

## Session 2

### Urban Material and Energy Use



**Chairpersons** : Prof. Hidefumi Imura, Prof. Hideo Harasawa

**Keynote Speaker** : Prof. Robert U. Ayres

**Speakers** : Dr. Frank Ackerman, Prof. Albert Koenig, Dr. Thomas Michael Sterr  
Prof. Itaru Yasui

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Imura Chairman introduced the mission of the 2<sup>nd</sup> session, then R. Ayres (Emeritus Professor, INSEAD, France) made a key note speech titled “Material Flows (& Stocks) in Cities”. Currently in Asian Mega cities are suffering from high density population, food, water, and waste problems. In viewpoint of sustainability, mega cities cannot sustain by themselves resulting increasing importance of material recycles as well as waste problems. But material recycles are very limited mainly because of economic efficiency. There are researches on material recycle and economy such as Vienna Urban Studies.

Most important points realizing sustainability are urban human activity along with agriculture and biosphere. As result of material flow analysis in US, it is understood that numbers and amount of materials recycled are very small in spite of first impression of bigger activities. Especially economic view points are inevitable to consider recycle of materials. To maintain economy vital, an engine to promote economy is necessary. So that it is quite sure that dematerialization or decoupling society is difficult to be realized considering the past development and materials like fossil fuel consumption as an engine of economic growth.

F. Ackerman (Global Development and Environment Institute, Tufts University, USA) presented “The Economy of Recycling: Neither a Crisis Nor a Luxury”. Economically poor situation makes recycle activity easy. What has happened in many countries as an income level increase from the history of economic development ? In low income level, people think wastes as valuable or marketable materials. In developing counties, it is called scavengers who recycle and reuse almost all wastes and disposed materials.

US is now implementing a high income recycle program. But we have to consider that there are two misunderstanding, e.g. 1) recycling activity does not solve capacity of disposal sites, and 2) recycle is expensive luxury.

Then, A. Koenig (Associate Professor, The University of Hong Kong, China) presents “Urban Metabolism in Asian Cities with Emphasis on Hong Kong” which is focusing Hong Kong in view point of urban metabolism of Asian mega cities. Currently there are 7 million people are living in Hong Kong, and the city is now facing serious problems such as high population density, urbaniza-

tion, economy transition, high consumption and waste generation. He showed results of simple input and output analysis. In his speech, after touching analogy of both human system and urban system in view of metabolism, accumulation of urban stocks and energy consumption and utilization of urban space and facilities are referred. Comparing the current situation between Hong Kong and Guangzhou, from a figure of urban size and energy consumption, it is considered that Hong Kong is so called compact city as a type of sustainable or eco friendly city. In addition he showed a serious another problem transboundary pollution as one of current problems which Hong Kong has.

T.M. Sterr (Managing Director, The Institute for Eco-Industrial Analysis, Germany) presents “Information and Communication for a Circular Economy on the Regional Level”. For establishing circular economy in regional level, whether disposal of waste or its recycling is necessary to be considered seriously. Furthermore, systems approach and world wide recycle system are also inevitable for circular economy. In addition to this topic, he introduced recent development of a new network and Iowa Waste Management system .

Finally, I. Yasui (Vice-Rector, Untitled Nations University) presents “The Environmental Problem and the Energy of the Mega City” which introduces Japanese case study on energy and material consumption in urban cities. As progress of LCA researches, analysis of chemicals, PET, and automobile are going on. From these studies, it is found that modal split of transportation and development and usage of hybrid cars are more efficient than fuel cell. Air conditioner using heat sink is also used in household recently. The environmental problems identified in mega cities has developed as follows; water supply service — waste management — pollution from transportation — heat island phenomena. The first 2 stages, problems are solved as economy grows. In addition transportation pollution also is solved mainly because of economy growth. But final problem, heat island, is not easily solved because it is a problem closely linking to economical activity using vast amount of fossile fuel. How do we reduce energy use? In comparison with conventional environmental pollution, this last problem is not solved by economy development itself. So in order to solve it, there needs further development of more efficient technology, institutional and social system and enlightenment of people who live in mega city like Tokyo.