
Editorial: Sustainable management of post-used products and the international cooperation on resource security in Asia

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Introduction

Resource security can be understood as the availability of various resources at all times, in sufficient quantities and at affordable prices. Now, ensuring resource security is becoming one of the biggest challenges in the world, especially in Asia, due to the sharp increase in resource demand driven by rapid economic growth and relative low supply potential. In addition, environment protection is another biggest challenge in Asia, especially in major developing economies such as China and India. The most effective way to resolve these two challenging issues simultaneously is to change the socio-economic system from large production, large consumption and large disposal to circulating economy by promoting reducing, reusing and recycling of resources (3Rs).

Japan has paid great efforts in building circulating economy and achieved a lot of progress in 3Rs, especially with respect to sustainable management of post-used products combined with advanced recycling and environmental technologies. However, mainly because of high labour cost, weak demand for used parts and recycled materials, and then low price of these, post-used products cannot be disassembled and recycled intensively. As a result, valuable parts and materials are disposed as wastes, and this treatment has

resulted in some kinds of pollution. At the same time, a considerable amount of post-used products originating in Japan are leaked out of Japan's lawful systems and exported to Asian developing countries. It often causes health damage, soil and water pollution, and dumping of toxic wastes because of inappropriate recycling processes in the importing countries.

On the other hand, China, as a major economy with the most rapid economic growth in the world, also started the measures towards circulating economy a few years ago, mainly focusing on reuse and recycle. Compared with Japan, post-used products in China are reused or disassembled and recycled intensively, because of low labour cost, strong demand for parts and materials, and then high price of these. The main problems in China are low dismantling and recycling technologies, insufficient measurements to prevent pollutions from dismantling and recycling process, and illegal treatment without observing the related laws and regulations, through various invisible routs.

This special issue of the *Int. J. Environmental Technology and Management (IJETM)*, 'Eco-design of multilateral recycling systems and development of circulating economy in Asia', focuses on problem-oriented analyses and constructive suggestions on recycling system in Asia, especially in China, Japan and between these two countries.

The selection of papers for inclusion in this special issue was done by an editorial board, with this writer serving as the chair, consisting of Jun Fujimoto of the Tokyo University of Japan, Yasushi Umeda of the Osaka University of Japan, and Zhang Aling of the Tsinghua University of China. Including the meeting for establishing the board on 29th November 2006, we met twice in Japan and twice in China. Nine papers were submitted for this special issue, of which the board finally selected five papers for inclusion. The other papers were passed over because they did not fit the theme of this special issue or the nature of *IJETM* and, in a few cases, due to quality problems. Some papers, in nature, look more like a report than a research paper, but they were selected because they contain useful data and give an excellent overview of the related measures and constructive suggestions.

Overview of the papers

The first paper by Yabar, Hara, Uwasu, Yamaguchi and Zhang addresses the evolution of environmental policies in Japan and China and proposes a framework towards a sustainable Asia. It stresses that using the experience in policy development and technology innovation of developed nations could help leapfrog our sustainability journey. The authors believe that if both developed and developing nations work together in a cooperative way in promoting and reorienting their policies and strategies, the path towards sustainability will be less difficult. It shows that the Osaka University's Research Institute for Sustainability Science is developing a system innovation model where management of technology plays a central role. This model makes use of the backcasting approach and is based on the design of future sustainability scenarios with long-term visions and mid-term strategic goals towards a sustainable Asia.

The second paper by Kondoh, Kuwatani, Fujimoto and Umeda conducts cost-profit analysis of multilateral recycling of four electronic products, namely, refrigerator, television (TV), air conditioner (A/C) and personal computer (PC), to identify dominant economic drivers of multilateral recycling system in Asia, based on the cost-profit

analysis model developed for considering the differentials of economic factors between developed and developing countries. It shows that high profitability and recycling ratio can be achieved by multilateral recycling systems in spite of its extra transportation cost, mainly due to low labour cost in developing countries.

The third paper by Fujimoto, Kondoh and Poland discusses a concept of the Ecodesign of multilateral recycling systems in Asia based on the economic dynamism of the future. The authors identify the condition using the recycling profit analysis model. It shows that material recycling utilised in Asian areas produces more profits, from several hundreds to thousands of yen per product, than that of Japan. Regarding the reuse of the products and their parts, marine transportation costs have a large effect on the secondhand business and its strategies. In order to solve the problem of 'invisible flow', resulting from illegal trade of post-used products and recycled materials between Japan and other Asian countries, the authors propose a system that allows the ownership of a product to be traced: Dual Traceable Ownership System (DTOS), which is defined as a system based on a different attitude towards 'ownership'.

The fourth paper by Kishita, Fukushige, Umeda and Fujimoto focuses on modelling and evaluation of resource circulation in Asia by using risks based on Life Cycle Simulation. It shows that a product reuse scenario is the most promising for the sustainable global circulation, and the risks in recycling scenarios are higher than those of reuse scenarios. It suggests that the traceability, one of the most crucial elements for constructing the sustainable global circulation, can be measured by the risks.

The last paper by Du, Li and Ding gives a field study on regional development of circulating economy in Zhejiang province of China. It shows that circulating economy in Zhejiang province experienced two development stages, named 'resources utilised briefly' and 'resources utilised high-efficiently'. It suggests that circulating economy development in China should be based on a new mechanism of five cardinal points: enterprise actors, industry-level self-regulation, public participation, policy underpinnings and technical underpinnings.

Approach for ensuring resource security in Asia

As discussed in the selected papers, although the nations of Asia have differing priorities, they all face the same set of problems as regards resource and environment, with resource security the central issue. A major player in Asia, Japan boasts world-class recycling and environmental technology, and possesses huge financial muscle. China, on the other hand, enjoys comparative advantages in areas such as market volume, cost competitiveness and human resources.

However, Japan and China – both major Asian powers – have looked on each other's resource security problems with indifference, and have mainly used their respective comparative advantages solely for the construction of their own resource security systems. This kind of fortress mentality is no longer a viable option. It is essential for future resource security that the two nations avail themselves of each other's comparative advantages, cooperate with one another, and work towards building an Asian resource and environment community.

The vital fields for cooperation within such a community will include popularisation of 3Rs technologies and pollution prevention technologies, joint treatment and

management of post-used products, promotion of the use of secondhand parts and recycled materials, establishment of common reserve systems and so on.

Establishing a high technology type resource recycle zone in Japan focusing on the recycling of rare and precious metal, and a labour intensive type resource recycle zone in China focusing on the recycling of other resources such as base metal and plastic, may be the first step towards the formation of an Asian resource and environment community.

Finally, it is hoped that the readers of this special issue of *IJEM* will find these papers interesting and useful.