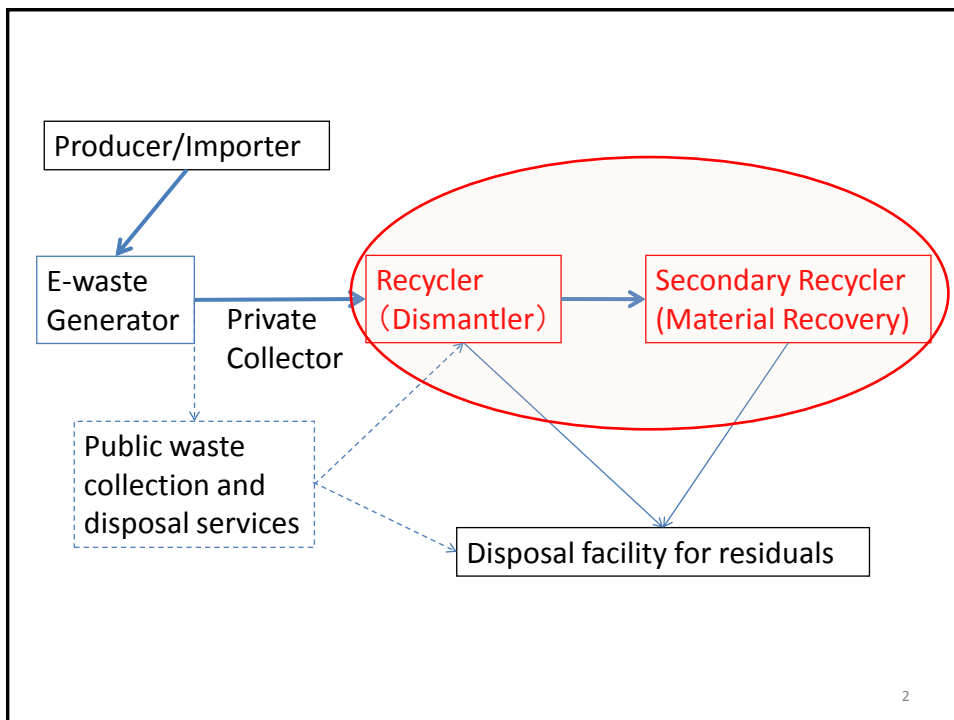


Greater Mekong Sub - region (GMS) sub - regional training workshop on
building capacity to deal with the illegal shipments of e-waste and
near-end-of-life electronics
Day 1:
Special Event on Possible Introduction of Recycling Certification in Asia

Recycling Facilities in Asia

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Objective of this Presentation

- To show various types of technology to handle e-waste
- To show both e-waste recycling with and without environmental sound technology

DISMANTLER



December 2007, Tokyo, Japan



March 2008, Vietnam

Dismantling

- The worker uses mask, glasses and gloves. Dust control equipment is used.
- The worker does not use mask, glasses nor gloves. No dust control, but working in open air.

→
August
2009,
Vietnam

December
2009,
China) ↓



TV Glass

- Funnel glass of CRT TVs contains lead. Panel glass of CRT TVs does not contain lead. It is better to separate funnel and panel glass for recycling.
- Waste funnel glass can be recycled as raw material for CRT again.



Removing IC Tip from Printed Circuit Board

- IC Tips are removed from printed circuit board. Removed IC tips are sold as secondhand IT tips, if they are good condition.
- Gold and silver are recovered from removed IC tips.



IC chips are removed from Printed Circuit Board by using heat. (Guiyu, China, Nov. 2004)

Removing IC Tip from Printed Circuit Board



A machine removing IC tips from Printed Circuit Board (December 2011, Hong Kong)



Removing IC tips from printed circuit board for mobile phone, using equipment similar to hair dryer. (December 2009, Guiyu, China)

Plastics



Crusher for plastic parts and other materials. (September 2010)



Crushed printed circuit board, which is sent to Cement industry. (September 2010, Indonesia)

Coated wire: Separating Plastics and Metals



Open burning of plastic-coated wire to extract copper. Vietnam, August 2009.



Nagget system to separate copper and plastics. (Dec, 2004)



Stripping Machine for Cable. (Dec. 2004)

Refrigerator and Air Conditioner: CFC collection and dismantling



CFC collection from Air Conditioner,
Akita, Japan, September 2009.

- CFCs and other coolant should be collected, to prevent ozone layer and to mitigate global warming.

MATERIAL RECOVERY

Gold Recovery



Recovering gold, silver and other precious metals, with water pollution control. (December 2009, Guiyu, China)



Recovering gold using acid, without pollution control. Wastewater is discharged into river directly. (November 2004, Guiyu, China)

Gold Recovery



Recovering gold from IC tips by using acid, without pollution control. (August 2009, Philippines)



Recovering gold using cyanide, with pollution control. (October 2006, Philippines)

Gold Recovery



Gold recovery using acid and heat. The work shop is small area next to kitchen. (September 2010, Indonesia)



Gold recovery using cyanide and heat, in e-waste recycling factory in Taiwan.

Copper



Copper refining process using electrolysis , December 2009, Guiyu, China



Producing copper cable from waste copper without refinery process. (August, 2002, China)

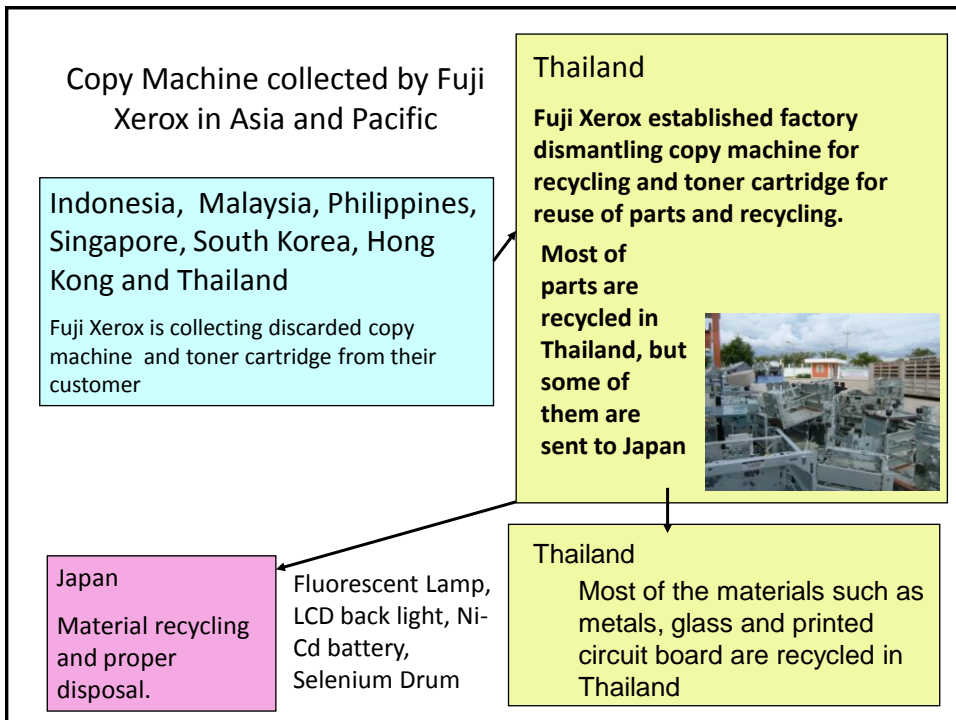
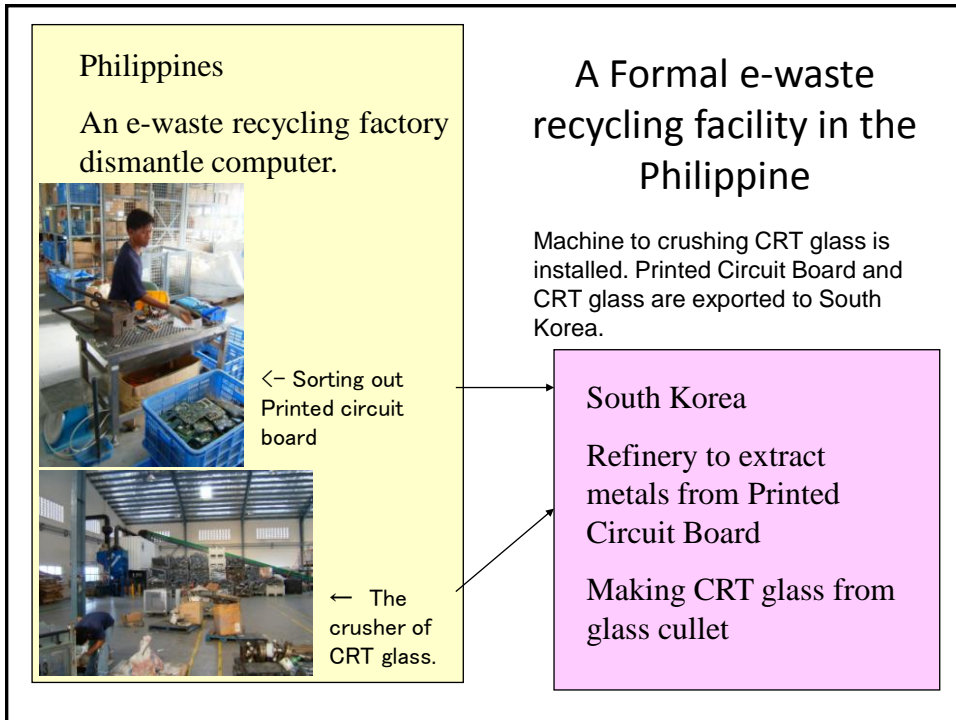
Recovering various metals by non-ferrous industry



Non ferrous smelter and refinery plant in Japan.
September 2009

- Combination of several types of non-ferrous smelter and refinery process can recover various metals. For example, Dowa, a non-ferrous metal manufacturer in Japan, can recover more than 20 types of metals.

TRANSBOUNDARY MOVEMENT



CONCLUSION

Conclusion(1)

- In both dismantling process and material recovery process, facilities generating pollution (Non-ESM facilities) and facilities with environmentally sound technology (ESM facilities) coexist in Asia.
- Government should consider how to upgrade non-ESM facilities to ESM facilities, how to promote ESM facilities, and how to ensure the flow of e-waste destined for ESM facilities.
 - Certificate is one of options.

Conclusion(2)

- It may be feasible to establish dismantling facilities in each GMS country.
- But it may be not economically feasible to have all types of material recycler in each GMS country, because of scale economy of material recycling with environmentally sound technology.

Guideline and Manuals for e-waste

- Various guidelines and manuals have been published for e-waste recycling.
 - BCRC-SEA[2007a] Technical Guidelines on the Reduce, Reuse, Recycle(3R) of End-of-Life Electronic Products.
 - Mobile Phone Partnership Initiative[2009] Guideline on Material Recovery and Recycling of End-of-Life Mobile Phones.
 - UNEP-IETC[2007b] E-waste Volume II: E-waste Management Manual.
 - US-EPA [2009] Responsible Recycling (“R2”) Practices for Use in Accredited Certification Programs for Electronics Recyclers.