Foreword

This is a book of human ecology, environmental history, and ecological economics that emerged over the last fifteen years in a pioneering and successful research programme led by Marina Fischer-Kowalski in Austria. One cannot but admire, as I do, the persistence of the leader of this group in balancing the social sciences and the natural sciences while developing this line of research, and rejoice in her success in attracting a brilliant team of younger researchers such as Helmut Haberl, Fridolin Krausmann, Karl-Heinz Erb, Heinz Schandl, Helga Weisz, and others now coming from other countries. The results are obvious in the many publications in journals, such as *Ecological Economics* and *The Journal of Industrial Ecology*, in addition to books in both German and in English. This volume is perhaps the best one, a collection of chapters on Europe, Asia and Latin America analysing transitions in the use of energy and materials, patterns of human time-use and economic changes, with the intention of explaining the past, but also aiming at sorting out possible and impossible futures.

The economy may be seen as a system of transformation of energy and materials into products and services for human consumption, and ultimately into dissipated heat, carbon dioxide, and solid or liquid wastes. The study of the ‘metabolism of society’ requires specific methodologies of accounting that have become standardized only in the last ten years or so. Thus, Eurostat now regularly publishes statistics on the materials flows (in tons per year) of the countries of the European Union. Such statistics allow us to trace historical patterns, make comparisons, and discuss and dismiss the hypothesis of ‘dematerialization’ of the economy.

Different patterns of socioeconomic metabolism also imply different patterns of land use. For instance, if fossil fuels are substituted for fuelwood, forests will perhaps be used less intensively, thus having a chance to recover from past overuse. By contrast, the addition of substantial amounts of biodiesel or bioethanol to the energy system will bring an increase in the human appropriation of biomass, probably to the detriment of other species.

Different countries show different trajectories in their trade balances of energy and materials. For instance, as analysed in some chapters of this splendid book, the United Kingdom exported energy before 1914 in the form of coal. Again, in the 1980s and 1990s the United Kingdom became at least self-sufficient in oil and even became an exporter before reaching
the North-Sea oil extraction peak a short time ago. Meanwhile, Austria followed a historical pattern common to many other European continental countries, becoming a larger and larger net importer of energy especially from the 1950s onwards.

There are differences in the histories of the metabolism of societies, but the main point of this book is that there is much that they have in common. Industrialization and economic growth bring countries to levels of energy use per year and per capita of 200 GJ or more, with 12 tons or more of material flows per year and per capita. China and India are still behind on this road towards higher per capita levels of use of energy and materials, but they are travelling the same road. There are certainly variations between such averages, however, there is an enormous jump between agrarian poor countries (based on biomass), and industrialized rich countries, as shown in the research in this book on some small scale rural societies in South East Asia by the ecological anthropologist Clemens Grünbühl (a specialist on Laos), and by the economic and environmental historian Simron J. Singh (a specialist on the Nicobar islands).

Does economic growth lead (with today’s technologies and consumption patterns) to a rather similar common future of the world societies as regards time-use and the metabolic flows? The answer is, alarmingly, affirmative. The demographic transition will be completed at a level of perhaps nine billion people in the world. But the ‘socio-economic metabolic transition’ will continue, in terms of use of energy and materials (including water) and a decreasing share of active agricultural population, towards a stage where humankind (by using natural gas, coal, and the remaining oil), will produce greenhouse gas emissions three or even four times larger than today.

A foreseeable but an impossible future.

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(2006, 2007)