

## Enhanced information exchange on hazardous substances in electronics

*Connecting the production and end-of-life stages*

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Stakeholders' Information Needs on  
Chemicals in Articles/Products,  
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## Overview

1. Institute for Global Environmental Strategies
2. Overview and rationale of the current study
3. Hazards of end-of-life treatment
4. Current policies and information exchange systems
5. Results of initial interviews
6. Conclusions

## Institute for Global Environmental Strategies (IGES)



Photo: Yasuhiko HOTTA

- Founded in 1998 supported by the Government of Japan,
- Policy research institute working to promote SD in the Asia-Pacific region,
- 7 research areas: Climate Policy, Biofuels, Forest Conservation, Fresh Water, Waste and Resources, Capacity Development and Education, Business and Environment
- Headquarters in Hayama (south of Tokyo), 3 other domestic offices (Tokyo, Kobe, and Kitakyusyu), and 2 international offices (Bangkok and Beijing)
- Visit our website for details ([www.iges.or.jp](http://www.iges.or.jp))

## Research objective and components

### Objective of the study

- To propose an information exchange system for hazardous chemicals contained in electronic products, aimed at reducing environmental risks in end-of-life treatment.
- Focused on Japan in the first stage, will expand to East Asia later

### Research components

- Identify environmental risks (incl. environmental pollutions and occupational health issues) at the recycling and waste treatment stages
- Analyze information needs and potential benefits of different kinds of information
- Investigate what information can be generated at what stages
- Analyze what kind of information system would be feasible and how it can be established

## Hypothesis - Potential Benefits

- **Information disclosure:** *from Producers to Recyclers*
  - Safer recycling process ..... ➔ Regulatory framework also needed
  - Higher recycling rate ..... ➔ Economic benefits for recyclers
  - Less contaminated materials ..... ➔

- **Feedback:** *from Recyclers to Producers*
  - Improve Design for Environment (DfE)

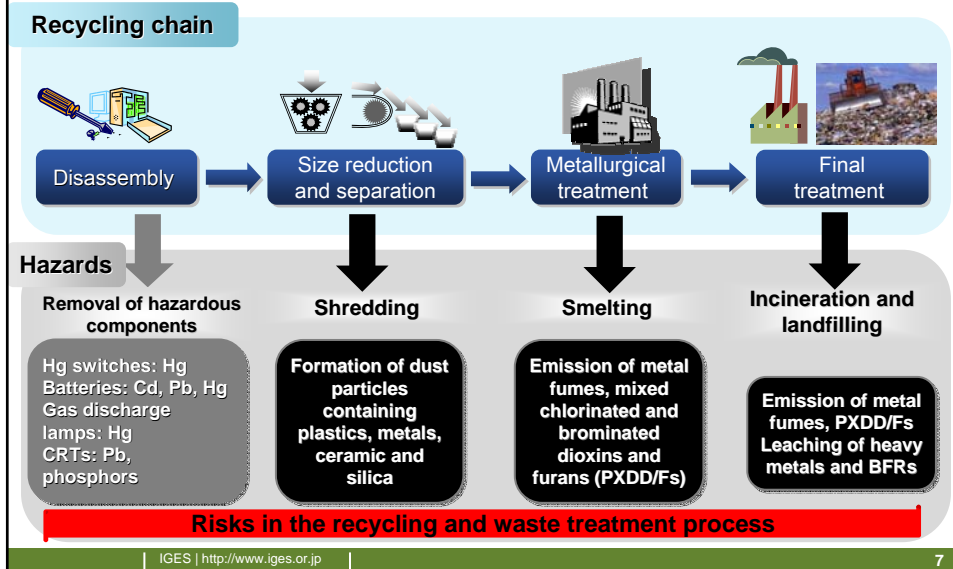
Rationale: With improved knowledge on how products are recycled and how waste is treated, and on hazards related with those operations, producers can improve their product design.



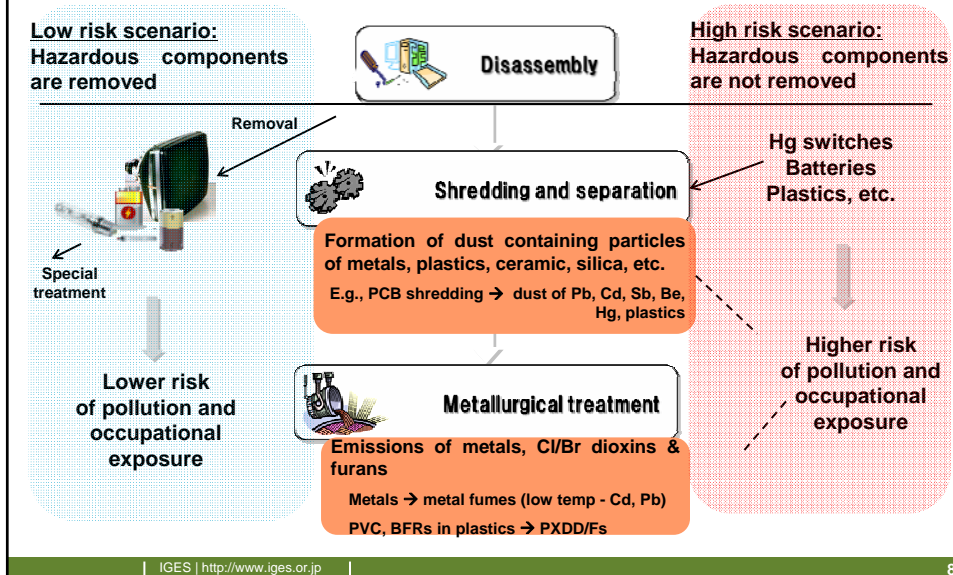
## Hazardous substances and components in WEEE

Components	Found in	Substances of concern
Cathode ray tubes	Old TV sets, PC monitors, oscilloscopes	Pb in cone glass Ba in electron gun getter Cd in phosphors
Printed circuit boards	Ubiquitous, from beepers to PCs	Pb, Sb in solder Cd, Be in contacts Hg in switches BFRs in plastics
Batteries	Portable devices	Cd in Ni-Cd batteries Pb in lead acid batteries Hg in batteries
Gas discharge lamps	Backlights of LCDs	Hg
Plastics	Wire insulation, plastic housing, circuit boards	Polyvinylchloride Brominated flame retardants

## Hazards associated with the recycling chain



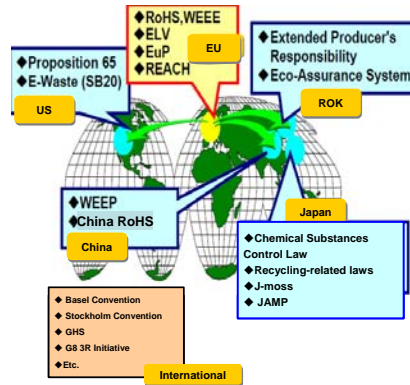
## Hazards associated with recycling



## Recent initiatives on treatment of end-of-life products and hazardous chemicals in products

### Globalizing movement

- Many policy initiatives, mainly originating from the EU
- Fewer and less hazardous substances used
- Improved availability of information on hazardous substances used in products
- Regional initiatives have global impact



Adapted from : Yoshiaki Ichikawa (Hitachi), "Eco-conscious design and the 3Rs", IGES/ K-FACE Global Environmental Seminar Economic Globalization and the 3Rs, January 31, 2007

### Domestic initiatives in Japan

- Revision of the Chemical Substances Control Law
- Recycling-related laws (e.g. Electronic Home appliances, PCs)
- **JAMP** (industry response to REACH)
- **Waste Data Sheet**
- **Marking and Labelling**
- **J-moss** (Japanese RoHS)

## Current situation in Japan

### Collection and recycling of e-waste

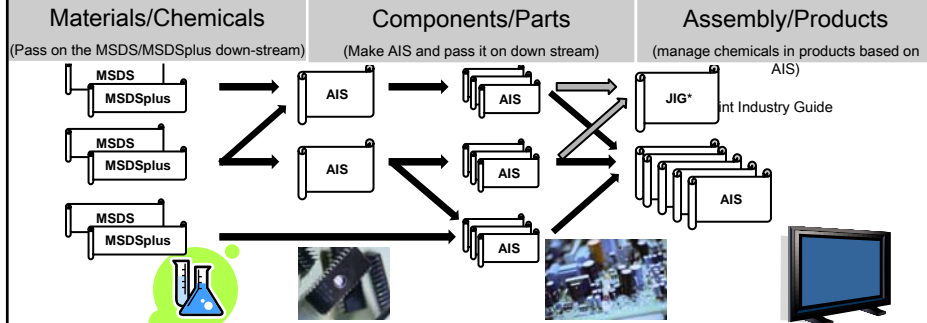
Products	Collection scheme
Refrigerators, Washing machines, TVs, PCs, Air conditioners	<ul style="list-style-type: none"> <li>•EPR system</li> <li>•Producer responsible for recycling</li> <li>•Consumers pay recycling fee at ..</li> </ul>
Mobile phones	Network operators run a joint initiative to collect and recycle
Other large household electronics (Stereos, Microwave ovens etc.)	<ul style="list-style-type: none"> <li>•Some municipalities collect as "large waste" on designated days</li> <li>•Sold to recyclers</li> </ul>
Small electronics (Cameras, MP3s etc.)	<ul style="list-style-type: none"> <li>• A few pilot projects to collect</li> <li>• Often public-private partnerships</li> </ul>

## Current situation in Japan

**JAMP (Joint Article Management Promotion-consortium)** is an industry initiative to manage information on chemicals in products (response to REACH)

**JAMP MSDSplus:** supplemental MSDS regarding substance/preparation. MSDSplus focuses on materials and the amount.

**JAMP AIS (Article Information Sheet):** Information format for conveying chemical information for articles



- Information sharing from up-stream to down-stream in the supply chain
- Producers of articles can receive “complete” chemical information

## Current situation in Japan

### Chemicals List for JAMP

#### Laws and directives required for MSDSplus

code	Laws and Directives	Revised Ver.
JP01	Law Concerning the Examination and Regulation of Manufacture , etc of Chemical Substances (Class 1 specified chemical substances)	Oct. 31, 2007
JP02	Industrial Safety and Health Law (chemicals prohibited to be manufactured)	Sep. 7, 2007
JP03	Poisonous and Deleterious Substances Control Law (specified poisonous substances)	Aug. 15, 2007
EU01	RoHS directive	2002/95/EC
EU02	ELV directive	2000/53/EC
EU03	67/548/EEC (Annex I CMR-cat1, 2)	2008/58/EC
EU04	76/769/EEC (excpet 67/548/EEC Annex I CMR-cat1, 2)	2007/51/EC
EU05	REACH SVHC	Oct. 28, 2008

#### Criteria to report optionally (Addition or deletion in the future is possible.)

code	Laws and Directives	Revised Ver.
OT01	ESIS PBT (Fulfilled)	Oct. 28, 2008
IA01	GADSL	2008 GADSL ver. 2.0
IA02	JIG (JIG A substances)	JIG-101A 2007

## Current situation in Japan

**Waste Data Sheets** contain information of industrial waste to assure proper disposal and to prevent accidents

<ol style="list-style-type: none"> <li>1. Date</li> <li>2. Name of Waste</li> <li>3. Name and Contact of Waste Provider</li> <li>4. Class of Waste (check lists)</li> <li>5. Type of Packing</li> <li>6. Amount of Waste</li> <li>7. Hazardous information                         <ol style="list-style-type: none"> <li>1) Hazardous Characteristics</li> <li>2) Stability</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>8. Physical/Chemical Property</li> <li>9. Composition/Component Information</li> <li>10. Remarks                         <ol style="list-style-type: none"> <li>1) Measure for Safety</li> <li>2) Accident Response(Emergency Treatment , Treatment for Leaking, and Treatment for fire)</li> </ol> </li> <li>11. Special Note.</li> <li>12. Others.</li> </ol>
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Reference: MOEJ, WDS guideline

- Information from waste generators to recycling and treatment
- Only industrial waste and focus on physical hazards

## Current situation in Japan

### Marking and Labeling

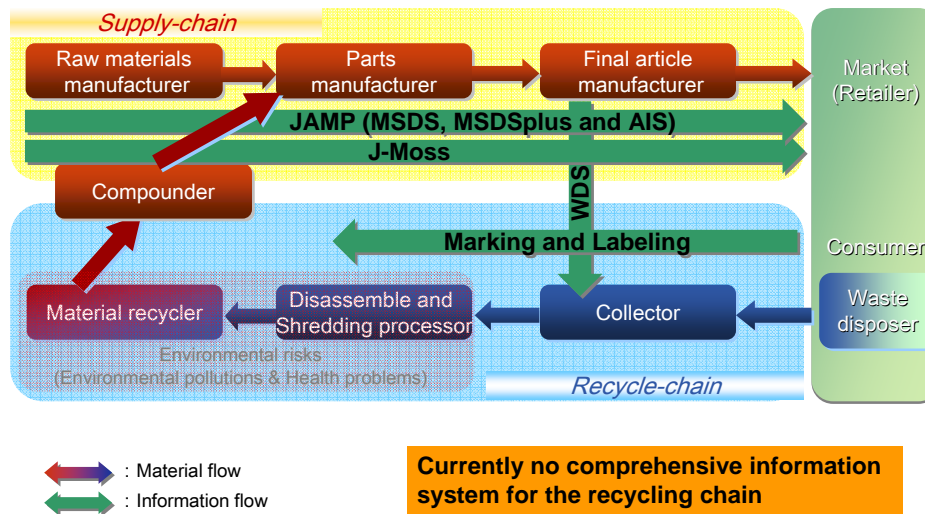
1. Identification of plastic parts
2. Symbols to make manual disassembly easier
3. Marking for presence or absence of selected chemical substances
4. Labeling of equipment containing rechargeable batteries

- Mostly voluntary systems
- Developed for large household appliances
- Introduced over the last few years

	Contents	Example of Marks	Year
Plastic Parts	Material Info.	>PC+ABS-CF FR(40)<	2007
	No Flame Retardants	>ABS< FR0	
	Contents Recycled Plastic	>PP< CR30	
	Label and Seal	>PET< / >PS<	
	Metal Info.	-Fe-	2008
Recycling Symbols	Metal has been inserted into the plastic parts		2004
	Hole puncture location		
	Symbols to show the direction of the compressor's refrigerant enclosing pipe		
	J-Moss Red and Green mark		2006
	Marking presence of specific chemical substances in mounted boards		2005
	Rechargeable battery		2001

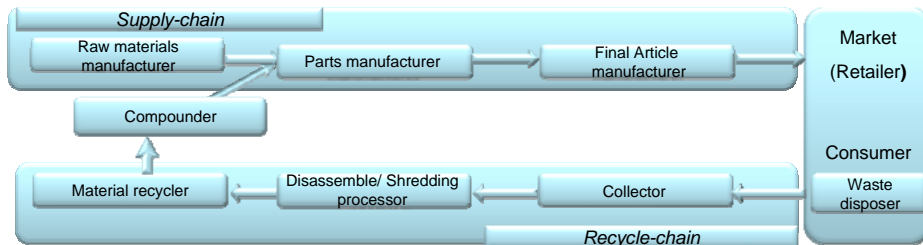
Reference; <http://www.aeha.or.jp/>

## Overview of information systems in Japan



## Interview Results: Current issues

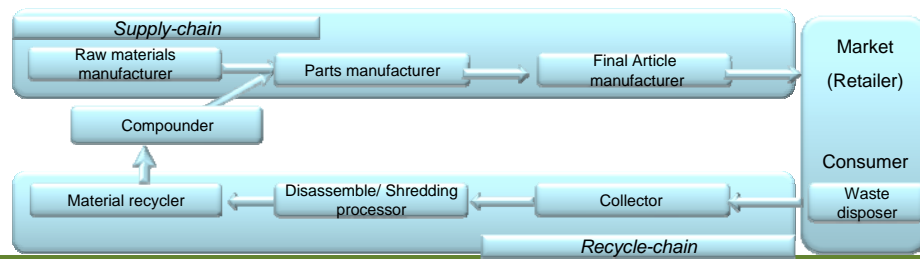
- **Lack of coordination and integration:** only a few information systems with weak linkages
- **Limited information flow in the supply-chain:** Information on hazardous chemicals in materials is often lost at the stage of parts manufacturers.
- **Low reliability of information in the supply-chain:** Final article manufacturers often have to check the product components by themselves. (e.g. X-ray fluorescence analysis)
- **Gap in awareness between producers and recyclers:** The awareness about hazards seems lower among recyclers than among producers.
- **Interpretation of environmental and health risks among recyclers:** Many recyclers suppose that the risks are negligible as long as they comply with the governmental regulations.





### Interview Results: Needs for information sharing

- **Differences between SMEs and large recyclers:** Large recyclers have developed some information on product composition by themselves. SME recyclers lack capacity to do this and are in greater need for information from producers.
- **Risk information:** Need to provide recyclers with broader knowledge, not only names and amounts of substances but also information on possible negative effects and proper preventive measures.
- **Quality assurance for recycled materials:** Need to introduce a standard to assure a certain level of quality (e.g. contents of brominated flame retardants in recycled plastics)



### Interview Results: Some challenges

- **Joint learning and problem solving:** Product designers need to visit recycling facilities in order to understand the processes used. Human interaction is also important for information exchange and learning.
- **Need for industry-wide approach:** An information exchange system must be introduced as an industry-wide approach, otherwise it will not be useful.
- **Improve the reliability of information in the supply-chain:** Especially at the stage of parts manufacturers
- **Strengthened regulation of waste management and recycling:** Possible need for industry-specific standards on occupational health hazards and environmental pollution
- **Analyze the long and medium-term risks:** Further evaluation of long and medium term risks of chemicals are needed.
- **Robust approach:** Once an information sharing system is established, it may be costly and time-consuming to modify
- **Other challenges:** Orphaned products, components imported from abroad, time-lag between production and recycling (existing product stock – products currently produced), and possible conflicts with intellectual property rights

## Tentative Conclusions

1. There is a need for more information on hazardous substances among the recyclers, especially SMEs
2. Proper disassembly is key to safe recycling, but important also to make sure that relevant info can follow components and materials along the recycling chain
3. Recently introduced marking systems are useful but only address some hazards and it will take several years until these systems become fully effective
4. The JAMP system (Article Information Sheets) has potential and would be valuable for developing a system also targeting the info needs in the recycling chain
5. Information on substances is not enough – recyclers need help to interpret such information and knowledge on how to act on it
6. Strengthened regulation might also be necessary

**Thank you for your kind attention!**

