

## PREFACE

Three International Workshops “Advances in Energy Studies” took place in Italy in the years 1998, 2000, and 2002, all of them dealing with issues of energy and energy-related environmental problems. As clearly stated in the Call of the 1<sup>st</sup> edition, the goal was to gather leading experts in the fields of Ecology, Energy Analysis and Ecological Economics

*“to seek and improve understanding in definitions of scales and boundaries, methods of analysis, policy initiatives and future research needs required to generate a balanced pattern of humanity and environment”.*

The series of Workshop was intended

*“to sharpen scientific focus and build a critical mass of scientists researching energy issues as societal attention once again shifts toward policy debates concerning sustainable use of resources and energy and their relationship to the economies of humanity”.*

After these three very productive events, it clearly appeared to the participants that one crucial problem has been still insufficiently explored, namely the disparity in access to energy sources. That very few wealthy countries have access to and actually use the largest part of world energy resources translates into a consequent higher consumption of natural resources and ecological services per capita, which entails a larger environmental impact.

In addition, a second disparity can be identified as the increased access to resources by small fractions of people *within* developing countries (the so-called “new consumers”), which is very likely to contribute very fast to increased depletion of resources and higher levels of environmental load.

The generation of social and political instability in several areas of the planet in the last 30 years up-to-date can be discussed in relation to the existence of the first kind of disparity, while the consequences of the second kind still need to be explored.

It is a matter of fact that, in spite of alarming signals that the era of cheap fossil fuels is coming to an end, industrialized economies in Northern America and Western Europe are still characterized by very large energy expenditures (respectively in the order of magnitude of 280 and 250 million BTU per capita in the year 2002), while most of the remaining countries (i.e. the 85% of world population) have access to negligible amounts of energy and primary resources (as low as 15-50 million BTU per capita, with African economies at the lowest end of the range).

Uneven access to resources entails very different development trends, leading to average GDPs per capita of industrialized countries as high as 10-

20 times the corresponding values in the rest of the world (again with Africa characterized on average by the worst figures).

It was clear to the participants in the 3<sup>rd</sup> Workshop (2002) that the energy and energy-related environmental problems can be looked at from very different points of view, and that issues other than technical (disparity-development-equitable resource exchange *versus* efficiency-renewability-environmentally friendliness) should be urgently raised and solutions explored. The decision that the 4<sup>th</sup> Workshop edition (2004) would focus on the energy point of view of developing countries, with special attention to Latin America, was unanimously taken during the last Session of the Workshop 2002, in Porto Venere, Italy. Prof. Enrique Ortega and his Latin-American Colleagues were invited to implement the proposal as well as to organize the Workshop in Brazil.

The Latin-American edition of Advances in Energy Studies was therefore designed in order to provide an innovative problem structuring and innovative points of view towards equitable distribution of energy-related benefits and loads among developed and developing countries.

Although energy exploitation and societal growth on resources are very often constrained by problems and achievements of technical nature (thermodynamic feasibility, environmental integrity, resource quality), it is not without a meaning the fact that the present trends in energy access and use leave large areas of the planet in poverty. Achieving better efficiencies and cleaner energy conversion devices is unlikely to solve the disparity and development problems, although it may provide a non-negligible part of the solution.

What is also urgently needed is the understanding of the dynamics of energy and resource appropriation, trade and use, in order to generate evaluation and decision-making tools which take disparity and resource exchange equity into account.

As always, also the 4<sup>th</sup> Workshop edition was made possible by the synergy of local and international organizing Committees, Sponsors and Colleagues, as well as by the passionate efforts of the Staff of Ecological Engineering Laboratory and graduate and undergraduate students of Food Engineering Program at the University of Campinas. We warmly thank all of them for helping us translating a project into the wonderful reality of this Workshop.

Our best hope is that many Researchers and Students can enjoy this book of Proceedings, which contains very valuable scientific papers and ideas contributed by the invited Speakers and by a large number of participants.

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