A *projet*-based approach of energy quality as a path towards sustainability

Abstract

Today's approaches to energy are based on performance indicators. Such approaches, although efficient, are unable to answer to a broader ethical conception of sustainability. Indeed, we consider that a sustainable approach of energy in architecture relies on four aspects: 1/ a design based on a renewed conception of the man-nature relationship; 2/ the consideration of the interaction of energy matters with physical, social and cultural contexts, i.e. the acknowledgment of today's world complexity; 3/ specific methods to handle that complexity and to activate all stakeholders responsibility and 4/ a focus on the reduction of the actual energy uses for living rather than on theoretical predictions.

Those four aspects correspond quite well with what Jean-Pierre Boutinet sees as the properties of a *projet*: to look for an improvement of the present situation, to combine thinking and acting, and to be explicitly carried out by a single or collective author. Therefore, we recommend a *projet*-based approach as a way to turn energy into a lever towards sustainability.

Introduction

Today's approaches to energy, such as the *Passivhaus* standard and the net-zero energy concept, are mostly predictive and technical. Such approaches, although efficient, are unable to meet a broader ethical conception of sustainability.[1] Various authors pointed the ethical dimension of today's crises.[2] Environmental, social and ethical challenges are the result of a fundamental disequilibrium in our development model. Thus, answers to these challenges should emerge from a criticism of that model.[3] Therefore, looking for sustainability today is equivalent to following a path leading to an unknown alternative world with values to guide us, e.g., the care for the higher good and the priority of persuasion over constraint. The translation of values into methodological principles makes them usable in our day-to-day decision processes.

Our reflection on the sustainability of the energy approaches in architecture is based on the five methodological principles proposed by the Belgian administration in 2000 to summarise the Rio Declaration on sustainable development.[4] Later, these have been used to propose a definition of sustainable architecture.[5] These principles are as follows:

1/ Principle of integration of environmental, social, economic and cultural dimensions: this principle reminds us that our world has an obvious physical dimension but is also the place of the social and political interactions constituting our human culture. Sustainable architecture should therefore combine high performance levels and simultaneous enhancement of all those dimensions, including, for example, architectural quality and cultural pertinence.[6]

2/ Principle of equity between present and future generations: sustainable architecture considers its impact on various spatial scales and temporal dimensions.

3/ Principle of precaution: the challenge is to design buildings according to actual needs, coherent with our historical background but taking into account the uncertainty about the future.

4/ Principle of shared responsibility: we all have to reconsider our behaviour in the light of social and environmental challenges. This is all the more true for designers who build our physical environment.

5/ Principle of participation: this principle emphasises the need for decision processes to include the very ones who will face the consequences of the decisions. Next to the well-known participative architecture, this principle calls for a militant role of design through the creation of healthy and inspiring environments, and the exemplarity of designs.

Based on these principles, we consider that a sustainable approach of energy in architecture relies on four aspects. First, a sustainable energy design must be developed on a renewed conception of the man-nature relationship. Second, this design must handle the complexity of today's world. Third, dedicated methods must be used in a reflexive way. And fourth, the energy design must guarantee

actual quality. These four aspects are developed later in this essay. Their connections with the above-cited principles are also explained. Figure - 1 offers a synoptic view of our discourse.

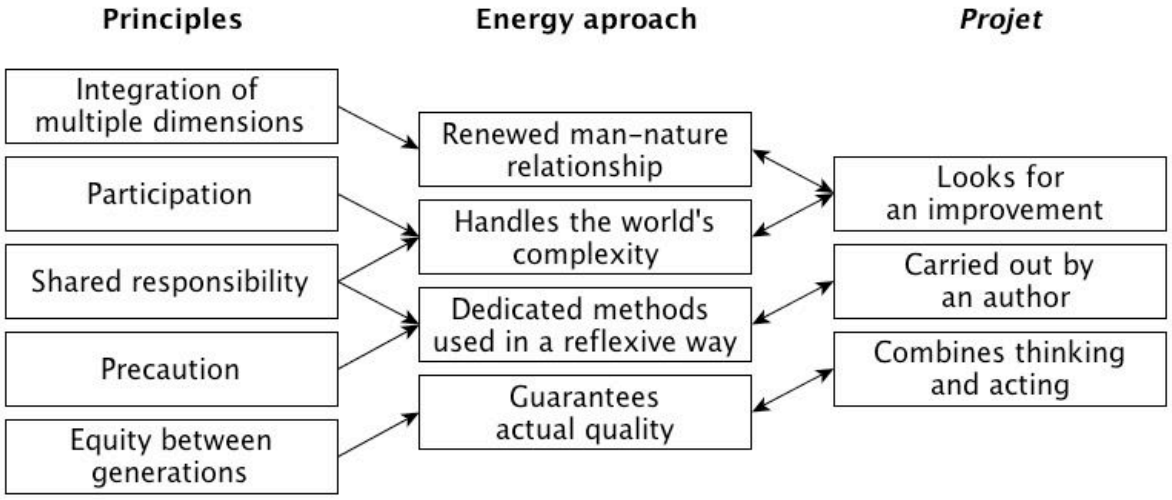

Figure – 1: Synoptic view of our discourse.

About the *projet*

It is easily seen that those four aspects fairly correspond with what Jean-Pierre Boutinet sees as the three properties of a *projet*.[7] (We will keep the French word to avoid betraying Jean-Pierre Boutinet's idea through inappropriate translation.)

Firstly, a *projet* must have an exemplary nature, he says. That means that a *projet* looks for an improvement of the present situation and implies the reference to a presumed ideal situation. Indeed we call for a questioning of the relation between human and nature. Our point is that energy conscious design may help turning over people's vision of the world, from a naturalist detachment to an *écoumenal* involvement, a complex physical, social, and cultural immersion in the world.

Secondly, a *projet* combines thinking and acting, speculation and implementation. Our proposal simultaneously stresses on the pre-eminence of actual quality above theoretical fantasies and recognize the necessity to be ambitious in our discourses and preliminary design. We call for a loop between theory and practice, each of them learning from the other.

Thirdly, a *projet* is explicitly human, meaning it is related to an author, either single or collective. Indeed we recognize that energy quality implies various stakeholders and specific methods to include them. A building belongs to different worlds: the one dreamt and experienced by the architect before and during the construction phase, and the one fantasised and experienced by the occupant, both during and after the construction phase. So whose *projet* is it? Hopefully, it belongs simultaneously both's.

Now that the similarity between the four aspects of our proposal and the notion of *projet* is exposed, we further develop these aspects.

A design based on a renewed conception of the man-nature relationship

We live in a world forged by 2500 years of what Descola called *naturalisme*: the paradigm of a distinction between mankind and the natural world.[8] Most interpretations of sustainable development postulated this distinction. We clearly see it in the idea of sustainability as a safe long-term management of our resources.[9] It also appears in the deep ecology movement when asserting that the mankind should step backwards to give place to nature.[10]

Following the principle of integration, we consider ecology as a notion based on the idea of inclusion: man is part of a network that he can affect by his actions, but which also reversely affects him. Both effects are complex, meaning that they are partly unpredictable because of paradoxical interactions. Indeed, the global ecological crisis gains an ontological dimension. Making this idea his own, Augustin Berque uses the word *écoumène* to describe simultaneously the inhabited world and the relation between the human and the world.[11] Doing so he stresses how much our experiences of the world are culturally determined.

However, if mankind actually is part of a network experienced as the *écoumène*, most people are clearly not aware of it. At this point, sustainable architecture appears as a valuable tool to help raise awareness of people's relation with the world. Creating various atmospheres inside a building is a first example of how architecture can help remind people about the rhythms of the physical world and the influence of thermal properties on the spatial delight.[12] This supports architecture based on transitional spaces, comfortable kernels and adaptive bioclimatic strategies.[13] V.Olgiatti's school in Paspels is an example of internal thermal partitioning consistent with architectural expression and the daily use of the building.[14] A second example is to go beyond the merely theoretical understanding that people have of energy, and to make them feel it in a more direct way. We may compare, for example, the reading of the electronic monitor of a central heating system with the physical movement of carrying wood logs, considering their mass before putting them in a stove. One heating mode speaks to our brains only, while the other also involves our bodies. Talking against high-tech automation systems is quite unorthodox today. Nevertheless, we believe that the combination of active behaviour from the occupant, along with adequate information about the consequences of actions, is a path worth trying. Our belief refers to the cognitive component of the nature connectedness theory.[15]

The acknowledgment of today's world complexity

The ecological inclusion of mankind in the biosphere raises complexity as a central concept in our discussion. Besides, complexity can also be found inside the limited system of elements that are directly connected to the energy performance of buildings. A mapping of this system is given in Figure - 2. In this limited contribution, let's just emphasize three aspects.

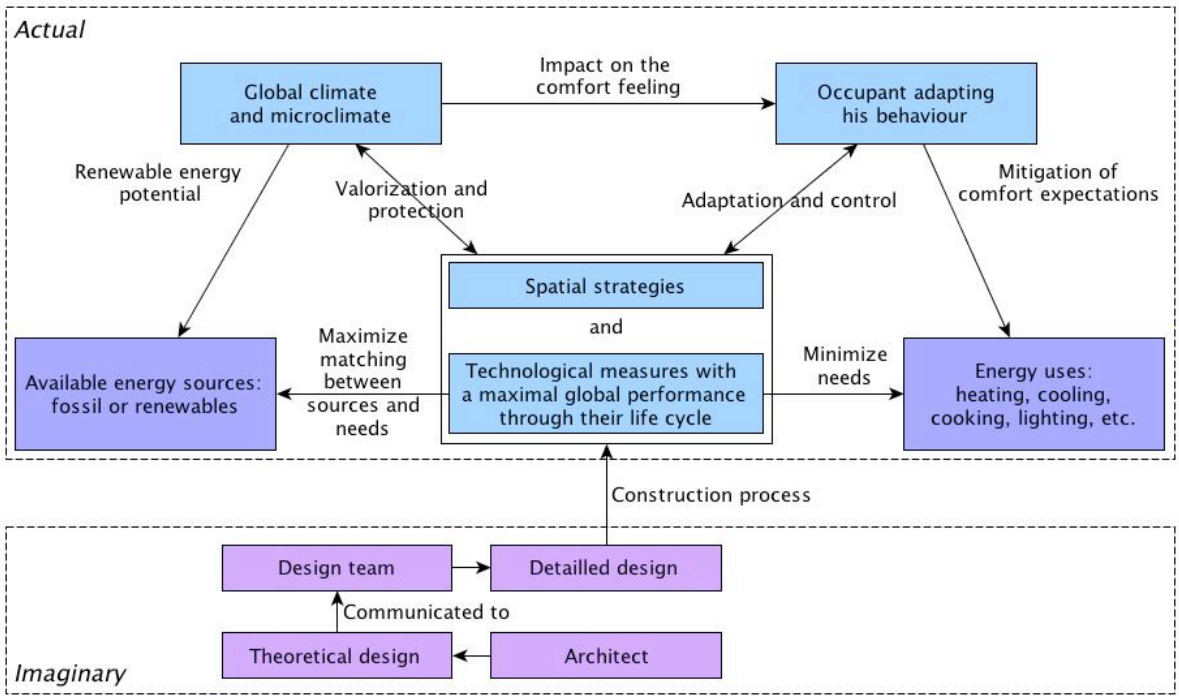

Figure – 2: Mapping of the complex system gathering the elements of the energy performance of buildings.

Firstly, the system is divided in two parts, reflecting the distinction between the theoretical performance of a concept, and the actual performance of a building. This distinction illustrates the role of various stakeholders, i.e., the architects, the builder and the occupant. The scattering of the achievement of energy quality between them underlines the sustainability principle of shared responsibility.

Secondly, focusing on the occupied building, we develop the system by updating the bioclimatic triangle formed by the occupant, the climate, and the building.[16] We integrating today's obvious fact that the building itself must be questioned in a life-cycle assessment perspective. Also, we include the consistency between energy sources and usages for which exergetic analyses have proven efficient.[17]

Thirdly, the occupant is a key element of that system, reflecting the importance of the principle of participation. Without the occupant's paradoxical behaviour, the building energy performance could be fully characterised through a thermodynamical analysis. Therefore we believe that an input from social sciences is essential in building physics today.

Specific methods

Handling complexity urges a change in design methods to effectively activate every stakeholder's responsibility. The design process should be iterative and inclusive.[18] Further, we identify two properties a design process should present in order to target sustainability.

The principle of precaution stresses the need for time-consuming extensive qualitative and quantitative analyses before construction, but we must also assimilate the limitations of those analyses. Uncertainty in the results ensues for example from the hypotheses hidden in the mathematical models.[19] In particular, many tacit hypotheses describe an unquestioned way of life (e.g. heating periods, internal gains). The choice of indicators is another tricky point. Converting energy performance indicators from kWh/m^2 to kWh/capita may lead to different interpretations. Therefore, we propose that building engineering should be a support for design, rather than a technical optimisation. Building physics specialists may use their knowledge to question the a priori positions of the designers and occupants.

The principles of shared responsibility and participation obviously call for methodologies that include a participative dimension. A typical way of implementing participation is to invite stakeholders to express themselves in an early design phase. Doing so, we guarantee the consistency of design choices with the constructor's ability or the occupant's way of life. Further, adequate literature should be produced to help the occupant to understand the design, whether he or she is involved in the design or not. This way, participation results in a loop of information between designers and the occupant. Let's mention here the original solution proposed by MDW Architecture for the Savonnerie Heymans housing project in Brussels.[20] They highlighted the housekeeper's role by making him the agent of transmission of knowledge about the bioclimatic behaviour of the buildings.

An amazing example of the benefit that a participation process may offer is given by the Passivhaus and ecological project 'Espoir' in Molenbeek, by the architect Damien Carnoy. 21 Through the process, the low-income immigrant families turned into self-confident Passivhaus ambassadors. This project also illustrates the key impact that unexpected stakeholders might have, such as local social workers.[22]

Truth is more important than fiction

We already stressed the difference between the ideal performance of imaginary architecture and the actual performance of the occupied building. Let's remind here that, behind sustainability discourses, we are dealing with actual crises such as climate change, fuel poverty, or oil depletion. The principle of equity should remind us that these crises will affect our neighbours and descendants, if not ourselves, today or soon enough.

This being said, we easily see that true performances matters more than sweet dreams. Paradoxically, this enlightens the importance of dreams and design. Two questions express this issue: Since we are facing major crises, do we entitle ourselves to temper our theoretical targets? Once ambitious targets have been set, moreover, do we tolerate to see them reduced during the design process? Answers to these questions show how important the role of architects might be in the mitigation of environmental crises. They are the ones at the central position to set high expectations at first, and to keep them high throughout the design process. The inspiring work of Francis Kéré in Gando, Burkina Faso demonstrates that green buildings may be designed and constructed with enthusiasm as only driving force, in an amazing process of endogenous sustainable development through architecture. [23]

Conclusion

In this contribution, we use five fundamental principles of sustainability to discuss an approach of the energy performance of buildings that relies on four aspects. We expose why we believe a sustainable approach towards energy in buildings should be developed on a renewed conception of the man-nature relationship, should handle the complexity of today's world, should question its own methodologies, and should focus both on expectations and actual performances. We also discuss the similarity between our proposal and what Jean-Pierre Boutinet sees as the three properties of a *projet*.

Therefore, we recommend a *projet*-based approach as a way to turn energy matters into a sustainability lever. Although our proposal is merely theoretical, various examples are cited to strengthen its key elements and to illustrate how it may lead to actual architectural developments. We believe it shows a way for architecture to contribute to sustainability. A *projet*-based approach might be a useful complement to technological innovations and large-scale political approaches. Further, our only certainty facing the coming age of scarcity could be the pertinence of ethically based contextual design approaches.

Captions (list of figures)

Figure – 1: Synoptic view of our discourse
Figure – 2: Mapping of the complex system gathering the elements of the energy performance of buildings

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