

BARCELONA INSTITUTE OF ARCHITECTURE

BIArch
FALL
2009

SEMINARS

ENERGY

30-31 OCT

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ALL SESSIONS WILL BE HELD IN ENGLISH. ACCESS IS FREE, BUT LIMITED.
REGISTRATION IS REQUIRED FOR ATTENDANCE: info@biarch.eu

BARCELONA INSTITUTE OF ARCHITECTURE

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Diputació
Barcelona

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ENERGY

Seminar objectives

AGUSTÍ OBIOL

DIRECTOR

Sustainability is the conjunction, never fully realized, of concepts and wills that seek to rationalize our link with the planet. One of the fundamental variables in this process is the optimization of the performance of energy resources. The discussion surrounding sustainability is all too often simplified by preconceptions that undermine arguments, reducing them to modish watchwords such as "renewable energy" or "energy saving" that usually draw on biased views of reality and opinions based on disinformation. It is reasonable to wonder how the planet is affected by the "energy stress" to which it is subjected, without ignoring the fact that the total energy produced by humankind is only a tiny fraction (less than a ten-thousandth part) of the energy received from the sun. It is likewise reasonable to want to bypass the benefits of nuclear energy, given the risks represented by its use and the waste that it generates, provided we are also capable of envisioning the landscape impact of the vast forests of wind turbines and endless plantations of solar panels needed to collect the same amount of energy.

In any case, given the dramatic technological development of recent decades, simplistic approaches should give way to far more integrative methods. Before pronouncing on the suitability of energy collection methods, it is necessary to assess the possible impacts of our decisions, not just in strictly environmental terms, but also from a social and cultural viewpoint. Likewise, we have to consider appropriate strategies for reducing our energy requirements to a minimum, since the elements or systems used to produce or save energy also consume energy, which in some cases represents a considerable proportion of the amount of energy they manage to produce or save.

Observation of the real world from the purely scientific viewpoint of energy balances is an opportunity to extract a series of principles that may serve to address the scope of urbanism and construction: energy as separate from human beings. Energy exchanges have their own laws and obey their own principles that reach far beyond the results of our actions, and building knowledge around them offers a great opportunity to improve the capacity for relation with our environment. The objective of the "Energy" seminar is not to solve specific problems inasmuch as to try to represent the broad scenario of which they form part, with the intention of adopting attitudes that set out to address these issues from a similarly global viewpoint.

ENERGY: PARTICIPANTS

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Assistant Professor at Harvard University (2006-2009)
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Professor at the École Cantonale d'Art in Lausanne. Rahm has taught at the Architectural Association in London, the École Nationale Supérieure de Beaux-Arts in Paris, and ETH Lausanne. He has also participated in numerous international exhibitions.

Principal of Philippe Rahm Architects, with offices in Paris and Lausanne, with private and public projects ongoing in France, Poland, England, Italy and Austria
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MATTHIAS SCHULER

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Adjunct Professor of Environmental Technology at the Harvard University GSD. Research engineer for numerous international R+D projects, key figure in the development of the TRNSYS simulation program.

Founder and director of Transsolar, a climate engineering firm specializing in complex computational simulations, based in Stuttgart.

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Associate lecturer, Escuela Técnica Superior de Arquitectura de Madrid (since 1976)

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CHRIS WISE

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Trustee at the Design Council in London. Wise has taught at Imperial College and Yale. Former director of Ove Arup & Partners in London, Sydney and San Francisco.

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SESSION 1

Friday 30 October, 4-8 p.m.

4 p.m.

PRESENTATION

AGUSTÍ OBIOL

4.15 p.m.

ENERGY, TECHNOLOGY AND SOCIETY

ALEKSANDAR IVANČIĆ

Nuclear energy can only be understood within a specific time sequence, involving the gradual development of technological advances that have made it accessible to humankind. Once available, it is the social will, expressed by political power, that decides when and to what extent it should be used. Hydraulic energy, harnessed during its transition from potential to kinetic, has been used by man practically since the origins of so-called civilization, with a historical development that can be regarded as continuous, almost irrespective of social or political upheavals. Wind energy, which is fundamentally kinetic, has had a far more erratic evolution that has continued almost without interruption from the first windmills to today's wind turbines, with social and economic as well as purely technical factors playing a major role in its development.

These three forms of energies are usually treated according to the "collection/production/use" trinomial, but their development rarely presents a linear relationship with the considerably more uniform advances of scientific knowledge. This session offers an interpretation of a branch of technology produced by applying the science/society dual operator to energy, since science is, ultimately, a social manifestation.

5.30 p.m.

THE FORMULATION OF ENERGY

JULIO MARTÍNEZ CALZÓN

From a radically contemporary perspective, the concept of energy, along with time and space, could be identified as the foundation of the singularity that gave rise to the universe.

We might say we are dealing with a scalar magnitude: abstract, subtle and protean. Rather than constituting a physical state, it is assigned as a condition or latent property that is intrinsic to these physical systems and which, in its nominal form, becomes a super-tool that allows us to control and manage these states.

This intervention is based on the active, connective development and formulation of energy cascade diagrams and their integration in space-time and in the space of systems energy, representing the potential of energy and its reflection in knowledge.

7.00 p.m.

ROUND TABLE MODERATED BY

LLUÍS ORTEGA

SESSION 2

Saturday 31 October, 10 a.m.-2 p.m.

10 a.m.

ENERGY AS A CONSIDERATION
IN URBAN DESIGN

MATTHIAS SCHULER

Practically until the last century territories were occupied and exploited to obtain the maximum possible returns from natural resources. Well into the 21st century, we are starting to see actions that are difficult to interpret using the previous paradigm, as regards both "what to occupy" and "how to occupy it". Easy access to natural resources is gradually becoming a thing of the past and is even deliberately rejected, as these resources are less and less natural and increasingly complex, and it is humankind that is drawing on them; the new paradigm comprises the will, partly social, partly political, to produce certain models of critical mass as a driving force of human development.

The erroneous perception that our capacity to collect and produce natural resources is practically unlimited ultimately generates models of growth that we now consider unlikely to be sustainable. Successive "oil crises", climate change and, finally, the current economic crisis are forcing us to consider new models for harnessing natural resources, and the territorial occupation strategy has a major role to play.

This session sets out more to formulate questions than to come up with answers, with the conviction that the only real possibility of solving the problem necessarily involves establishing a judicious approach.

11.45 a.m.

CONSTRUCTION AND ENERGY

PHILIPPE RAHM

There seems to be a consensus that the resources available to optimize the energy response of a construction can be divided into three groups: those related to form, passive and active systems.

There are also various lines of research that aim to evaluate the efficiency of the systems used to obtain different levels of energy self-sufficiency.

Although many of them have a fundamentally economic approach, the most interesting ones extend to the field of energy balances, quantifying the energy consumed to build a renewable energy collection system.

This intervention takes a more general look at the problem by understanding consumption not only in terms of the energy needed to function but as every demand made, from the construction of a building to its final demolition when it becomes obsolete.

1 p.m.

ROUND TABLE MODERATED BY

JUAN GALLOSTRA ISERN

SESSION 3

Saturday 31 October, 4-8 p.m.

4 p.m.

ENERGY CONTROL IN BUILDINGS

RAFAEL ÚRCULO

It is precisely in the functioning phase of buildings that the energy savings planned during the project break down. For a while, intelligent buildings were considered the last word in construction, just as their sustainable and/or bioclimatic counterparts are now. But they quickly began to lose favour due to lack of user adaptation, problems of communication with the systems and lack of training on the part of operators, a situation which, to a greater or lesser extent, persists today.

One of the aims of this session is to convey the basic concept for the design of any building project with an automated energy system: that the intelligence of a system should never be greater than that of the operator controlling it. Failure to respect this idea leads inevitably to the corresponding functional and economic failure of the operation.

5.15 p.m.

STRUCTURE AND ENERGY

CHRIS WISE

Static analysis is perhaps the most intuitive approach when considering structural equilibrium. The moment that structural design looks beyond the simple considerations of stability and strength, the need to turn to other disciplines in order to advance becomes obvious.

Aside from collateral issues, such as fire protection engineering, energy analysis provides a more global view of structural mechanics itself. Accordingly, even the prestressing techniques used for concrete structures can be seen as mechanisms that are conducive to achieving minimum energy consumption, looking beyond the material's purely strength-related applications.

In this way, the need for equal internal and external work shows that the more rigid the structure, the less energy is stored during the load-bearing process; that typologies that absorb loads working under compression and tension are more efficient, as they need to store far less energy, and that with the same typology and "amount" of structure, the mechanical efficiency also stems from the minimum energy principle.

Without going in great detail into the numerical techniques involved, this session will take a qualitative and conceptual approach to these principles, currently being used to develop strategies of topological optimization.

6.30 p.m.

ROUND TABLE MODERATED BY

AGUSTÍ OBIOL

CLOSING REMARKS
