

## *Resource Circulation in Asia: Practical Challenges in Setting up Recycling Industries*

**C. Visvanathan**

Environmental Engineering and Management Program  
School of Environment, Resources and Development  
Asian Institute of Technology  
Pathumthani, Thailand

### **Extended Abstract**

In the last decade, Asia has been moving ahead in all fronts – population, economy, environmental pollution, threats from resource consumption and waste generation etc. Nevertheless, all of these are interconnected and have commonality in one way or another. Lifestyle of an average Asian has changed drastically and it requires more resources to satisfy their needs than it was a decade or two back. Though this is a common tendency of humans, the footprints it leaves are difficult to patch up; resource consumption and waste generation, particularly.

A common misconception exists that the earth is an infinite supplier of resources, while it is not so. The Organization of the Petroleum Exporting Countries reports that world crude oil reserves would last only until the end of the 21<sup>st</sup> century, if production and consumption trends where to continue the way it was in 2007. Crude oil is not only concerned with fuels, but with plastics, and many other chemicals that find vital use in our everyday life. Same is the case with metals such as Aluminium, Steel, Copper, Tin and many other metals with which we have tied our daily lives. These metals ores are continuously mined, refined, processed and made into products; most which take a one-way route.

On the other hand, waste generation has been increasing all over the world, while the facilities to address them are not being developed in the same pace. Developed countries, with their enormous cost of handling waste often export them to developing countries. This trend of continuous extraction of resources and generation of waste cannot continue for long. Eventually, it will one day end up in a deadlock condition where the entire earth will starve for resources.

Upgrading processes and systems to move from consumption to circulation has become inevitable and this is possible only by setting up recycling industries that accept waste as a feedstock and offer products that are on par with virgin materials. These recycling industries face stiff competition from their counterparts and even more challenges, practically. Major among them arise in the form of economies of scale, transboundary movement, technology transfer and training, ensuring markets, and more importantly financing. This presentation covers in a systematic manner these major issues through real-world examples and brings to limelight some of the often unseen issues.

Typical industries capitalize on economies of scale and produce a wide range of products that give them the competitive advantage of distributing costs. Where as an industry with a recycling agenda rarely has the ability to scale up and distribute costs. It is often forced to operate in a smaller scale. The case of lead acid battery recycling in Cambodia and a private sector business of lead recycling in Thailand are compared for discussion.

When looking at promoting economies of scale for recycling one much thought way of providing sufficient feedstock is to move the waste across boundaries to an industry. Transboundary movement has been on the top-line of recycling for long, with many illegal cases involved causing havocs in the destination countries. The presence of a large number of stakeholders, with little idea on environmental protection, resource consumption and hazardous waste issues is the principal reason for those unsuccessful stories.

Any discussion on promoting recycling involves technology transfer as a key component. However, it has to be realized that technology cannot be transferred directly between any two countries. How suitable is the technology for the destination is an important question that has to be answered convincingly. Another key aspect is the training that has to be coupled with technology transfer. Recycling is not an activity that fully involves only the industry. From the point of waste generation till the waste reaches the recycling industry, several groups are involved. The training and knowledge needs of all these groups have to be taken care while introducing a new technology.

Assuming a successful recycling industry is setup, the products have to reach a market and compete with their counterparts. Only then can the recycling industry survive in the long run. Ensuring markets is an issue to be addressed. Though consumer choices may turn towards recycled products, the genuineness of recycled products has to be assured. This can be achieved by way of commissioning a recycling certification system that instills confidence amongst consumers.

On top of all these are the financing issues faced by recycling industries. In the Asian context, industries are categorized based on the raw materials and products. Rarely, are they awarded priority for accepting waste as a feedstock and producing useful materials. Where they are eligible for priority, they are most often offered tax incentives and rebates that are helpful only when the industry gets into operation. Opportunities to cover upfront costs are very rare.

An overview of the major practical challenges in setting up recycling industries to keep resource circulating indicates that time has come to look at addressing the practical challenges.