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An environmental and economic analysis of e-waste recycling based on the Japanese experience -Focusing on Flow Estimation

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Introduction

This presentation aims to analyze the Japanese system for recycling e-waste with regard to (1) 4 large-size items (TVs, Air Conditioners, Refrigerators, Washing Machines). We also consider (2) PCs, a separate issue. At the same time, we are seeking for suggestions for the better recycling of (3) small-size electronics (mobile phones, digital cameras, DVDs, etc.).

The current Japanese scheme requires consumers to pay a recycling fee at the time of disposal for 4 large-size(3000-4600 JPY).

Current regulations require retailers to take back goods that they have sold, while manufactures are required to recycle them. The system has achieved a high collection and recycling rate: in 2010, this came to about 70% (26 million units/38 million units).

This success of the current system depends upon (1) the clear responsibility of each actor, (2) that the system is limited to four items only (TVs, Air Conditioners, Refrigerators, Washing machines), (3) that the Japanese trade-in system of old for new, (4) that the government invests in the recycling facilities with a subsidy of about 50% (devoted to building an infrastructure for green business); and (5) an “Eco-Point” subsidy for the replacement and disposal of energy saving equipment (since consumers do not pay any recycling fee).

Why Is There So Much Recycling Of TVs?

The reasons why there is so much TV recycling are clear:

- (1) By the end of July 2011, the Japanese Broadcasting system was due to complete a change from analog to digital broadcasting, which means that the digital sets are now obsolete and their disposal has become a social problem.
- (2) Once the temporary “Special Demand” collection of digital sets has been completed, this problem will become less severe.
- (3) Yet no one knows how to deal with used CRT (hazardous cullet with Pb)? There are no recycling facilities in Japan and those in other countries are decreasing.

The export of used TVs is increasing (source: Japanese Trade Statistics)

At the same time, the export of used TVs is increasing:

in 2008: 2.24 million units to Vietnam; 0.77 mil. to Macao; 0.56 mil. to China; and, to the Philippines, 0.46 million units;

in 2009: 2.29 million units to Vietnam; 0.79 mil. to Macao; 0.78 mil. to China; and, to the Philippines, 0.48 million units;

in 2010: 2.53 million units to Vietnam; 1.08 mil. to Macao; 0.68 mil. to China (the estimated final destination); and, to the Philippines, 0.56 million units.

Since China is now the 'World's Factory' and needs material, TV sets that are made in China and exported now return to China: this is an example of 'Circular Economy'.

Recycling Costs 2010

Consumers have to pay the recycling cost:

TVs at JPY2700 (26 Euro), Air conditioners at JPY2500 (24Euro), Washing machines at JPY 2400 (23 Euro), Refrigerators at JPY4600 (44 Euro). The Government subsidizes the recycling facility.

The Outlet Flow of Used PCs from Home and Business Users

PCs from home users: since about 60% of Used PCs are valuable, e-waste collectors gather and export them.

PCs from business users: since about 60% of used PCs are leased on rental terms, about half of the used PCs constitute valuable goods: 40% are exported as products, 60% as scrap.

PC manufactures thus cover only 12% of used TVs discarded by home users and only 5% discarded by business users; it seems that about one-third of these sets are exported.

PC Recycling in Japan

A free take back by manufactures was introduced for business users after 2001, and after 2003 for home users as well. The Collection Rate has been very low because of a design failure in the system, which is not user friendly.

While (1), there is a Free Take back of Market Valuables,

(2), the Responsibility of Each Actor is not clear.

And the user is required to send the used PC back to the manufacture directly.

Estimated Flow of Small-size Electronics

The flow of small size electronics, such as Mobiles, PHSs and Personal Storage items, is about 40%. Of this, almost 95% is discarded by families rather than by industries; half of it is passed on to the municipality and landfilled. About 30% is reused and recycled as domestic product. About 15% is exported for reuse and recycling abroad, where it might not be properly treated.

The proposal of new scheme

Given such a background, a new recycling scheme for small electronics appliance has been proposed, with three specific aims:

- (1) The stable recovery and supply of metals (90 items are named as potential targets);
- (2) An extension in the lifetime of final disposal sites;
- (3) The appropriate treatment of harmful substances.

The system and actors of the proposed scheme

- the municipality is to carry out the optional recovery of small house appliances by setting up collection boxes or stations,
- the retailers are to cooperate with municipalities over the methods of recovery,
- waste treatment facilities and recyclers under contract with the municipality are to carry out appropriate recycling under a wide area permit authorized by the government,
- manufactures are to try to make their designs environmentally friendly,
- the central government is to set the standards, issue the permits and enforce the regulations for trans-boundary movement, with a subsidy to municipalities to create the infrastructure.

Problems and further agenda about the proposed scheme

- 4 large house appliances (TVs, air conditioners, washing machines, refrigerators) will be recovered and recycled according to different schemes (consumers have to pay the recycling cost),
- The producers responsibility (EPR) is not clear,
- Municipalities will have to face the new financial and environmental burdens of recovery and sorting,
- The recycling companies will have to bear the risks of fluctuations in the price of metals.

Summary

- The collection of 4 items of e-waste for Formal Recycling has been increasing because of the need to dispose of used Analog TV sets once they became obsolescent, but once this process comes to an end the numbers of sets collected will decrease.
- Because of their market value, more than half of the used company PCs are reused and exported.
- The Japanese Ministry of the Environment had proposed a new system for the Recycling of Rare Metals from Small Size Electronics.
- But this will require an adjustment of the collection and paying system of the 4 items.
- A clearly defined Collection System and proper Incentives are very important.
- The Role of the relevant Actors, Cost Sharing and the Proper Treatment of Waste must be the Premise for the Effective Usage of Resources.

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