

*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  
10-13 July 2012, Hanoi, Viet Nam*

## Technical Session 1: Detection, prevention and control of illegal traffic of e-waste and near-end-of-life electronics

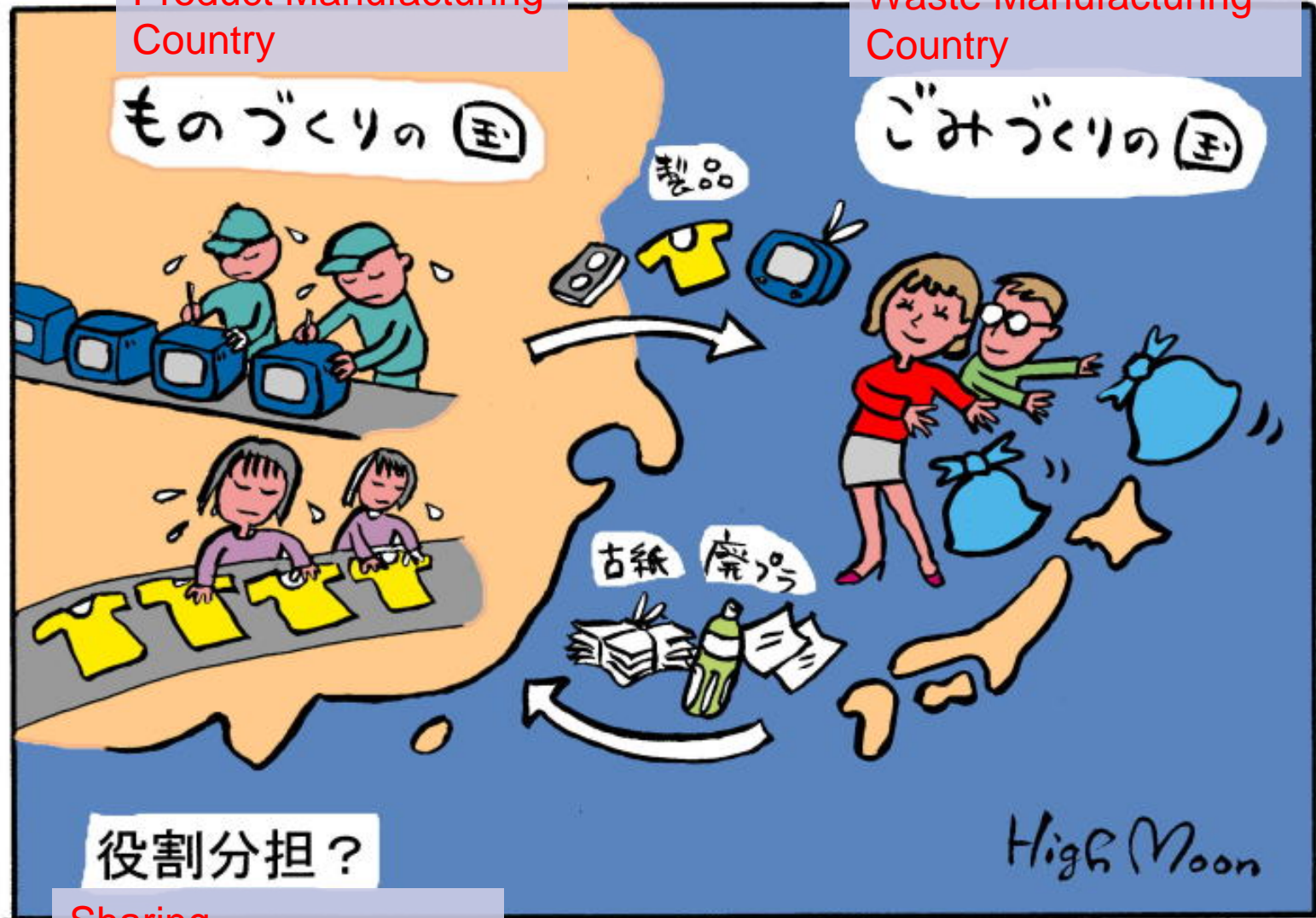
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Center for Material Cycles and Waste Management Research  
National Institute for Environmental Studies (NIES) Japan



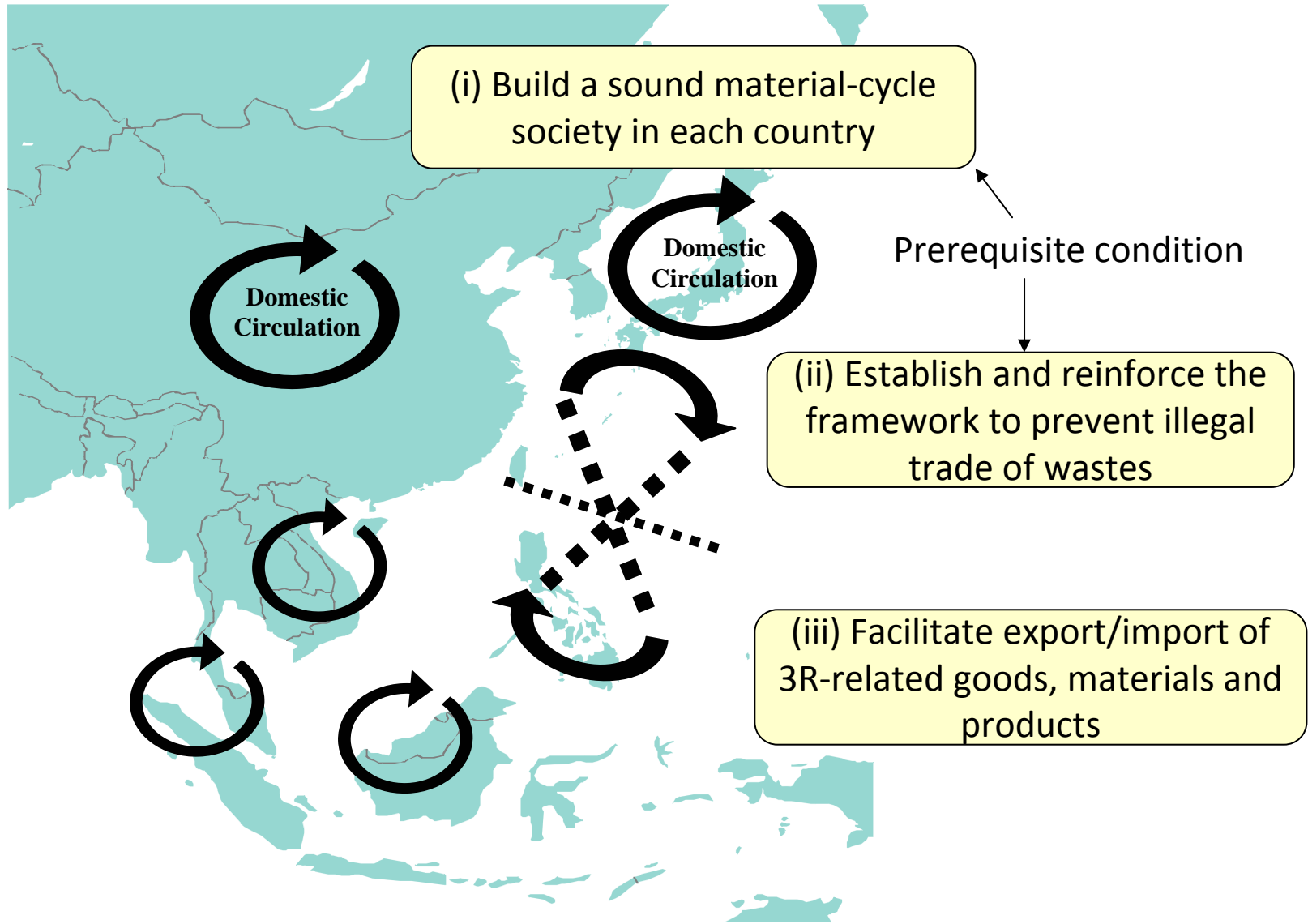
Product Manufacturing  
Country

Waste Manufacturing  
Country



Sharing  
responsibilities?

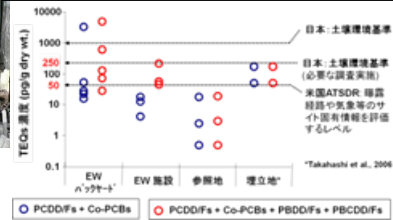
# Sound material cycle society in Asia through 3Rs



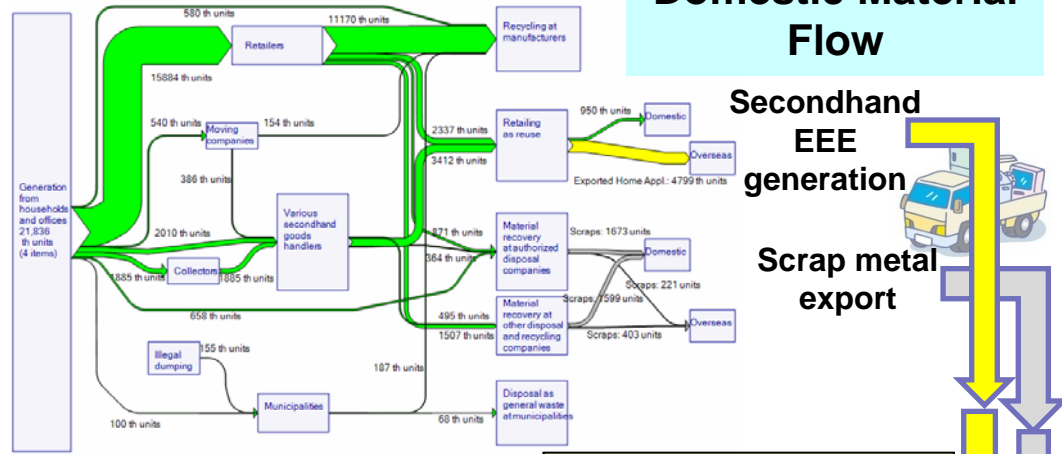
# E-waste research at NIES from the viewpoint of international Material Cycle

## Environmental Impact of e-waste recycling in developing countries

Analyze env samples from recycling sites in India, Vietnam, Philippines and Indonesia. **High-level heavy metals and PCDD/DFs have been confirmed.**



## Domestic Material Flow



**Japan's export control on Secondhand CRT TVs** is implemented in 2009. Destination is changed to Vietnam and Macau in 2009 to exploit weak import control.



Reuse condition of exported CRT TVs from Japan was examined. **Formal and informal recycling** were characterized.



## Secondhand CRT TV export in 2009 International Flow

Home appliances are contained in scrap mixed metal. **Proper export control** is recommended. **Fire accident** would generate PCDD/DFs



## E-waste recycling (and reuse of secondhand EEE) practices and systems in Asian countries

## Mixed metal scrap

# Content

1. Trade of Secondhand EEE(Electrical and Electronic Equipment)
  1. Estimation method
  2. Export from Japan (CRT TV)
  3. Import and re-export in Vietnam
  4. Import control in Asia
  5. Challenge of export control in Japan
2. Trade of Mixed Metal Scrap incl. E-waste
  1. Export from Japan
  2. Challenge of export control in Japan

# 1.1 Estimation Method: Secondhand (and partially E-waste) Export

	<b>Outline</b>	<b>Example</b>	<b>Advantage</b>	<b>Disadvantage</b>
<b>Trade Statistics</b>	i) <b>Codes of second-hand EEEs</b> ii) <b>Unit price method</b> iii) <b>Description method</b>	Kahhat (2009) Sander (2010) Fuse (2011) Terazono (2012)	Relatively easy	Data availability depending countries, Possibility of underestimation
<b>Mass Balance</b>	Estimation of entire domestic mass balance	Yoshida (2009)	Relatively reliable	Difficult estimation
<b>Enforcement Data</b>	Use of seizure and/or monitoring data	MOE Japan (2011) Joas (IMPEL/TFS, 2011)	Convenient, if data available	In general incomprehensive
<b>Handler Surveys</b>	Use of commercial handler survey	IAER ISRI	Convenient, if data available	Incomprehensive
<b>Proxy Trade Data</b>	Use of waste lead acid battery trade data	Lepawsky (2010)	Easy	Less reliability

Classification derived from: Miller T.R., Gregory J., Duan H., Kirchain R., Linnel J. (2012) Characterizing transboundary flows of used electronics: Summary report. Boston, MA.

# Trade Statistics:

## i) Codes of second-hand EEEs

In Japan, HS codes have been set for **secondhand air conditioner, refrigerators, washing machine, monitor and TV** (not including PC and mobile phone) since 2008.

Only a few countries have such specific codes of

€ Ex. CRT TV:

852872 990

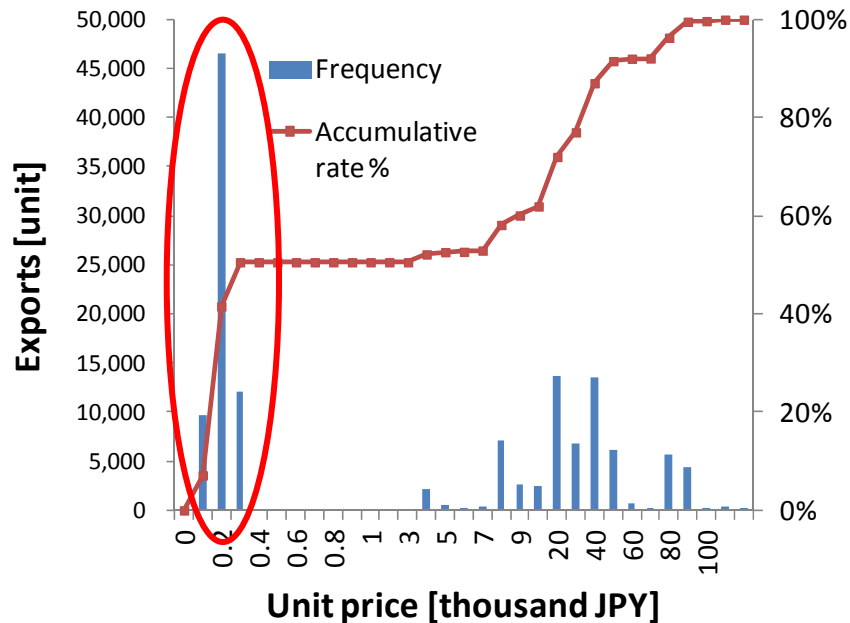
HS  
(World-wide  
common code)

Japanese  
original  
code

Item	Type	2004.1 - 2006.12	2007.1 - 2007.12	2008.1 - current
Air conditioner	For wall and window	841510.000	841510.000	841510.100 (New) 841510.900 (Sec)
Refrigerator	Refrigerator with freezer	841810.000	841810.000	841810.100 (New) 841810.900 (Sec)
	Home refrigerator (compression type)	841821.000	841821.000	841821.100 (New) 841821.900 (Sec)
	Home refrigerator (others)	841822.000 841829.000	841829.000	841829.100 (New) 841829.900 (Sec)
Washing machine	Automatic	845011.000	845011.000	845011.100 (New) 845011.900 (Sec)
	Twin tub type	845012.000	845012.000	845012.100 (New) 845012.900 (Sec)
	Others	845019.000	845019.000	845019.100 (New) 845019.900 (Sec)
Personal computer	Laptop	847130.000	847130.000	847130.000
	Integrated	847141.100	847141.100	847141.100
		847141.900	847141.900	847141.900
Desktop	847149.000	847149.000	847149.000	
Mobile phone		852520.500	851712.000	851712.000
		852520.600		
Monitor	CRT monitor (for PC)	847160.220	852841.000 847160.220	852841.100 (New) 852841.900 (Sec)
	CRT monitor (for others)	unclear	852849.000	852849.100 (New) 852849.900 (Sec)
	Other monitor (for PC)	847160.210	852851.000 847160.210 (LCD)	852851.100 (New) 852851.900 (Sec)
	Other monitor (for others)	unclear	852859.000	852859.100 (New) 852859.900 (Sec)
TV	Color (LCD)	852812.190	852872.100	852872.110 (New) 852872.190 (Sec)
	Color (PDP)	852812.190	852872.200	852872.210 (New) 852872.290 (Sec)
	Color (CRT)	852812.110	852872.900	852872.910 (New) <b>852872.990 (Sec)</b>
	Black and white	852813.100	852873.000	852873.100 (New) 852873.900 (Sec)

# Trade Statistics

## ii) Unit price method



In case HS codes of secondhand EEE is not set, unit price method may be applied from **detailed trade statistics data (monthly custom level)**.

## iii) Description method

### Export Declaration (E/D)

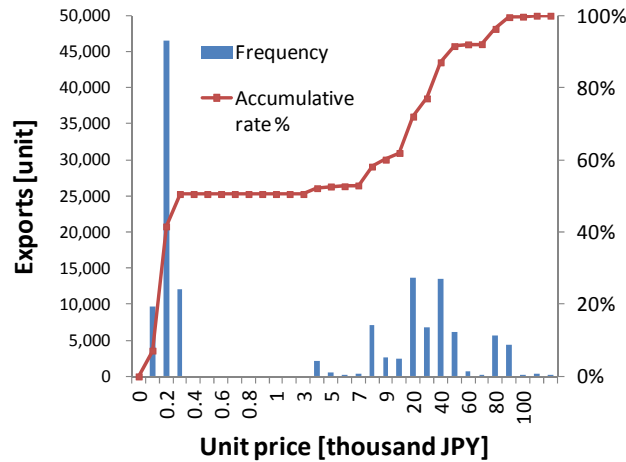
Code	Amount	Status	Name	Transaction	.....
.....	.....	old	Item 1	used	.....
.....	.....	new	Item 2 (second hand)	.....	.....
.....	.....	.....	Item 3	.....	.....
.....	.....	old	Item 4 (used)	.....	.....
.....	.....	.....	.....	.....	.....

In case E/D data set is open or accessed, secondhand cargo may be extracted from **description (old, secondhand, used) in E/D**.

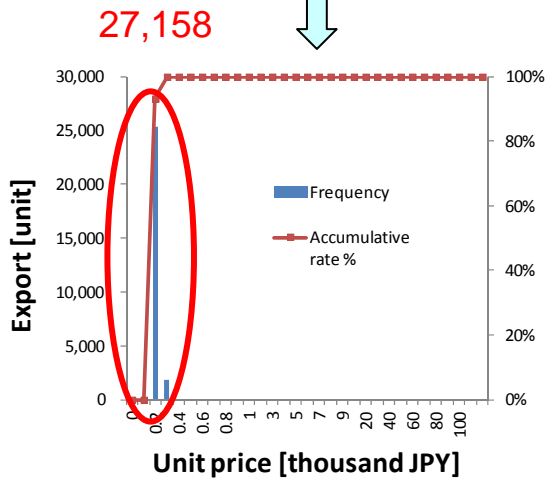


# Trade Statistics

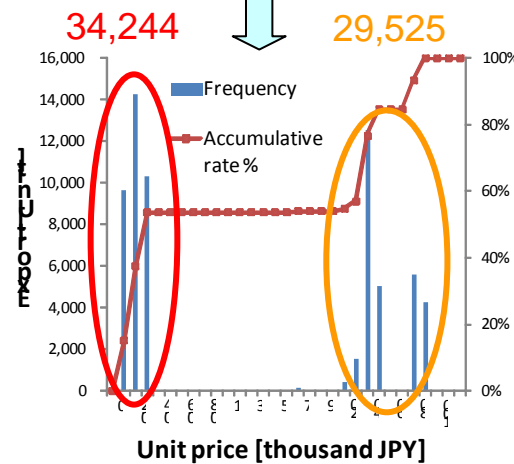
## ii) Unit price method (Ex. Mobile phone)



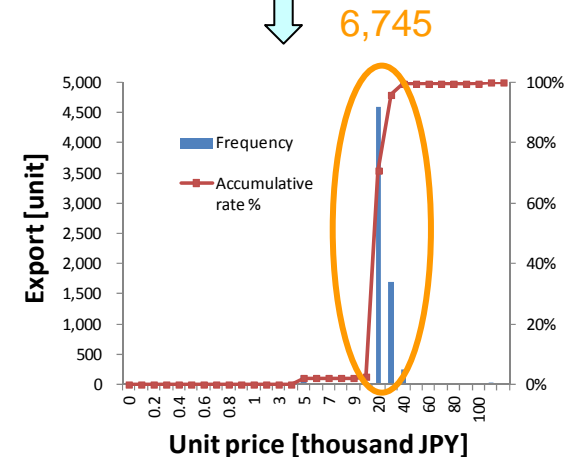
Mobile phone  
export from  
Japan in 2011



to Afghanistan

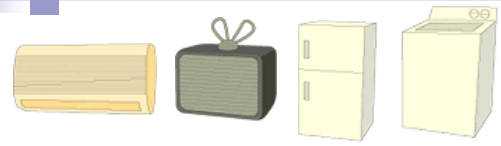


to Hong Kong

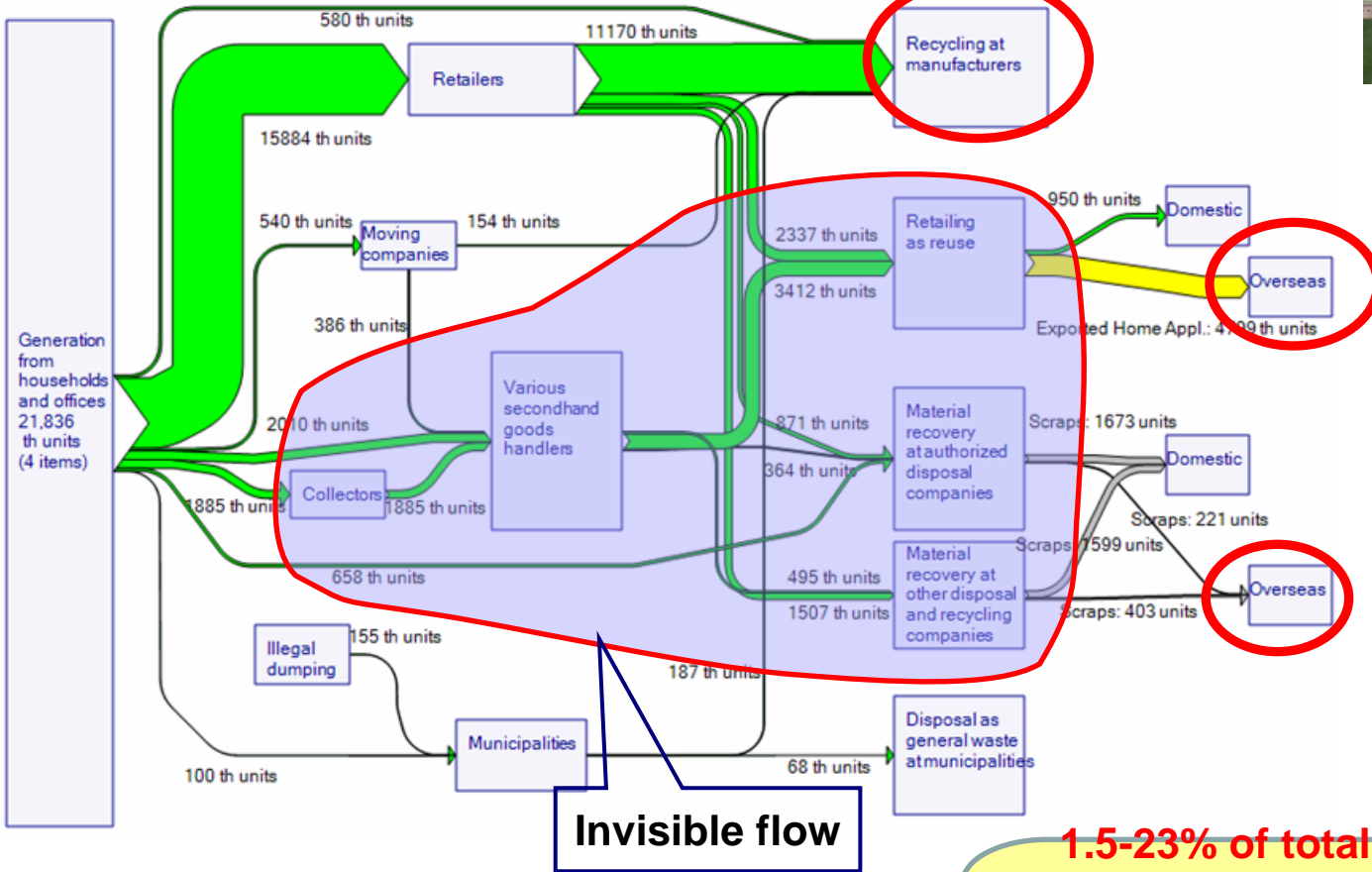


to USA

# Material flow of Large-sized HA



50% is recovered at manufacturers under the Home Appliance Recycling Law in Japan



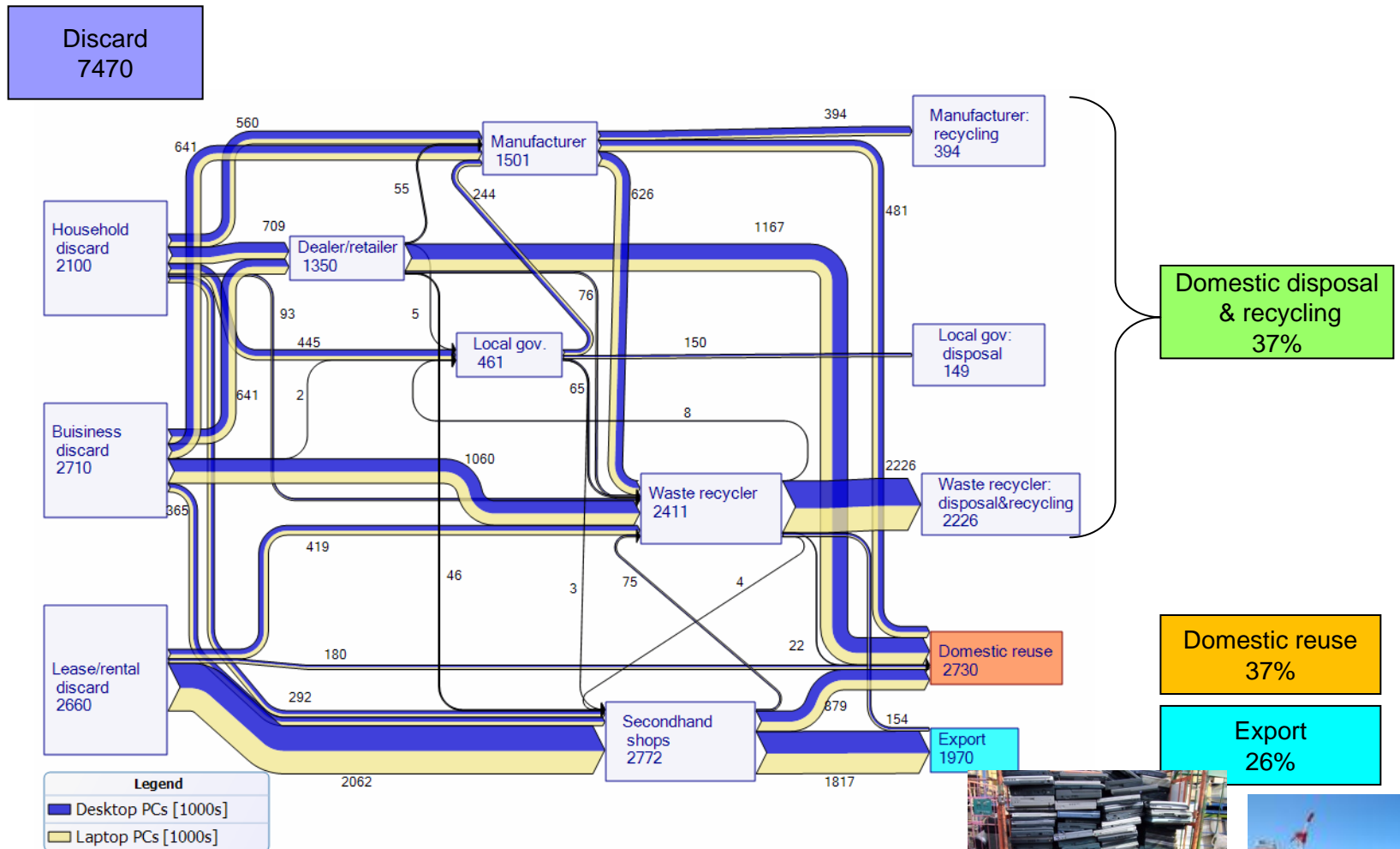
Other flow is called "invisible flow". 4.8 million units are estimated to be exported for reuse in 2007. (over 2.0 million are TV sets.)

Domestic material flow of end-of life home appliances of Japan in FY2007 (estimated by Terazono)

1.5-23% of total home appliances can be contained in the mixed metal scrap from our sample studies

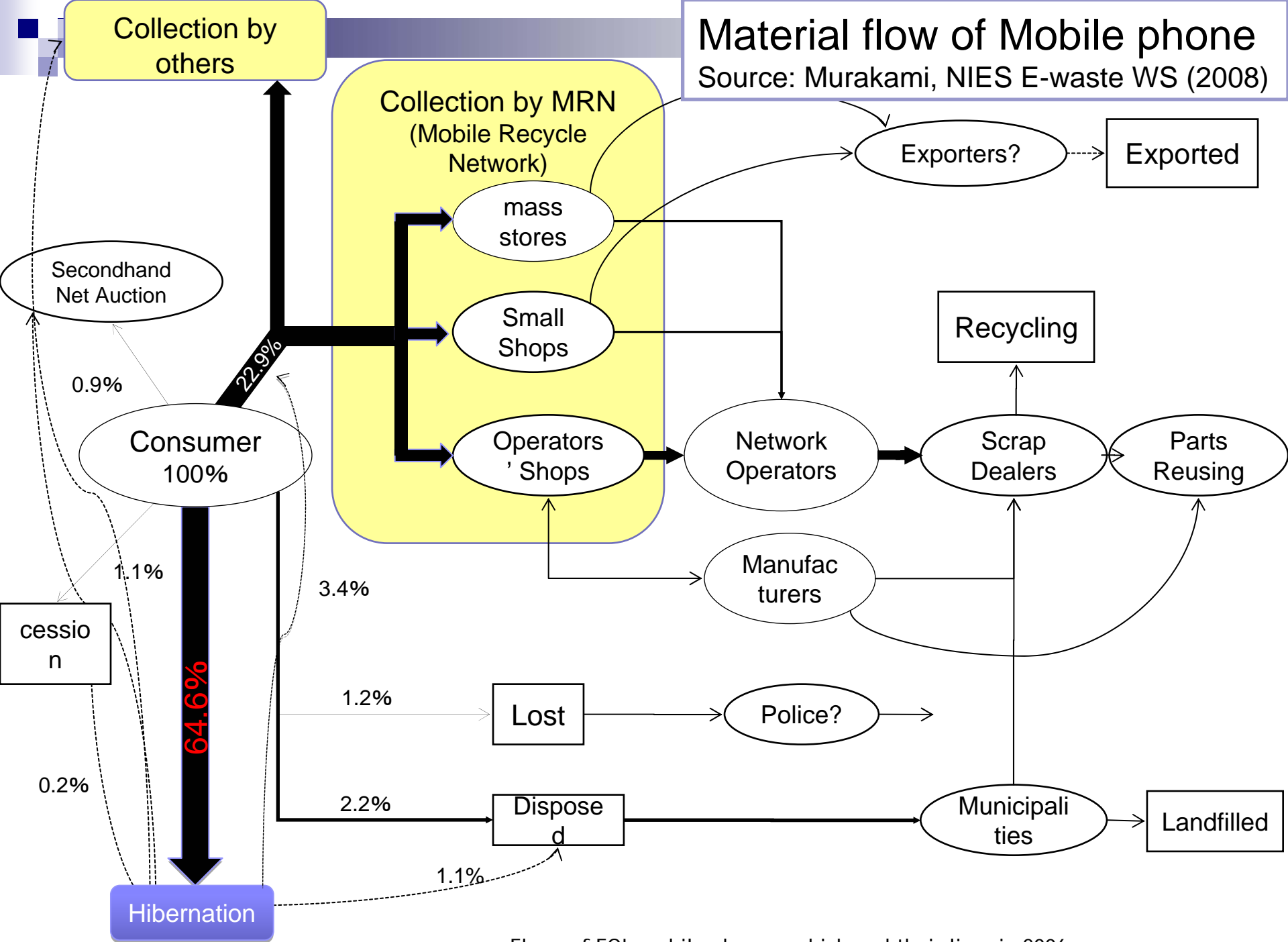


# Material flow of used PCs in 2004 in Japan (calculated error minimization method by Dr. A. Yoshida)



# Material flow of Mobile phone

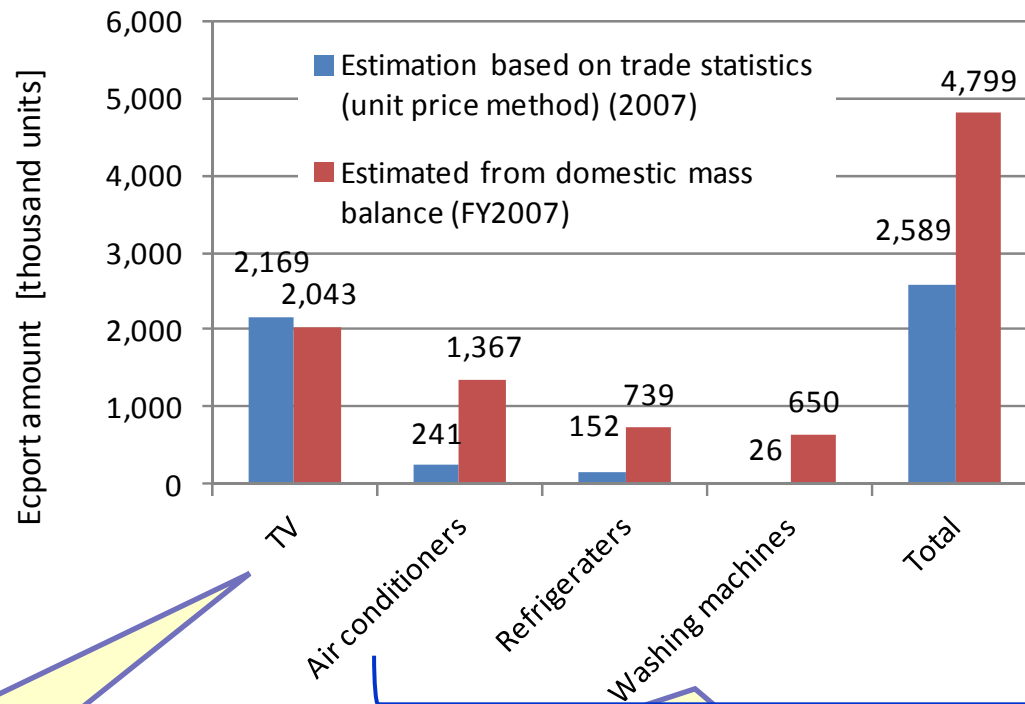
Source: Murakami, NIES E-waste WS (2008)



Flows of EOL mobile phones, which end their lives in 2006

# 1.1 Estimation Method:

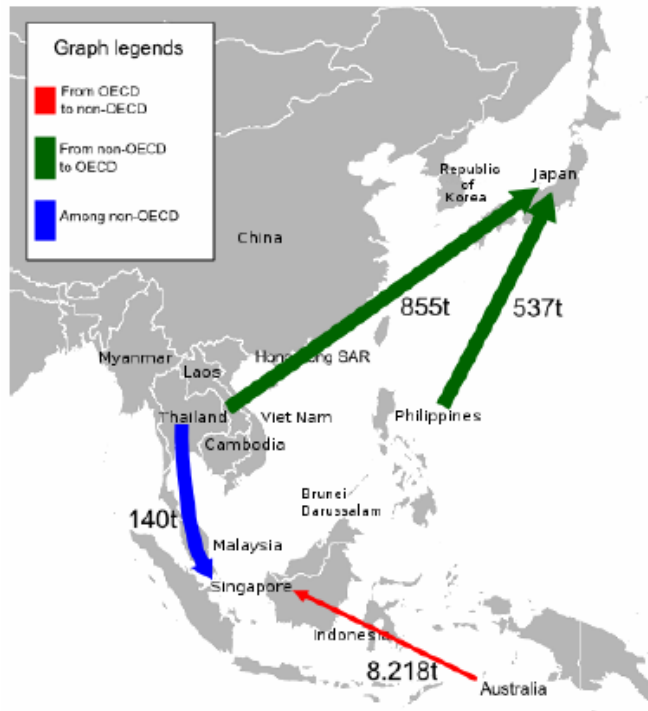
Comparison between **trade statistics** and **mass balance**



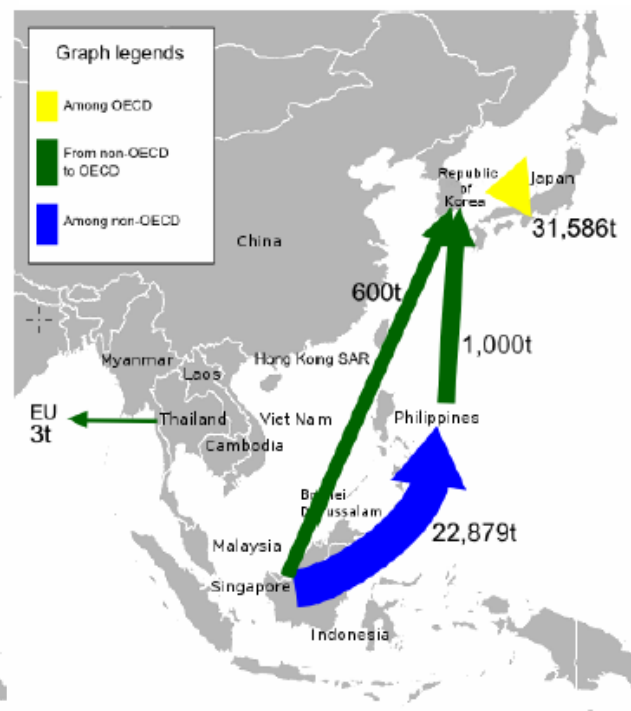
Compatible for (CRT)TV from both estimations. This is because secondhand TV is often exported as main cargo in E/D.

Attention.  
**Trade statistics gives underestimation for secondhand EEEs other than TV.**  
Those secondhand EEEs other than TV are exported as **low-value cargo** (less than JPY200,000 in E/D) that are not covered by trade statistics.

# 1.1 Estimation Method: Enforcement data (Ex.: Country report for BC)



(1) Import statistics base



(2) Export statistics base

Transboundary flow of E-waste in Asia (2004-2006)  
(MOE of Japan, 2011)

According to country report (import base), Japan is importing country of print circuit board and other electronic scrap. But **difficulties** include:

- definition of e-waste,
- non-reported trade,
- data reliability, and
- data availability.

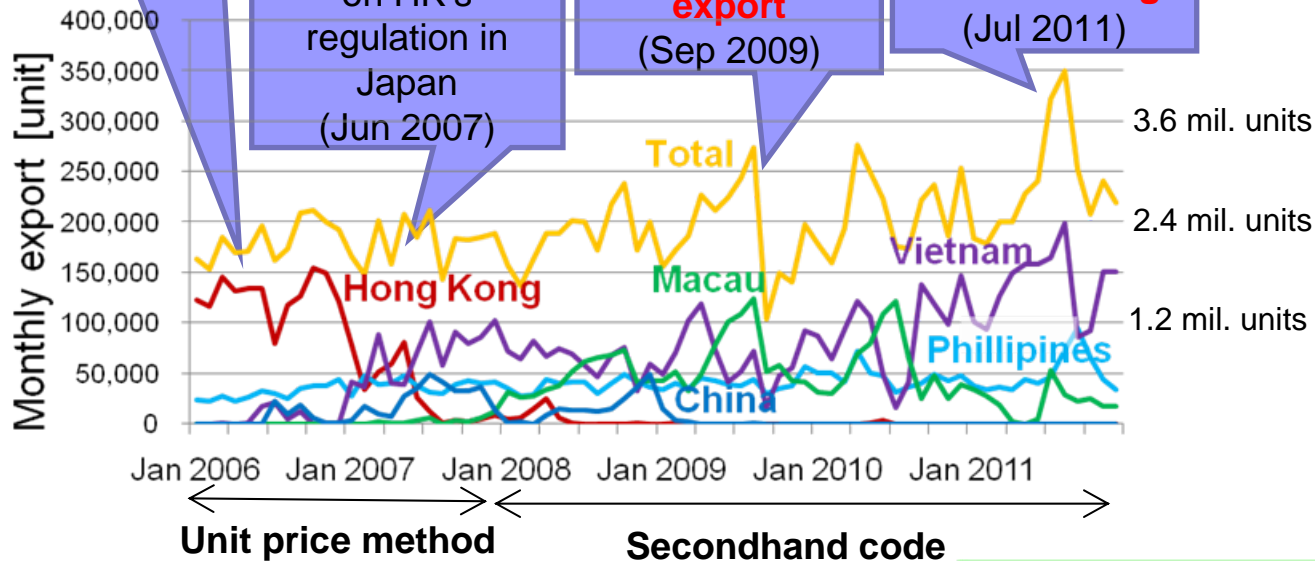
# 1.2 Export from Japan (CRT TV)

HK's Import control was strengthened (Apr 2006)

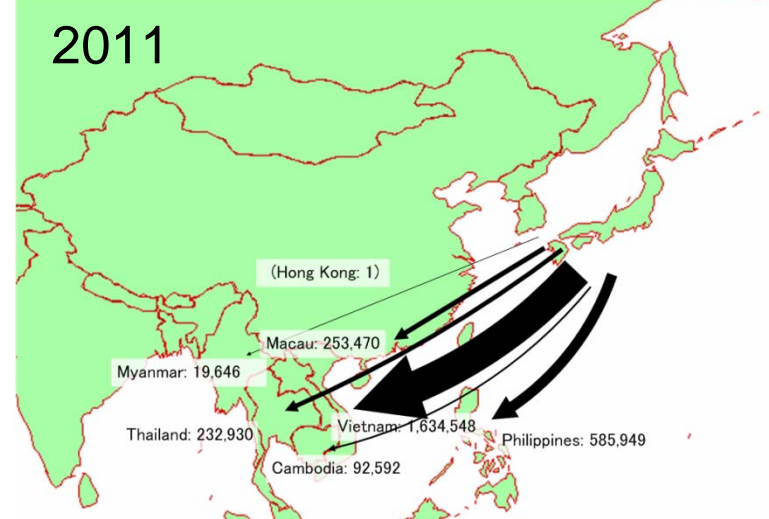
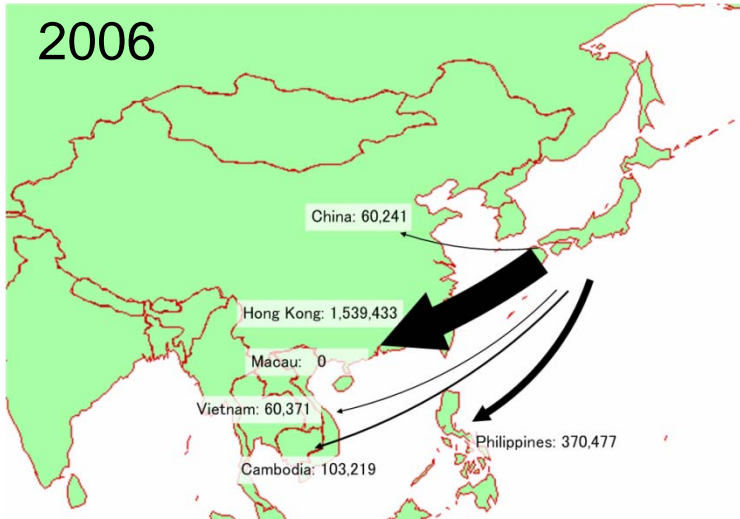
Announcement on HK's regulation in Japan (Jun 2007)

Criteria of secondhand CRT-TVs for export (Sep 2009)

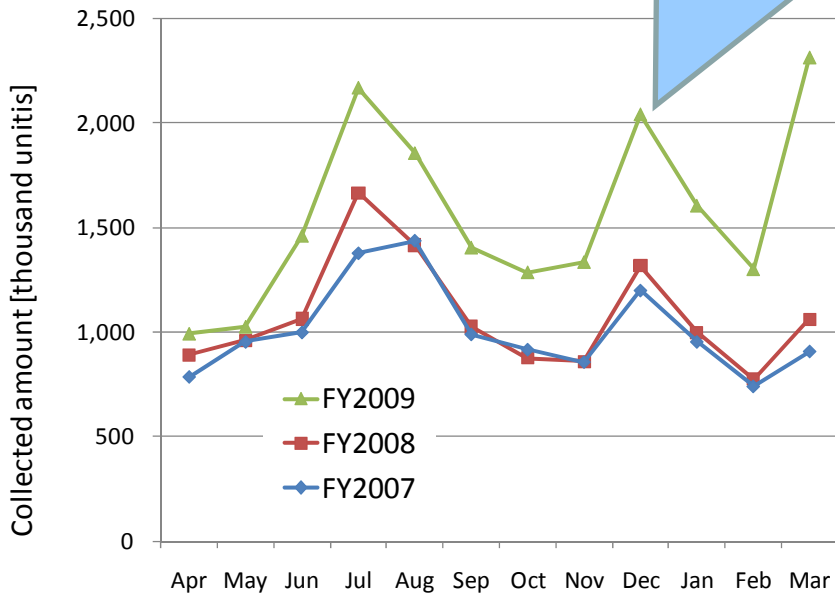
End of terrestrial analogue broadcasting (Jul 2011)



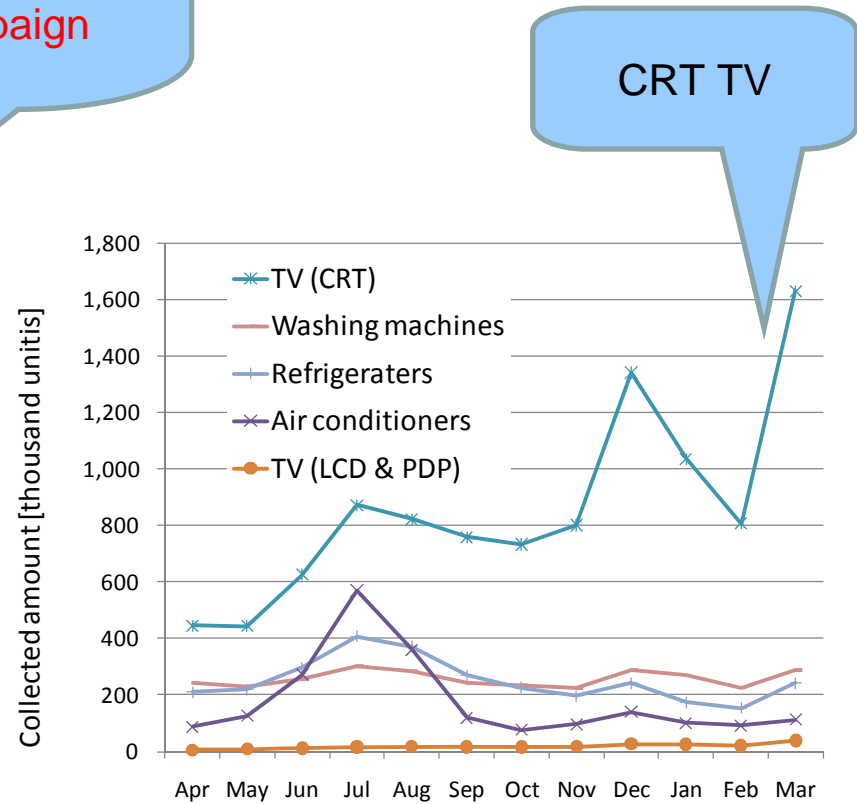
Result of the tightening of regulations in some countries/ areas, export destination has been changed to southeast Asia (exploiting weak import control).



Amount of **home appliances collected** under the Home Appliance Recycling Law in Japan **was increased in FY2009**, due to the transition to **terrestrial digital broadcasting** (analog broadcast ended in Jul 2011) and **Eco-Point Campaign** (from May 2009 to Mar 2011)



Home appliances (4 items) collected at designated stockyards in FY2007 to 2009



Home appliances collected at designated stockyards in FY2009



# 1.3 Import and re-export in Vietnam

## Observed material flow of secondhand EEE and E-waste around Vietnam



→ Printed circuit board

→ Secondhand PCs

→ Secondhand home appliances (e.g. TV sets)

Above flows are estimated based on the interviews by our colleague, Dr. Shinkuma



Exporting secondhand PC monitors at Mong-cai (Vietnam) to China (Sep 2007)



# 1.4 Import control of secondhand and waste EEE in Asia

	Secondhand EEE	Waste EEE (E-waste)
Cambodia	Possible (only PC prohibited)	Some items are prohibited as hazardous waste.
<b>China</b>	<b>Substantially prohibited</b> (3C certification is needed for home and large electric machines. TV is prohibited.)	Prohibited except for waste motors, cables and others with restricted permission.
<b>Hong Kong</b>	Possible ( <b>permission needed</b> ) “Advice” requires 1) demand in Hong Kong, 2) functioning, 3) proper packaging, and 4) <b>5 or less years after manufacturing</b> .	Possible (permission needed) Prohibited from OECD, EC and Liechtenstein.
Indonesia	Many secondhand EEEs are <b>prohibited</b> .	Prohibited if regarded as hazardous waste.
Japan	Possible	Possible (permission needed)
Korea	Possible (safety certification needed.)	Possible
Malaysia	Possible (application needed.) It requires functioning, no physical damage, proper packaging, and <b>3 or less years after manufacturing</b> .	Possible (permission needed) Prohibited from OECD.
<b>Philippines</b>	Possible ( <b>application and consent needed</b> )	Possible (permission needed)
Singapore	Possible ( <b>permission needed</b> )	Possible (permission needed)
Taiwan	Possible	Prohibited
Thailand	Possible It requires 1) <b>3 or less years after manufacturing</b> (5 years for copying mach.), 2) industrial standard, and 3) guarantee.	Possible (permission needed)
<b>Vietnam</b>	<b>Prohibited except for re-export case</b> (only laptop PC possible.)	Prohibited

### About Asian Network

Background Information

Objective

Activity

### Participating Countries & Partners

Participating Countries

Network Partners

Reference Form

### Country Information

National Reporting

Statistical Data

Law and Regulation

Import Control on Secondhand

### Annual Workshops

### Project and Research

Asia E-waste Project

Import/export procedures

Good practices for effective enforcement

Trend of Transboundary Movement in Asia

ESM standards in Asia

Measures for strengthening border control

### Publications

[Ministry of the Environment, Government of Japan](#) > [Waste & Recycling](#) > The Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes



## The Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes

The Asian Network for Prevention of Illegal Transboundary Movement of Hazardous Wastes aims at facilitating the exchange and dissemination of information on transboundary movements of hazardous wastes and selected used products among North-east and South-east Asian countries, and assists participating countries in formulating appropriate legislative response to such movements under each country's system taking into consideration necessary procedures required by the Basel Convention. This system also provides useful information that can contribute to capacity building for the implementation of the Basel Convention.

A project for the establishment of the Asian Network for Prevention of Illegal Transboundary Movement of Wastes has been proposed by the Government of Japan, and acknowledged by Parties at the First Session of the Open-ended Working Group of the Basel Convention (OEWG 1, held in Geneva from 28 April to 2 May 2003). This web site has been developed by the Ministry of the Environment, Japan as one of the tools to promote information exchange and dissemination for the prevention of illegal transboundary movement of hazardous wastes.

### Current Participating Countries

Brunei Darussalam, Cambodia, China, Hong Kong SAR(China), Indonesia, Japan, Republic



# Study on Criteria and Requirement on Environmentally Sound Management of Hazardous Wastes and Other Wastes

[www.env.go.jp/en/recycle/asian\\_net/](http://www.env.go.jp/en/recycle/asian_net/)

# 1.5 Challenge of export control in Japan

## Guideline on the separation of home appliances for reuse or recycling for retailers

- METI & MOE of Japan
- issued in September 2008
- Objectives
  - **reference** of criteria for retailers to differentiate the received end-of-life home appliances from consumers for reuse or recycling purpose
  - **to avoid the illegal transaction** (such that retailers receive recycling fee from consumers but sell to secondhand dealers)

GL A (prevention  
improper disposal)



	Generally hard for reuse	Depends on retailers	Generally possible for reuse
Year after manufacturing	15 (AC, TV) 10 (Ref, WM)		7
Functioning	Not functioning		Well-functioning
Observation	Damaged or dirty		Clean

GL B (promotion of  
proper reuse)



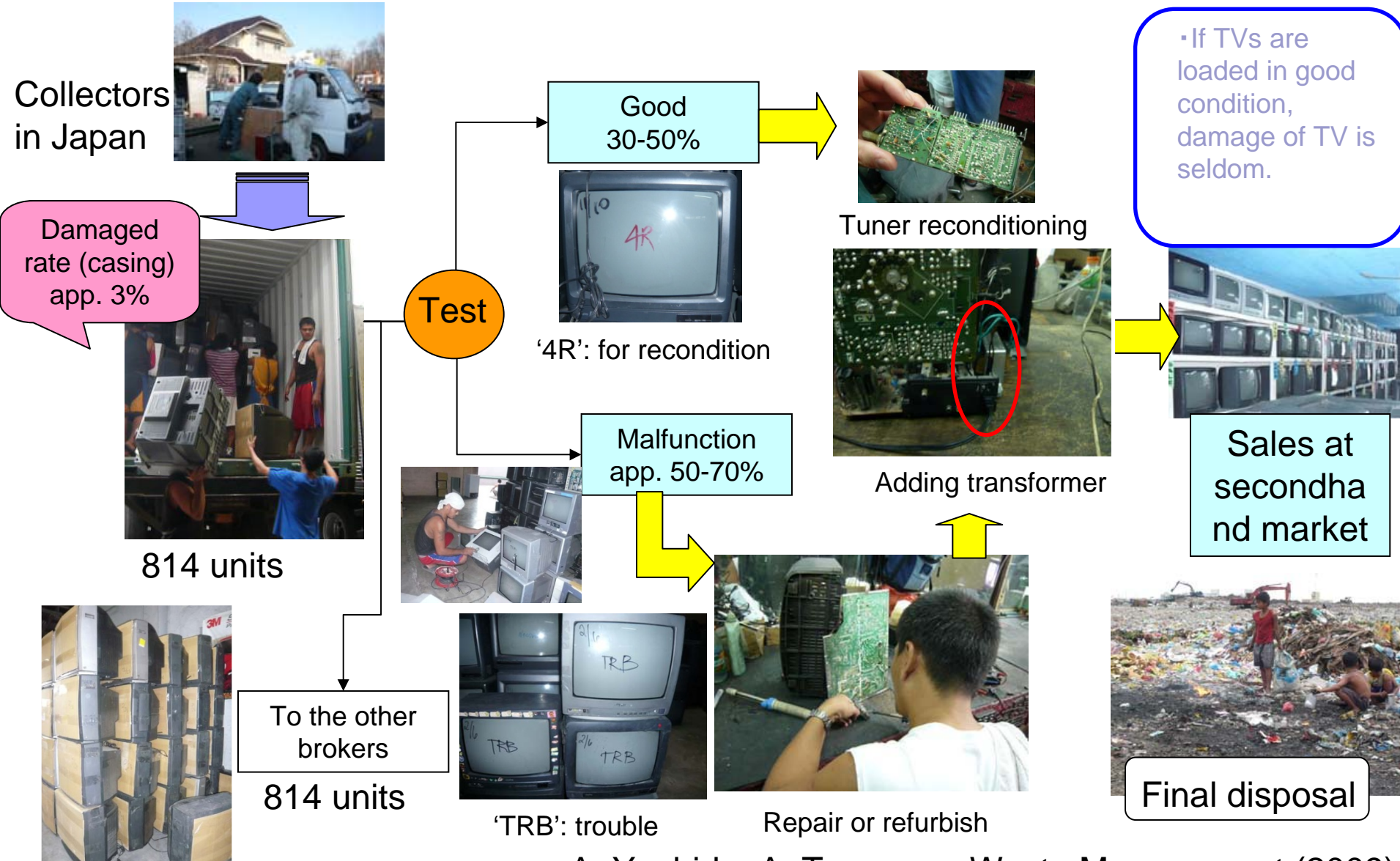
# 1.5 Challenge of export control in Japan

## Criteria of secondhand CRT TV for export

- MOE & METI of Japan
- set from September 2009
- Concrete criteria
  - 15 or less years after manufacturing
  - Observation
  - Functioning with electricity
  - Proper packaging
  - Confirmation of retailers in importing country
- Next criteria for other secondhand EEEs are being discussed.

Various discussion:

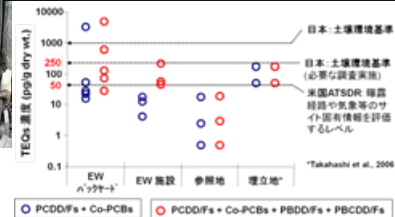
- Malfunctioned EEEs are repaired and sold. (Should be banned before export?)
- Destination of re-export cases are unclear. (Difficult to control before export.)



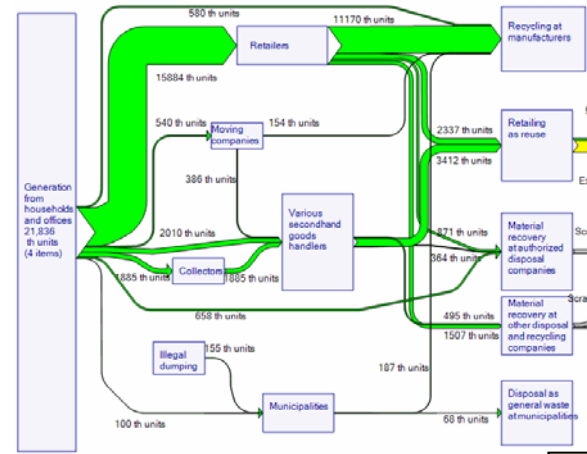
# E-waste research at NIES from the viewpoint of international Material Cycle

## Environmental Impact of e-waste recycling in developing countries

Analyze env samples from recycling sites in India, Vietnam, Philippines and Indonesia. **High-level heavy metals and PCDD/DFs have been confirmed.**



## Domestic Material Flow



## Secondhand EEE generation

## Scrap metal export

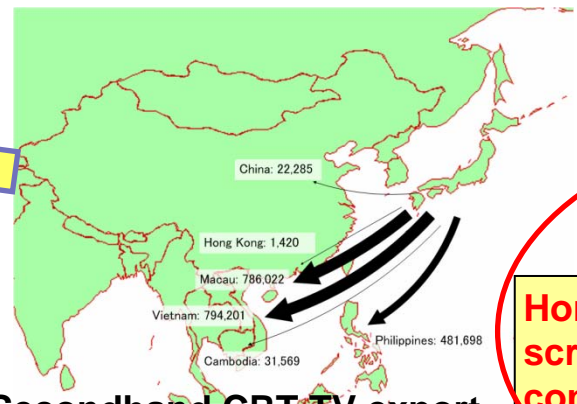


**Japan's export control on Secondhand CRT TVs** is implemented in 2009. Destination is changed to Vietnam and Macau in 2009 to exploit weak import control.



**NIES Workshop on E-waste (The 7th WS on Oct., 2010)**

**Reuse condition of exported CRT TVs from Japan** was examined. **Formal and informal recycling** were characterized.



**Secondhand CRT TV export in 2009 International Flow**



**Home appliances are contained in scrap mixed metal. Proper export control** is recommended. **Fire accident** would generate

PCDD/DFs **Mixed metal scrap**

**E-waste recycling (and reuse of secondhand EEE) practices and systems in Asian countries**



# 2.1 Export of mixed metal scrap from Japan



# 2.1 Export of mixed metal scrap from Japan

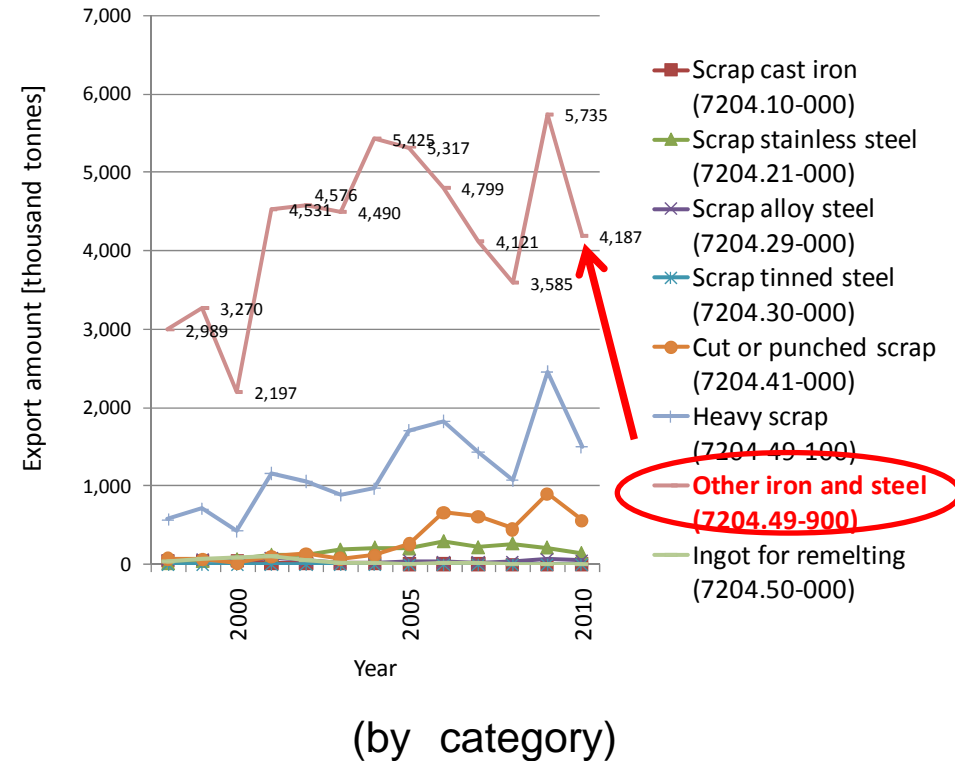
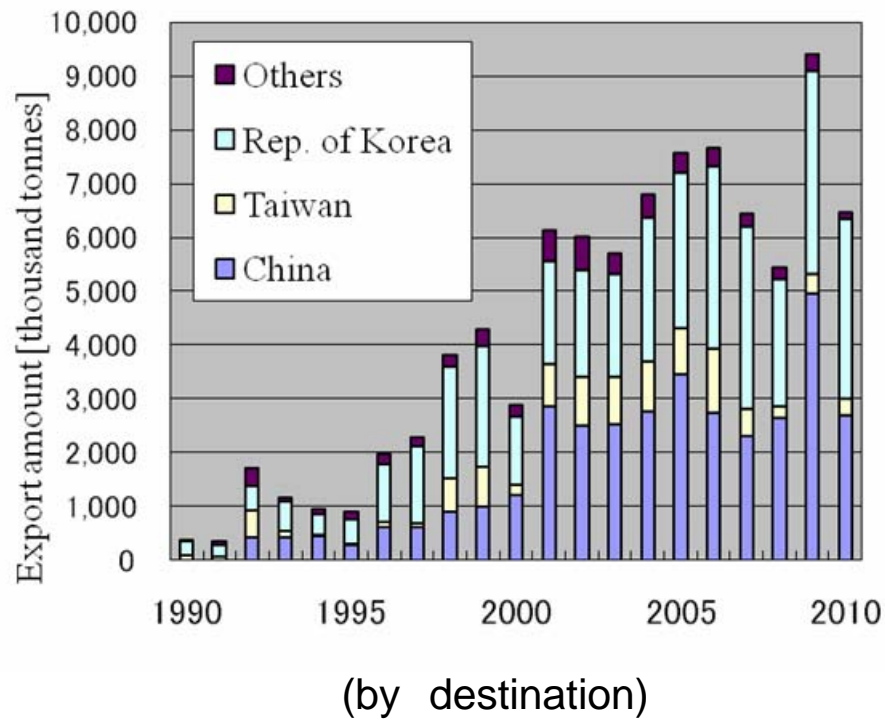
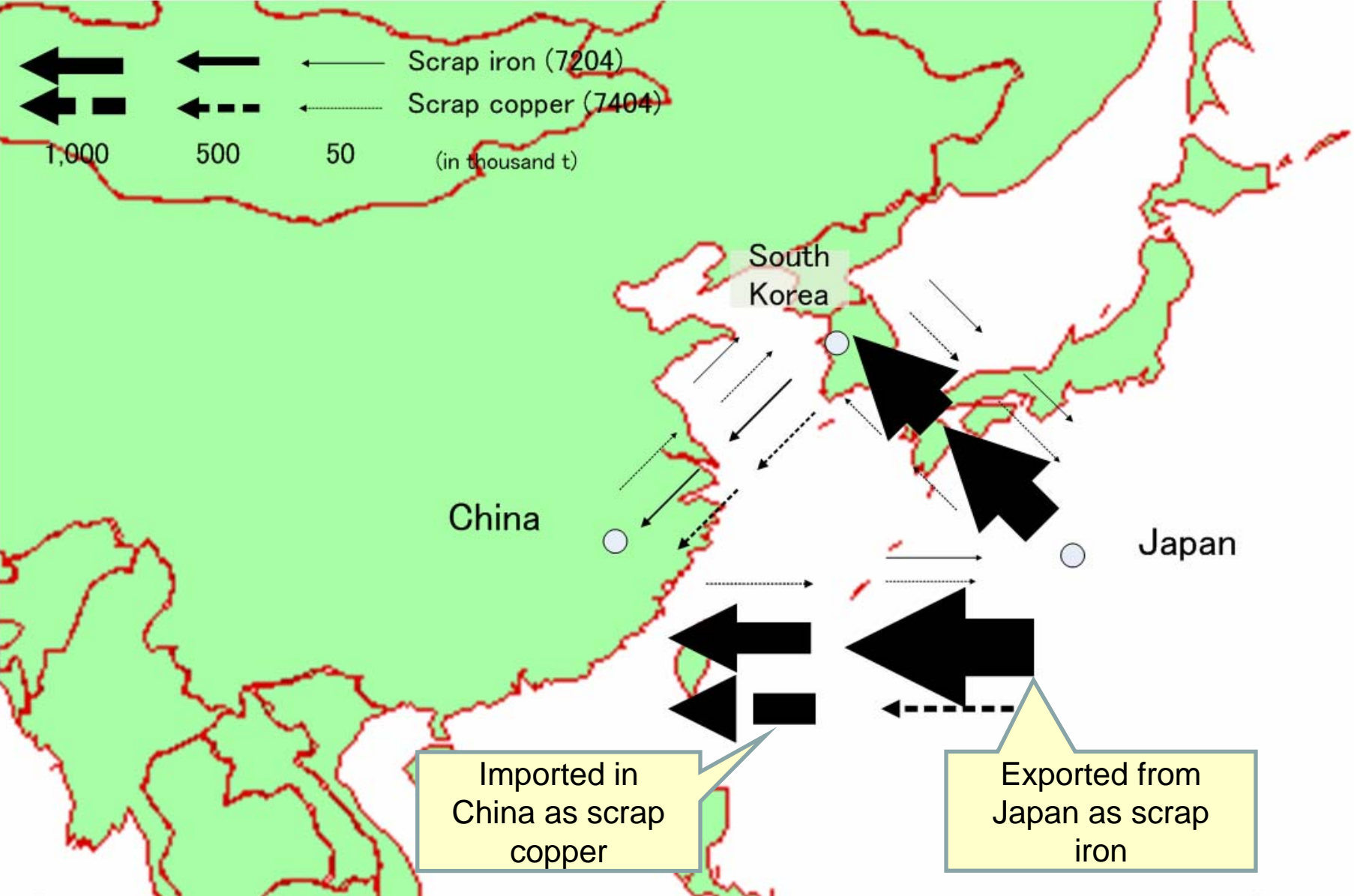


Fig. Export of **scrap iron and steel (HS:7204)** from Japan

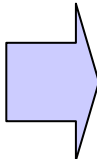
- So-called “**mixed metal scrap**” or “zappin”(雑品 in Japanese, miscellaneous commodities in English) is mostly included in “**Other scrap iron and steel**” (HS: 7204-49.900) that is exported with 4.2 million tons in 2010. **1.3 to 2.0 million tons** is considered as mixed metal scrap.



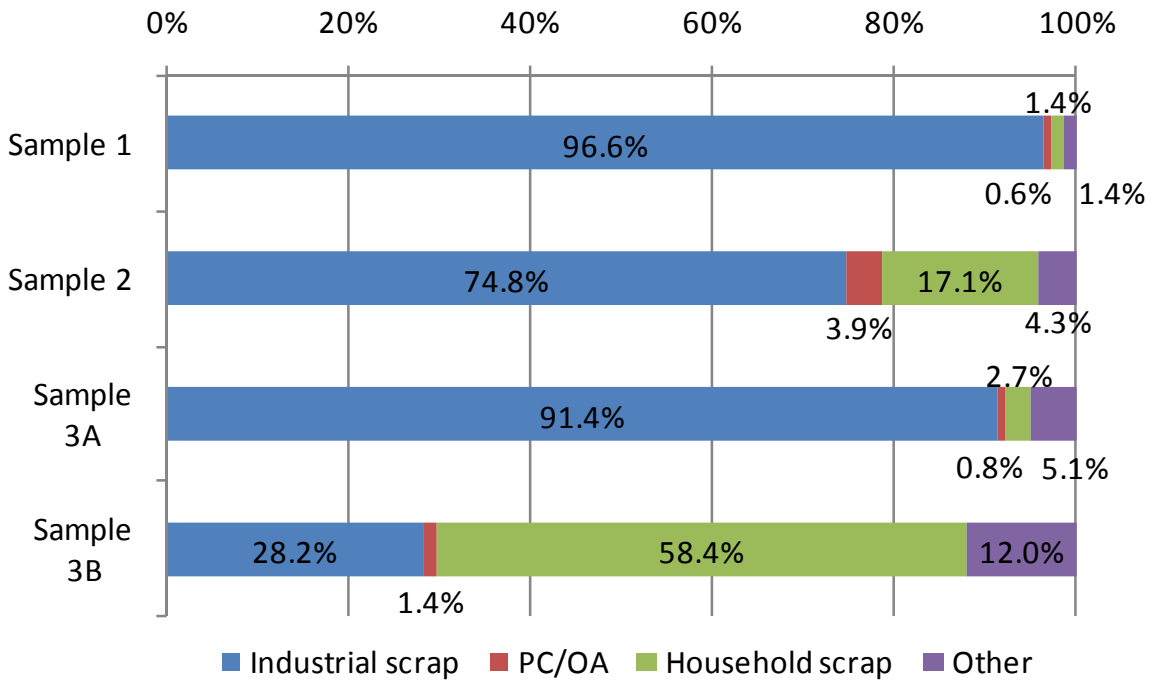
Trade of scrap metal among three countries in 2005

# Sample examination for items/materials: Overall results

We sampled **10 tons** of scrap metal three times to examine **contained items** and **hazardous materials** in the scrap metal.



- Industrial scrap: more than 75% (by weight base); **household scrap may be more than half.**
- Household scrap includes many **air conditioners**. TV was also found.
- Various E-wastes and small batteries were included.



# Examples of found items

Most of them also violate  
**Chinese import regulation**



LCD TV, Monitor



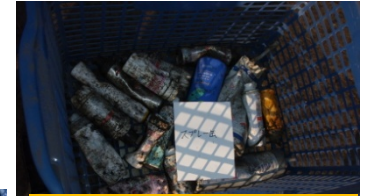
Lead coated boiler



Ni-Cd battery



Li battery



Spray can



Printed circuit board



Lead Acid battery



Li-ion battery



Compressor

**Violation of Basel Law (Basel wastes)**

**Danger of flammability or explosion**



Air conditioner (business-use)



CFC12 detected

Air conditioner (home-use)



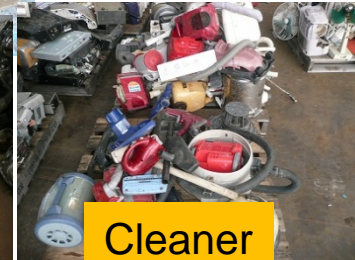
Video cassette recorder

**Violation of CFC Recovery and Destruction Law**

**Necessity of enhanced collection under Recycling Law**



Rice cooker



Cleaner

**Necessity of domestic collection and recycling**

# 2.2 Challenge of export control in Japan

## Mixed metal scrap: Simplified flow



Household,  
Office, Industry

Charge-free  
collectors, delivery  
traders, retailers



Scrap dealer



Exporter  
in Japan



Custom inspection

Prior-consultation by MOE/METI  
considering Basel law and  
Waste Management Law

Inspection before shipment

Importer  
in China

Various regulation  
and inspection

Recycler



Manual separation  
and recycling  
(material recovery)



# 2.2 Challenge of export control in Japan

One exporter (S, Inc.) was convicted in 2010 as a violation of  
 - waste export without MOE confirmation and  
 - waste disposal service without permission.

**Mixed metal scrap** consists of non-homogeneous and various types of E-waste.  
 It is generally regarded as non-hazardous and non-waste as a whole, but includes some hazardous waste.

Currently MOE of Japan is trying to control gray zone in various manner.

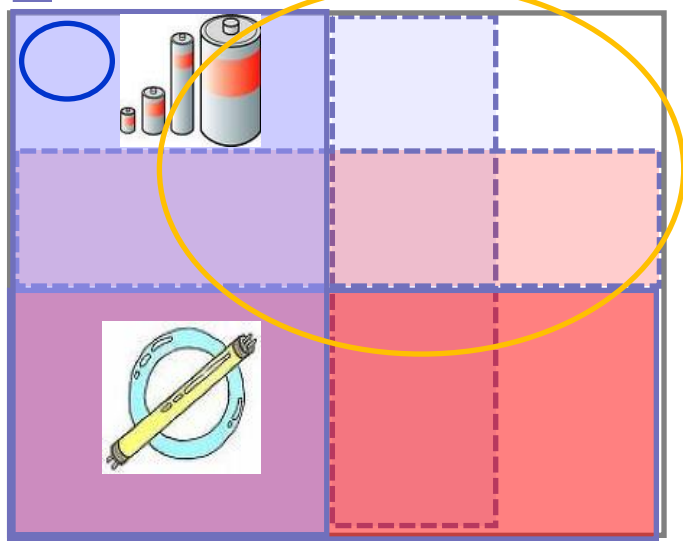


Non-Hazardous

Gray zone

Hazardous (incl. household waste)

Basel Law



Waste      Gray zone      Non-Waste

Waste management Law

S, Inc. © 2010 Google



# Summary

- Trade of Secondhand EEE
  - Estimation method include **trade statistics** (codes of secondhand, unit price, description), **mass balance**, enforcement data, etc..
  - **Trade statistics gives underestimation** for secondhand EEEs other than TV due to low-value cargo.
  - **Over 2 million** units of **secondhand CRT TV** is annually exported from JP to VN and other Asia for reuse. Secondhand mobile phones are exported to HK and Middle East.
  - **Import regulation is strengthening in Asia**, although some weak import control might still be exploited as loophole.
  - **“Asian Network on the Prevention of Illegal Trade of Wastes”** is supporting trade control and enforcement in Asia.
- Trade of Mixed Metal Scrap
  - **1.3 to 2.0 million tons** of **mixed metal scrap** is exported from JP to CN for material recycling. Mixed metal scrap consists of **non-homogeneous** and **various types of E-waste**.
  - Currently **MOE of Japan is trying to control gray zone** in various manner.





Thank you for your kind attention!

Acknowledgement: This work has been supported by Dr. Aya Yoshida and other colleagues.

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