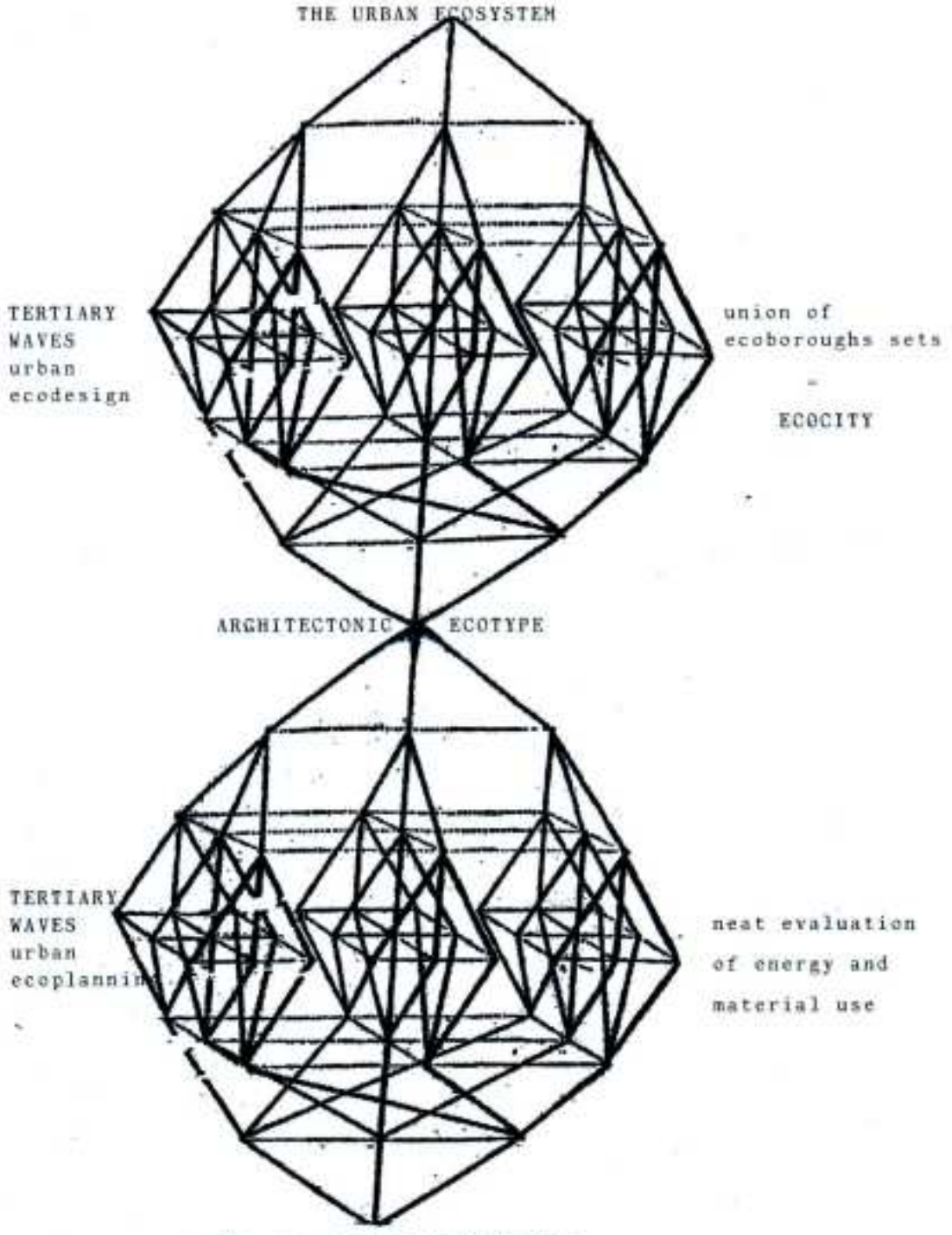

Figure 3. The Totemic Manager inspired by Lévi-Strauss.

Being concise if you want to know the use of material and energy by Building B_1 from neighborhood $N_{1,}$ you find it easily in the totemic operator concerned with primary waves. Can you imagine how easy it is to find out when such a knowledge based system is implemented which are the best sustainable practices. Of course methods such as the Emergy and Exergy methods createad by Howard Odum and Joergensen allows us to make such evaluation.
The current discussion for example about who contributes more to the Planet Greenhouse gas production leads nowhere, because one cannot localize which practices are sustainable or unsustainable.
Such a knowledge based system can. One can also be sure if it is indeed industries that are really responsible for the degradation of the Planet or the traditional urban design practices. In a previous paper, I made clear 70% of the production of CO_2 in the USA comes from transportation and production of cement (38%) to build reinforced concrete buildings.
With such a model, it will be very easy to apply ecotaxes locally and efficiently.
Moreover, I am unfolding current research to see **the urban eco-system with hyphen** from different viewpoints such as:

1) an homeostatic organism
2) as a self that may have **a superorganismal self, the individual self and the infraorganismal self** like in social insects. It is easy to map this notion to the totemic manager and realize that the processes act like genes, controlling the "self" of the ecocity from below.
3) as a rhizome – or highly flexible arrangement orbiting around the domain model occupying the central place in a knowledge system – in analogy with the horizontal stem in a rhizome. You can cut a rhizome and it is rather generative again!

I am absolutely sure this is what every designer joining this conference wishes. Everyone wants to see the autonomy of his/her ideas. Here we have an ecodesign model that allows this, simply and efficiently generating the necessary synergy to build Paradise on Mother Earth.
Special thanks for your attention and hope the discussions will be rewarding and fruitful.