3R initiatives lunch seminar (E-waste)

The status of Japan's Electric Appliance Recycling Law and warning for a new environmental pollution by re-use products and component

7 March 2006

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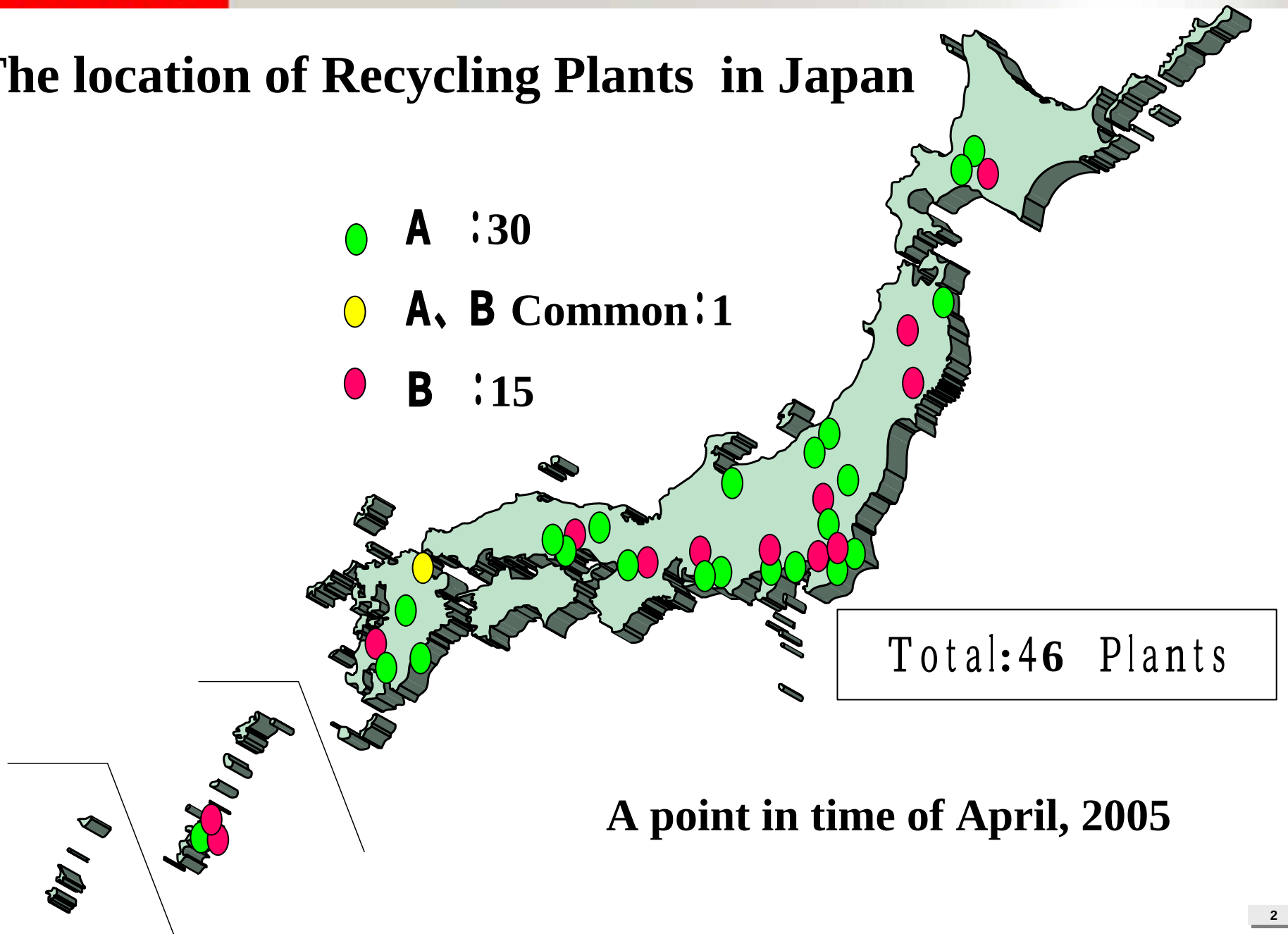
For presentation

The location of Recycling Plants in Japan

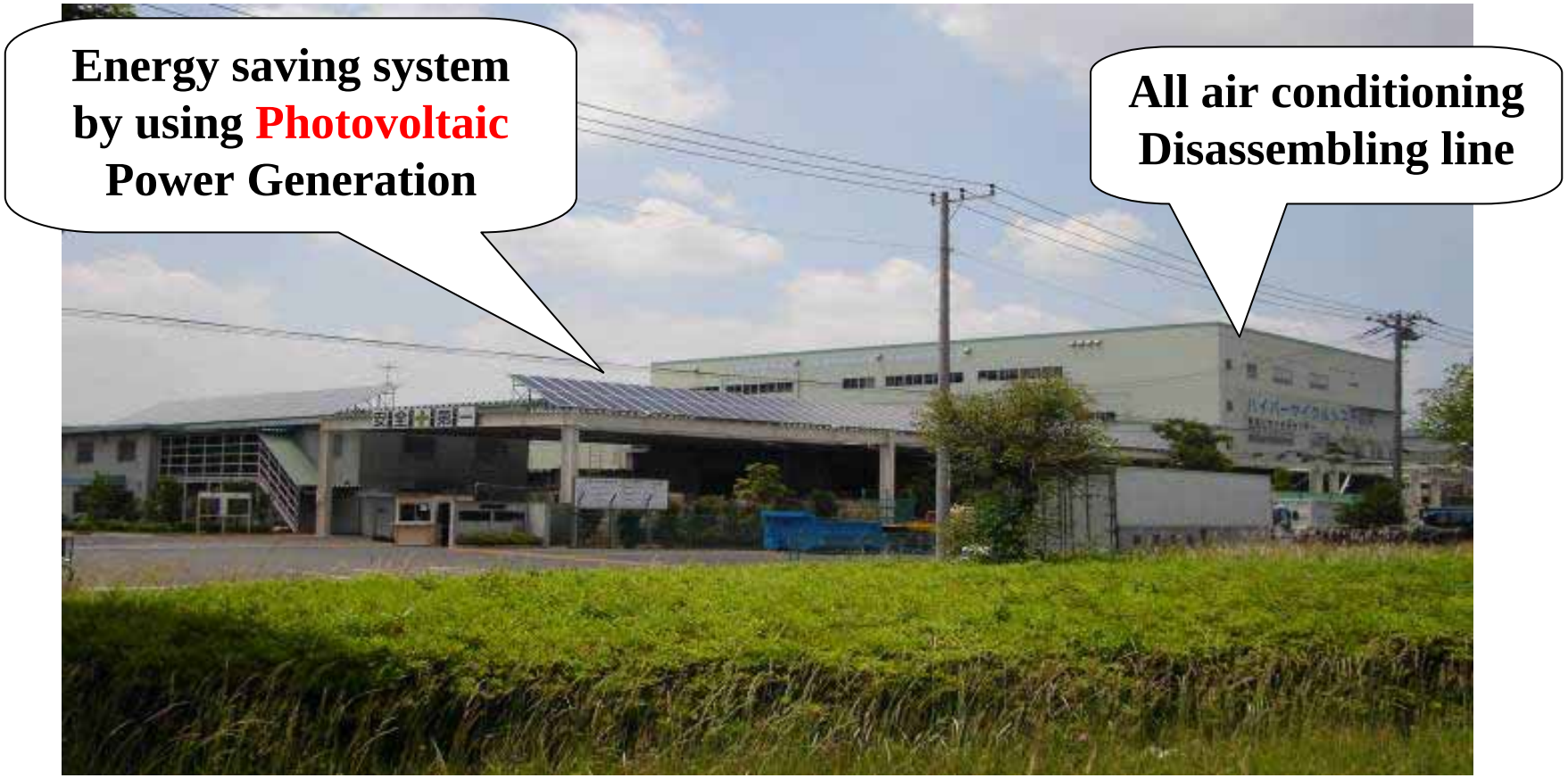


A point in time of April, 2005

Janna's Typical recycling plant

Hyper Cycle Systems Corporation

by Mitsubishi Electric



All air conditioning facility for operators “Air conditioner disassembling line”

Hyper Cycle Systems Corporation: Japan

All air conditioning facility for operators “Refrigerator disassembling line”

Hyper Cycle Systems Corporation : Japan

Refrigerant (Freon) recovery operation from refrigerator

Hyper Cycle Systems Corporation : Japan

Thermal insulator (Freon) recovery facility from refrigerator

Hyper Cycle Systems Corporation : Japan

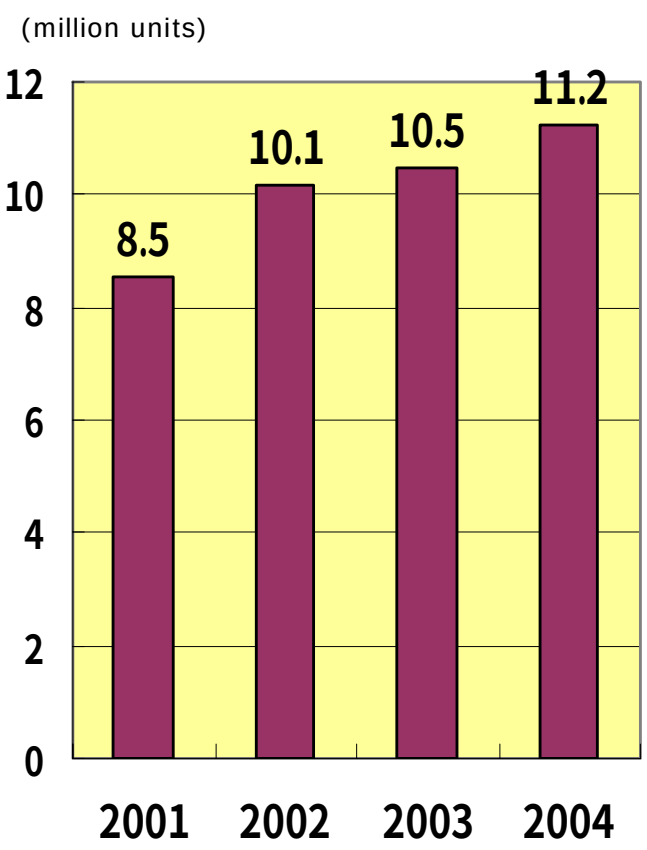
The result of Home appliances recycling Law in Japan

Recycling plants	41⇒44 plants throughout Japan			
Stocking yards	About 380 throughout Japan			
	Fy2001	Fy2002	Fy2003	Fy2004
Number of appliances Submitted for recycling	8.55 Million units	10.15 Million units	10.46 Million units	11.22 Million units
The ratio of illegally dumped appliances	1.58%	1.61%	1.66%	1.54%

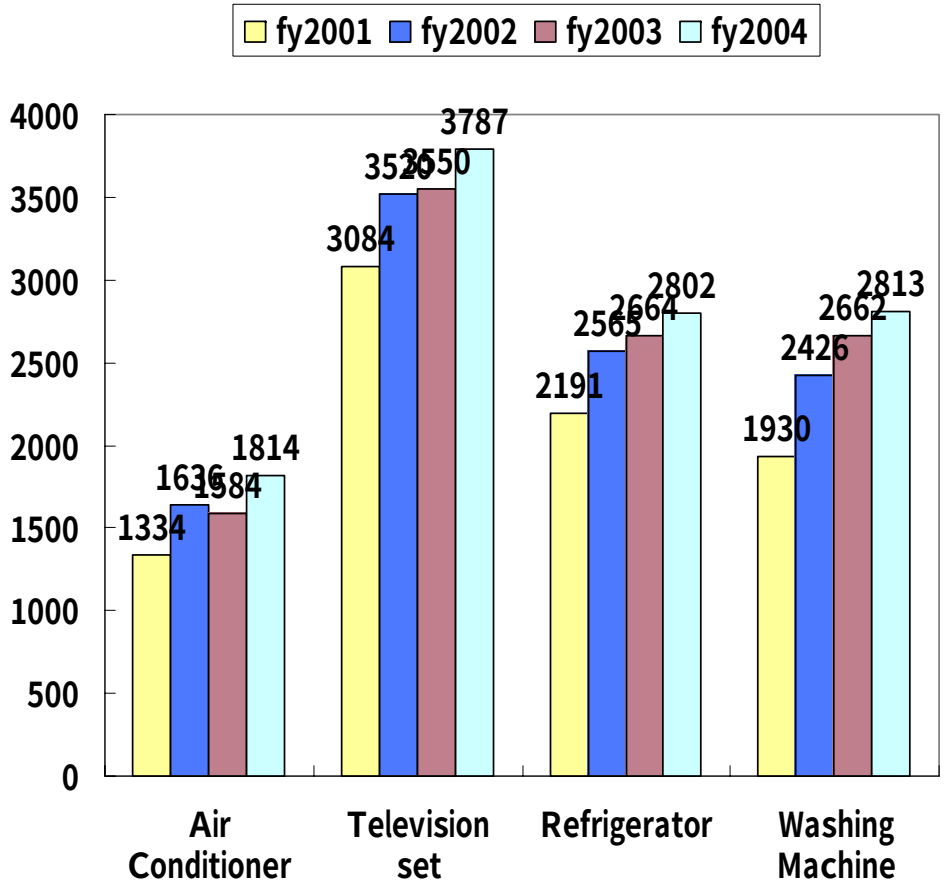
The official data from Ministry of Economy, Trade and Industry (METI)

Current situation of Home Appliance Recycling

Number of units taken back at designated take-back sites (total)



Number of units taken back at designated take-back sites (Per Items)



Source: Association for Electric Home Appliances 2005

Recycling standard and results

	Recycling standard by law	Actual data (2004)
Air conditioner	60%.	82%
Television	55%.	81%
Refrigerator	50%.	64%
Washing machine	50%.	68%

CFC,HCFC&HFC as Refrigerant must be recovered and either destroyed or recycled.

Recycling standard = A/B × 100
where A = (reused weight by manufacture) + (sold material weight)
B = Total received weight

Notes!: The definition of Japan's recycling standard is different from EU-WEEE`recycling ratio

Source: AEHA(Association for Electric Home Appliances) 2005

Breakthroughs 1

An Innovation for DFE(DFD) has began

More than10,000,000 units post use appliances are returned to manufacturers (Designers)* every year.

**** Manufacturer`s managed authorized recyclers***

∗DFE（Design For Environment）
∗DFD：Design For Disassembly

DFE Seminar program for young engineers

Mitsubishi Electric Hyper Cycle Systems Corporation

DFE Seminar program for young engineers

Experiences of disassembling guided from Skilled operator

Mitsubishi Electric Hyper Cycle Systems Corporation

DFE Seminar program for young engineers

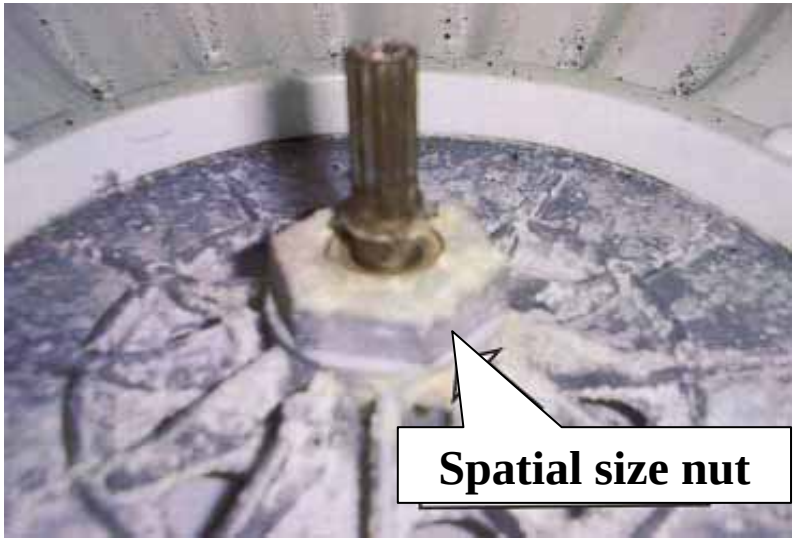
Mitsubishi Electric Corporation Kamakura institute center

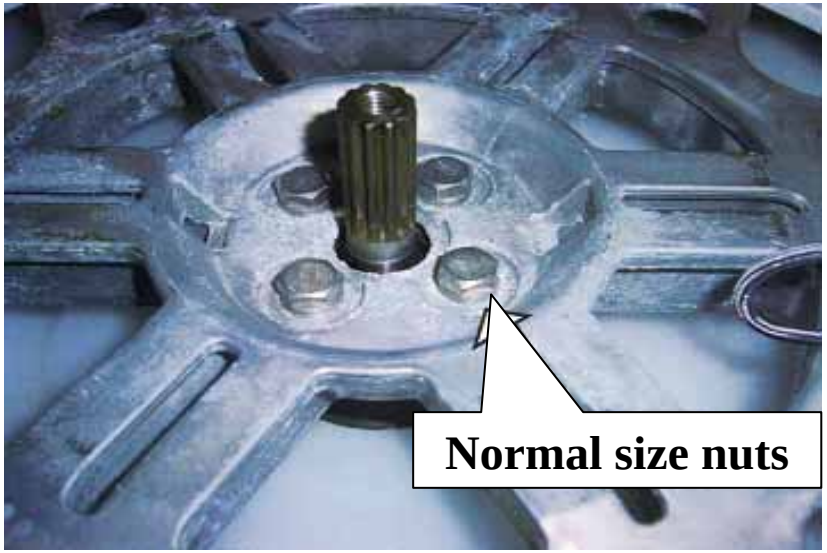
Ideas for Easy to break

For the porpoise of easier to break ,
breakpoint slit is added to harness holder

Improvement of Connecting assays

Case of Pullsator unit of washing machine





In recycling plant,
special size tool is necessarily to disassemble

In recycling plant, it is easily able to disassemble by normal tool

Breakthroughs 2

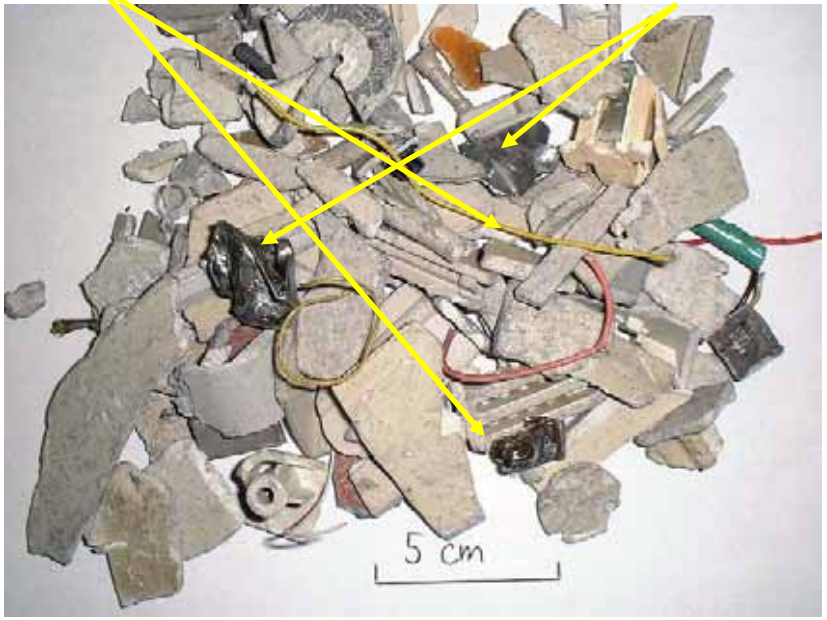
"Horizontal self-recycling in used plastic"

More than10,000,000 units post use appliances are returned to manufacturers (Designers) * every year.

**** Manufacturer`s managed authorized recyclers***

Plastic Material Recycling

PVC coated copper wire Metal plate



Metal-plastics mixed shreds (Raw material)

Plastics after milling and separation (Not containing metal & PVC)

STOP! Landfills,Incineration

RECYCLABLE

Reductant for blast furnaces in steel plants & material recycling

The 'Horizontal Self-recycling' concept is now into practice

Collected used Vegetable case of refrigerator

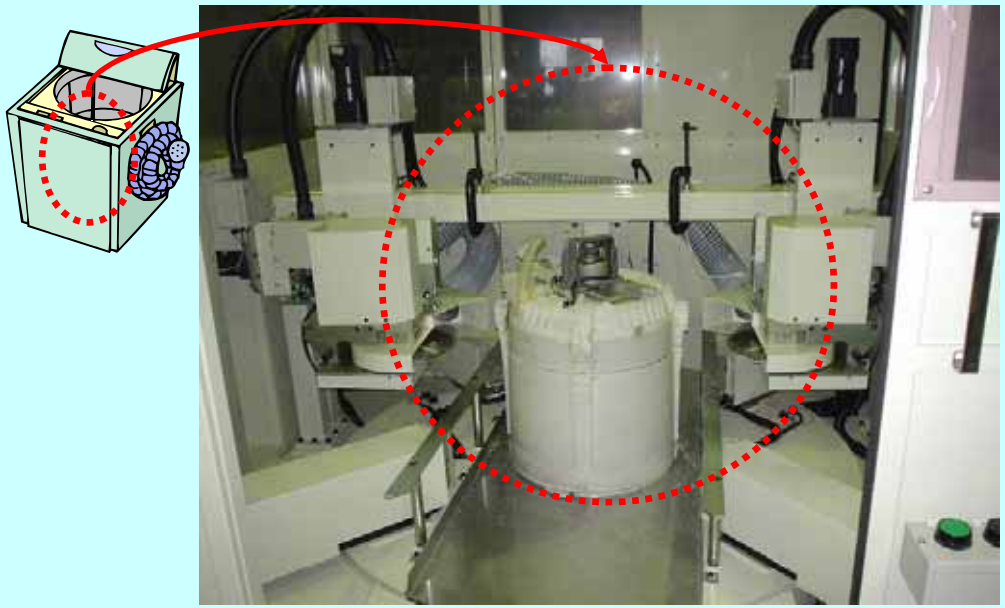
The service panel of an air conditioner

Clean up and refined pellet plastics

Example of Horizontal use material recycle:
From Refrigerator parts to Room air conditioner parts

The ‘Horizontal Self-recycling’ concept is now into practice:Case of Washing machines

Plastic collecting tool from inner body of washing machine



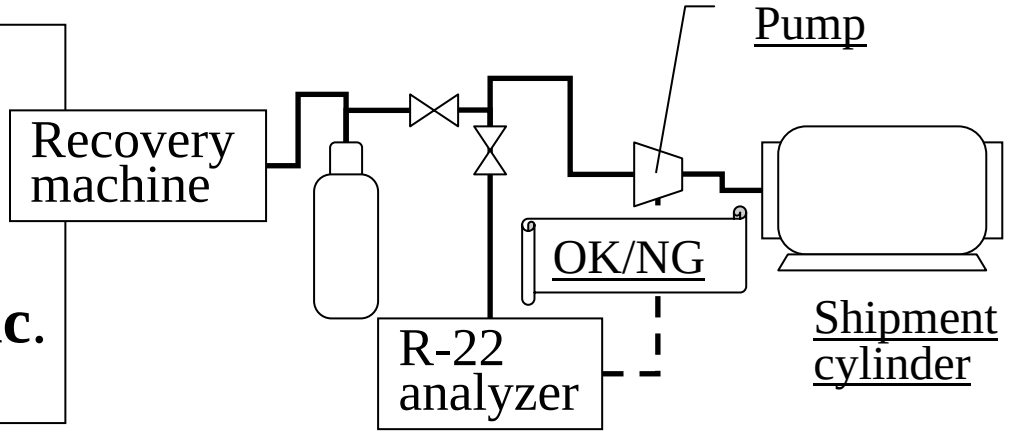
Crush,Cleaning and re-pelleting

Re-use for base plate of washing machine

Chemical Recycling of R-22

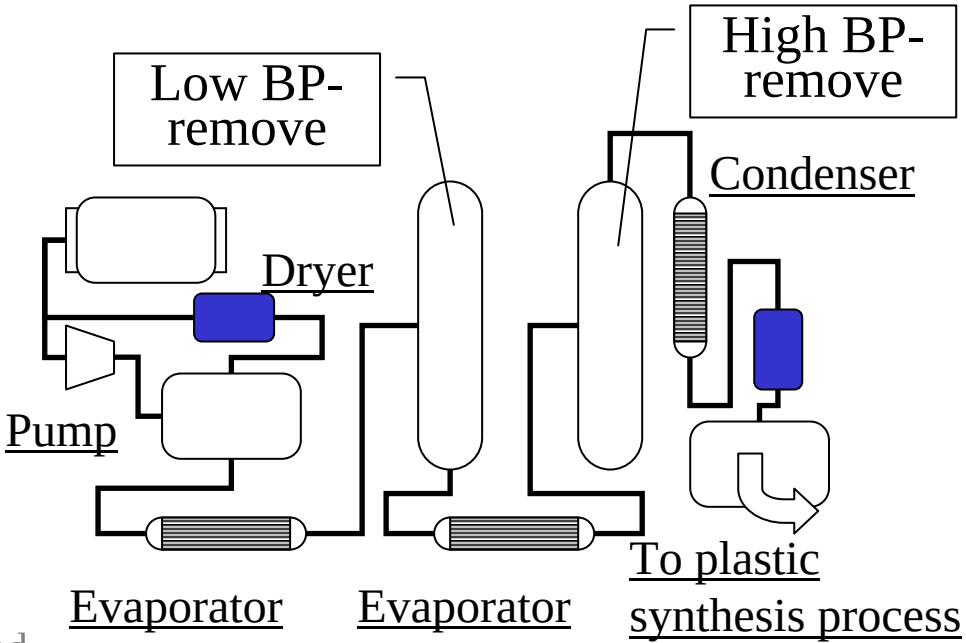
- **Development of the system to recover uncontaminated R-22.**

  By Mitsubishi Electric.



- **Development of the technology to concentrate the recovery R-22,and to apply the current plastic synthesis plant.**

  By Asahi Glass.



The example of Fluorinated Plastics applied to Fish grill Plate

Fluorinated Plastics Made from Recovered R22

Fish grill Plate coated by Fluorinated Plastics

IH cooking heater

Estimated flow of post-use electric appliances breakdown (at2003)

	Recycled by Official Recycling plants	Exported	Others (Ex. municipals)	Total wasted
TV	355(39.1%)	550(60.6%)	3(0.3%)	908(100%)
RAC	158(53.9%)	75(25.5%)	60(20.6%)	294(100%)
Ref.	266(77.1%)	50(14.5%)	29(8.4%)	346(100%)
W.M.	266(78.6%)	60(17.1%)	12(3.7%)	339(100%)
Total	1,046(55.5%)	735(39.0%)	105(5.6%)	1,886(100%)

Notice!: Just estimated data by hearing

×10,000units

Source: METI March 2005

Warning for re-use market

1. Warning about a spreading of E-Waste in developing countries.
2. Warning about diffusion and expansion of CFC,HCFC,and other environmental relevant materials.
3. Warning about illegal use of an intellectual property right. (In this W.S N/A)

Warning for a spreading of E-Waste in developing countries.

Almost Asian countries has preparing a law or some regulations of recycling system and recycling facilities.

And also has ratificated Basel Convention.

But …..

Re-used product on the market of developing country

Re-used room air conditioner

Not via recycling plants !!

∴So cold ‘gray markets’ in Japan

Recycling shop in developing country

Photo:2004

Advanced recycling plant in China

Photo:2004

Warning for diffusion and spreading of CFC,HCFC,and other environmental relevant materials.

Many used components, parts, materials are usually not adapted new environmental regulations especially material constitution or DFE (Design For Environment) .

Re-use components on the market of developing country

Re-use compressors
Photo: for the courtesy of Shinko research Mr.Kamiura

Not via recycling plants !!
∴So cold ‘gray markets’ in Japan

The recycling facility in developing country

Photo:2002 (Dismantling compressors)

Trade Regulation on Secondhand Electronics

Japan	**International trade of secondhand is not under control.**
China	**In 1998,Import of secondhand home appliance is prohibited.** **In 2000,import of e-waste is also prohibited.** **In 2002,import of crushed e-waste is also prohibited.**
Hong Kong	**International trade of secondhand is not under control.But a notice on distinction of secondhand and waste is issued by Environmental Protection Department,such as testing before shipment and proper packaging.**
Philippines	**Prior Notice and Consent is requested to import of electric assemblies.**
Thailand	**Copying machine that is less than 5 years old and other electronic product that is less than 3 years old can be imported**

Source Michikazu Kojima: Institute for Developing Economies – JETRO ERI 28
3R Initiatives International symposium at UNU April 28, 2005

Allowable re-use and should be regulate re-use

Just trial & private only classifications!!

Classification	Details
Re-use Should be promote	・Re-use products managed by manufactures themselves ・Re-use components managed by manufactures themselves
Re-use Something worrying	・Re-use by third parties (not authorized by original manufactures)
Re-use Should be regulated or prohibited	・Re-producing or rebuilding using another manufacture's components or parts ・Re- producing or rebuilding for the purpose of escaping environmental regulations.
Environmentally Relevant component	・ Mandate a destruction of a function ・ Not for re-use but for only material recycling

In-house Standard in case of exporting from Mitsubishi Electric recycling plant

1. From HCS
   The shipment (export) route to the treatment plants must be followed in the contract terms.
2. Import quota must be own slot.
3. The treatment plant must have corporate permission and the operational permit.
4. The export articles are contained in the permission items.
5. The treatment plants must have the policy of environmental measures turned to the future, and be improving environmental measures etc.
6. Must recycle them as a maximum as resources (partly can be landfilled etc.).
7. Must not reuse as the functional components.
8. In the incineration processing, must not cause environmental pollution.
9. In processing of landfill, must not cause environmental pollution.
10. The secondarily treatment facilities must have the policy same as or more than the primary treatment plants.
11. HCS to make audits the plants regularly.

∗HCS:Hyper Cycle Systems Corporation

In-house standard of functional destruction for used components

Components	Mandated operation guide
Compressor	• Discharge & collect Freon gas & oil • Drill to body or destroy electric terminals
Mortar	• Cut off coils or lead weirs
Capacitor	• Discharge & collect oil (Oil capacitor)
Deflection York	• Destroy core section or cutting off coils
Speaker	• Destroy crone paper
Transformer	• Cut off coils or lead weirs

Not for E-Waste

The case of printed circuit boards

Sorting

Crushing

Dismantling operation of printed circuit boards from TV sets at Mitsubishi Electric Hyper Cycle Systems Corporation Kyoto pref. Japan

Non ferrous smelting plants
Mitsubishi Material Naoshima Plant
Kagawa pref. Japan

Exporting materials from recycling plant
The case of Mitsubishi Electric Recycling plant

Materials	Exporting	Status
Metals	As materials	Via trading company (With auditing)
Plastics	As materials	Via trading company (With auditing)
CRT	As caret glasses	According to AEHA quality regulation
Printed circuit boards	Nothing	Treating in domestic smelters
Used components	Not existing	Strictly Prohibited to export from recycling plant by in-house regulation
Used components (Functional destroyed)	As materials	All components is not for reuse but for material recycling

- All these materials are not exporting directory but via trading company
- In-house Exporting regulation is strictly performed and audited by audit division
- AEHA: Associations for Electric Home appliances

Destruction of a function is carried out for the purpose of environmental protection

Collected used compressors

Source :Mitsubishi Electric Hyper Cycle Systems Corporation

Some proposals to prevent E-waste and promote a reasonable re-use

- Mandate a functional destruction to an environmentally relevant components when exporting to developing countries .
- Mandate a PL law to producers treating ‘re-use products’ or ’ re-build products’
- For promoting reasonable re-use, the regulation and management control is necessary not only importing sides but also exporting sides.

Just trial & private only proposals!!

Conclusions

- **Japan's Home Electric Appliance Recycling Law has brought about unexpected breakthroughs in Japanese electric and electronics Industries.**
- **One is a qualitative shifts in DFE which depends on the information from recycling plant.**
- **Another is a field of used plastics, the 'Horizontal self-recycling concept ' is now into practice.**
- **On the other hands ,a new worrying problem of an environmental pollution has become clear in case of re-use markets treating with secondhand products and components .(ex. compressors)**
- **For promoting an appropriate re-use, some trial proposals are introduced .**

Thank you very much for your kind attention!