

## Recycling and waste management activities in Japan and Southeast Asia

DOWA ECO-SYSTEM CO., LTD.

Juillet 2022

# 1. Overview of DOWA's Business

## Overview of DOWA Holdings Co., Ltd.

- Founded 1884 in Japan
- Capital Stock JPY 36.4 billion
- Net Sales (FY2022) JPY 831.8 billion
- Employees approx. 7,400 (March 2022)

5 Business companies

**Environmental  
Management  
& Recycling**



**Dowa Eco-System**

**Smelting  
Nonferrous  
Metals**



**Dowa Metals & Mining**

**Electronic  
Materials**



**Dowa  
Electronics Materials**

**Metal  
Processing**



**Dowa Metaltech**

**Heat  
Treatment**



**Dowa Thermotech**

# Origins for Recycle-Oriented Society

## Company History

DOWA ECO-SYSTEM began operations as a mining and smelting company in 1884. By combining know-how in operation and concentration with its smelting technologies, infrastructure and transport network, DOWA ECO-SYSTEM has been able to successfully transform its core business away from mining and smelting to environmental business.

### 1884 Mining business founded



### 1977 Environmental recycling business started



### 2003 Environmental recycling business started in Asia



### 2014 "Motivate Our Planet" brand vision adopted

2016 Committed to boosting circular economy through Advanced Waste Management



## The Origin

Mining and Metal smelting.  
 Hazardous material handling.  
 Metal Recovery  
 Heat Treatment  
 Environmental Protection

 *Diverted into*

New Business Trend of;  
 Hazardous-waste Management  
 Precious Metal Recovery  
 Home Appliances Recycling  
 Waste-to-Energy Operation



### 1. Waste Treatment

Collection of mainly industrial waste and some municipal waste, and treatment of waste.



### 2. Metal Recycling

Recycle of precious metals from waste and scraps, such as factory discharge, discarded home appliances and end-of-life vehicles.



### 3. Soil & Groundwater Remediation

Investigation and remediation of soil & groundwater contaminated by heavy metals (lead, arsenic, etc.), oils and Volatile Organic Compounds (VOCs).

### 4. Logistics

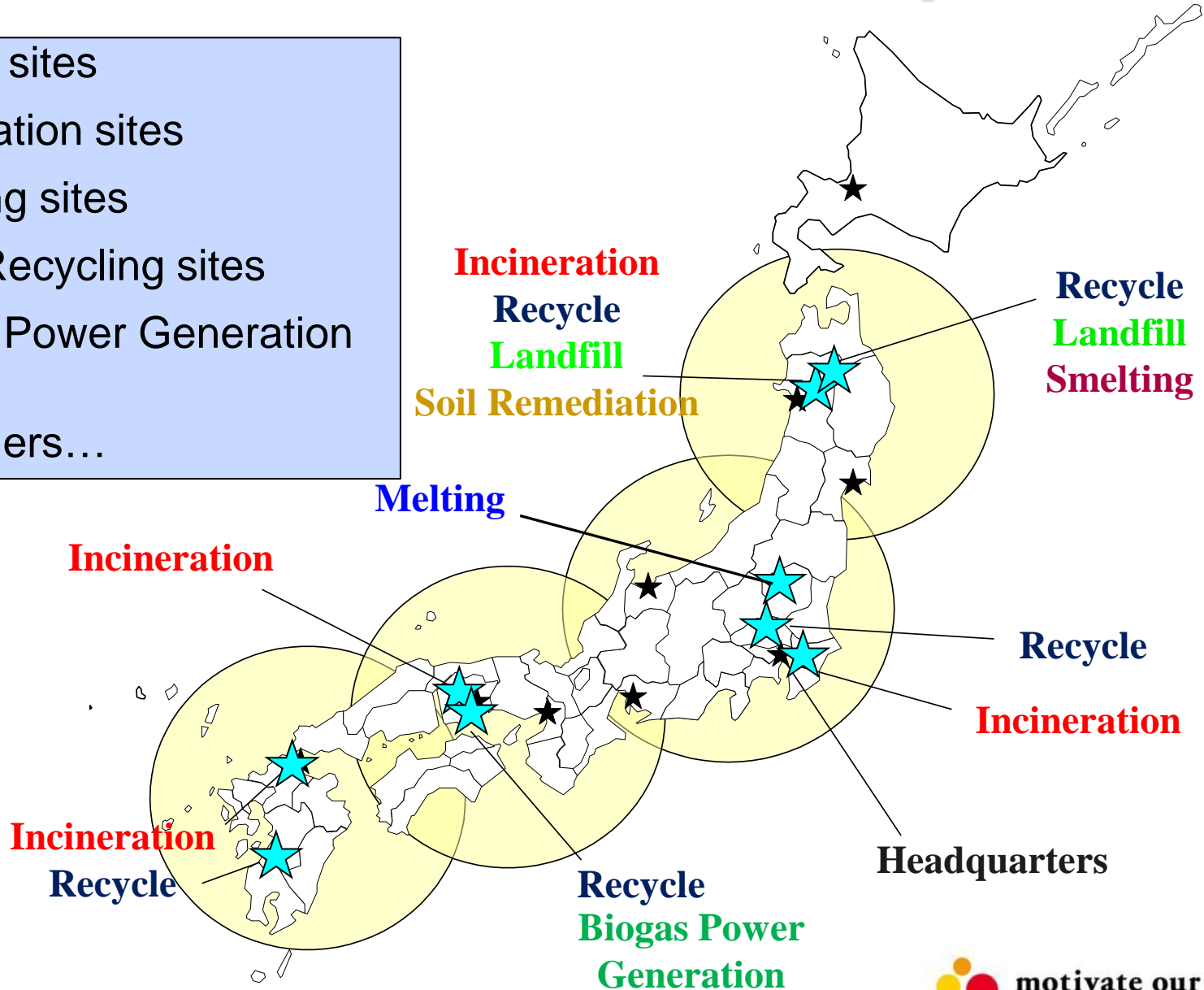
Transportation of waste and recyclable materials mentioned above.



## 2. DOWA's Network in Japan and Southeast Asia

# DOWA's Network in Japan

- 2 Landfill sites
- 4 Incineration sites
- 1 Smelting sites
- 3 Metal Recycling sites
- 1 Biogas Power Generation sites
- and others...



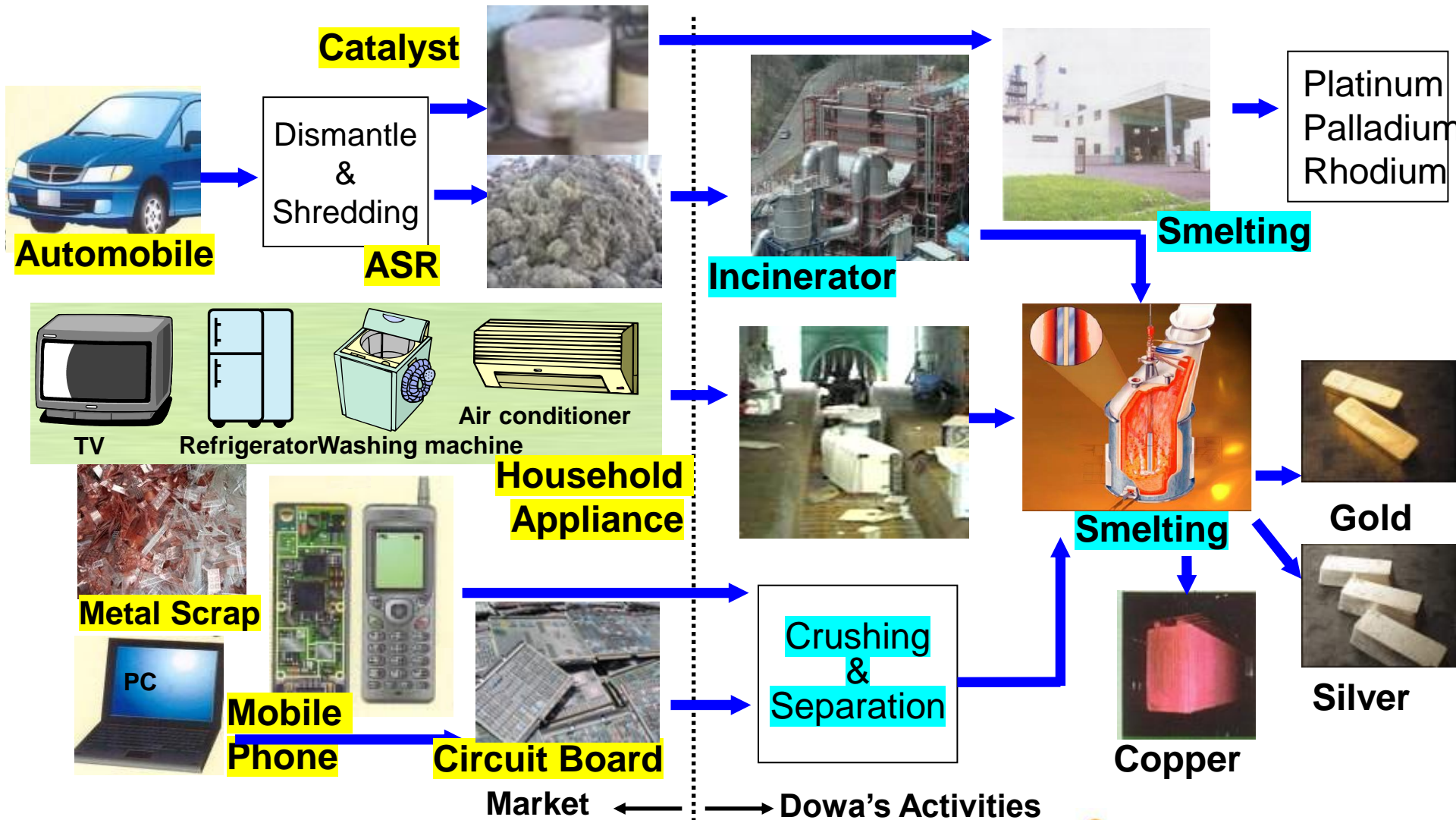
# DOWA's Environmental Management and Recycling in Asia





## 3. Metal Recycling

## Metal Recycling Process



# Smelters / Refineries Complex of DOWA



Complex dirty Ore

**DOWA Group Network**

Incinerator  
Crushing  
Separation etc.



E-Waste

**IJIMA Zinc Refinery**



Residue  
Pb,Ag,Au,Cu      Zinc hydroxide

**KOSAKA Copper Lead Smelter & Refinery**



Ga	Ge
Zn	In

Cd

**H<sub>2</sub>SO<sub>4</sub>**

**Cu**

**Au,Ag**

Pb

Bi

Sb

Ni	Sn
----	----

Se	Te
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**PGM Pt,Pd,Rh**

UMICORE-HOBOKEN (Belgium)

**DOWA-KOSAKA (Japan)**

XSTRATA-HORNE(CANADA)



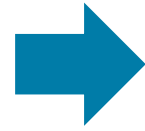
## 4. Recycling for Home Appliances

# Home Appliance Recycling Law of Japan

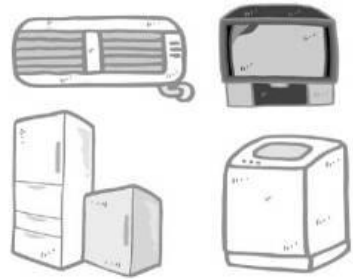
## Recycling Flow of Home Appliances



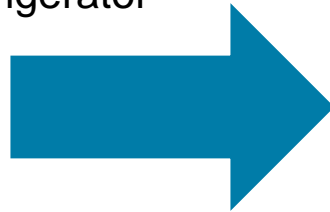
- Enacted in 2001.
- Washing machine, ACs, TV, and Refrigerators are to be recycled by the Law.
- Reduction of disposal volume to landfill and illegal dumping.
- Recovery of precious metals and other materials.
- Pollution prevention of heavy metals, CFCs, etc.



# Home Appliance Recycle



TV  
Washer  
Air conditioner  
Refrigerator

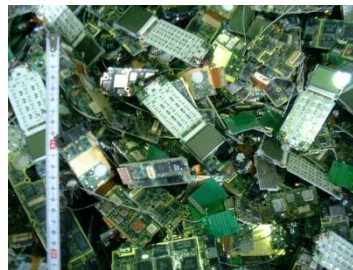


Disassemble  
into parts/  
material



<Technology required for effective use of resources>

- Sorting materials by type
- Identify type of material (difference in specific density, near infrared rays)
- Freon recovery technology



Printed circuit board

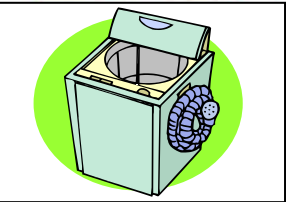


Metal parts



Non metal parts

# DOWA Dismantling Process



**Refrigerator  
Air conditioner**



Collecting lid



Collecting motor



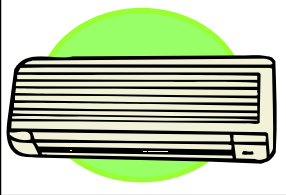
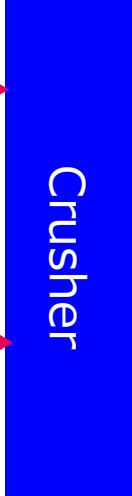
Collecting reduction gear



Removal of salt water



Crushing



**Washing machine**



Collecting CFC



Collecting motor & CB



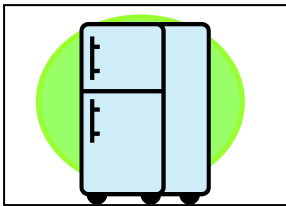
Collecting heat exchanger



Collecting compressor



Outer frame



**CRT-based TV**



Collecting plastics



Collecting rubber packing



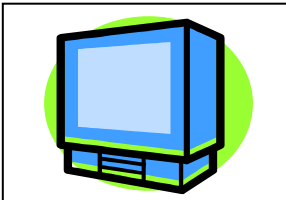
Collecting compressor



Collecting CFC



Crushing



**Flat-screen TV**



Collecting rear cover



Collecting CB & speaker



Collecting deflection yoke



CRT is taken out



Collecting shadow mask



Collecting cover



Collecting CB



Collecting liquid crystal

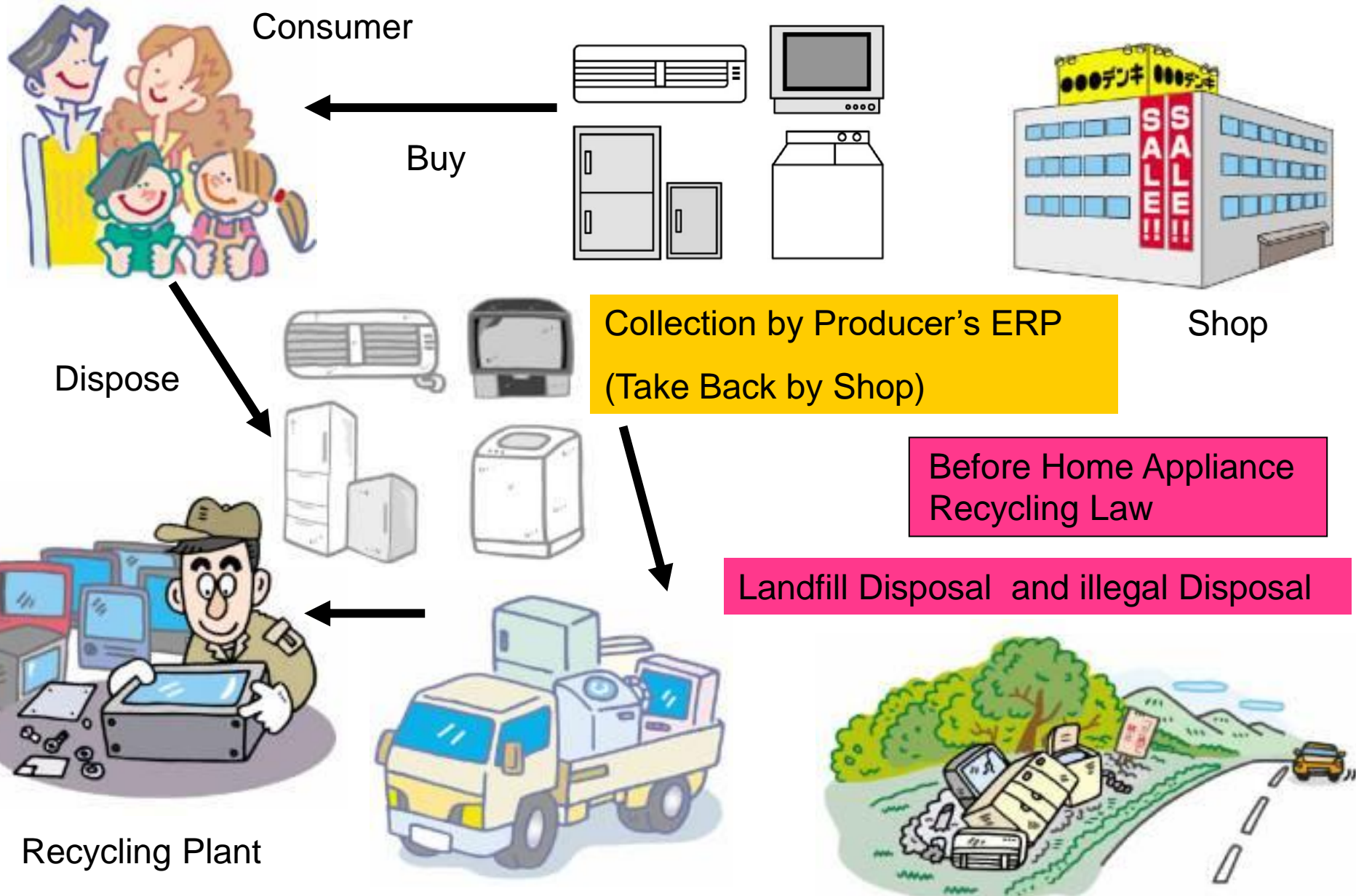


Collecting film



Collecting back light

# Home Appliance Recycling Law





# Recycling Standard

	2001~	2009~	2015~	Result 2020
Air Conditioner	60% or more	70% or more	80% or more	<b>92%</b>
TV (Braun Tube)	55% or more	55% or more	55% or more	<b>72%</b>
TV (Liquid Cristal)	-	50% or more	74% or more	<b>85%</b>
Refrigerator	50% or more	60% or more	70% or more	<b>81%</b>
Washing Machine	50% or more	65% or more	82% or more	<b>92%</b>

*Ministry of the Environment, Japan*

Recycling Standard = Material Recycling + Thermal Recycling

# Certified Recycling plants in Japan

- A group 28
- B group 15
- A B 2
- total 45**

株式会社拓琉  
リサイクル研究センター

株式会社拓琉金属

Eco-Recycle (DOWA)

北海道エコリサイクル  
システムズ株式会社

東日本リサイクル  
システムズ株式会社

西日本家電リサイクル株式会社

株式会社  
関東エコリサイクル

株式会社  
ハイパーサイクルシステムズ

東京エコリサイクル株式会社

Act-B (DOWA)

JFEアーバンリサイクル  
株式会社

株式会社フューチャー  
・エコロジー

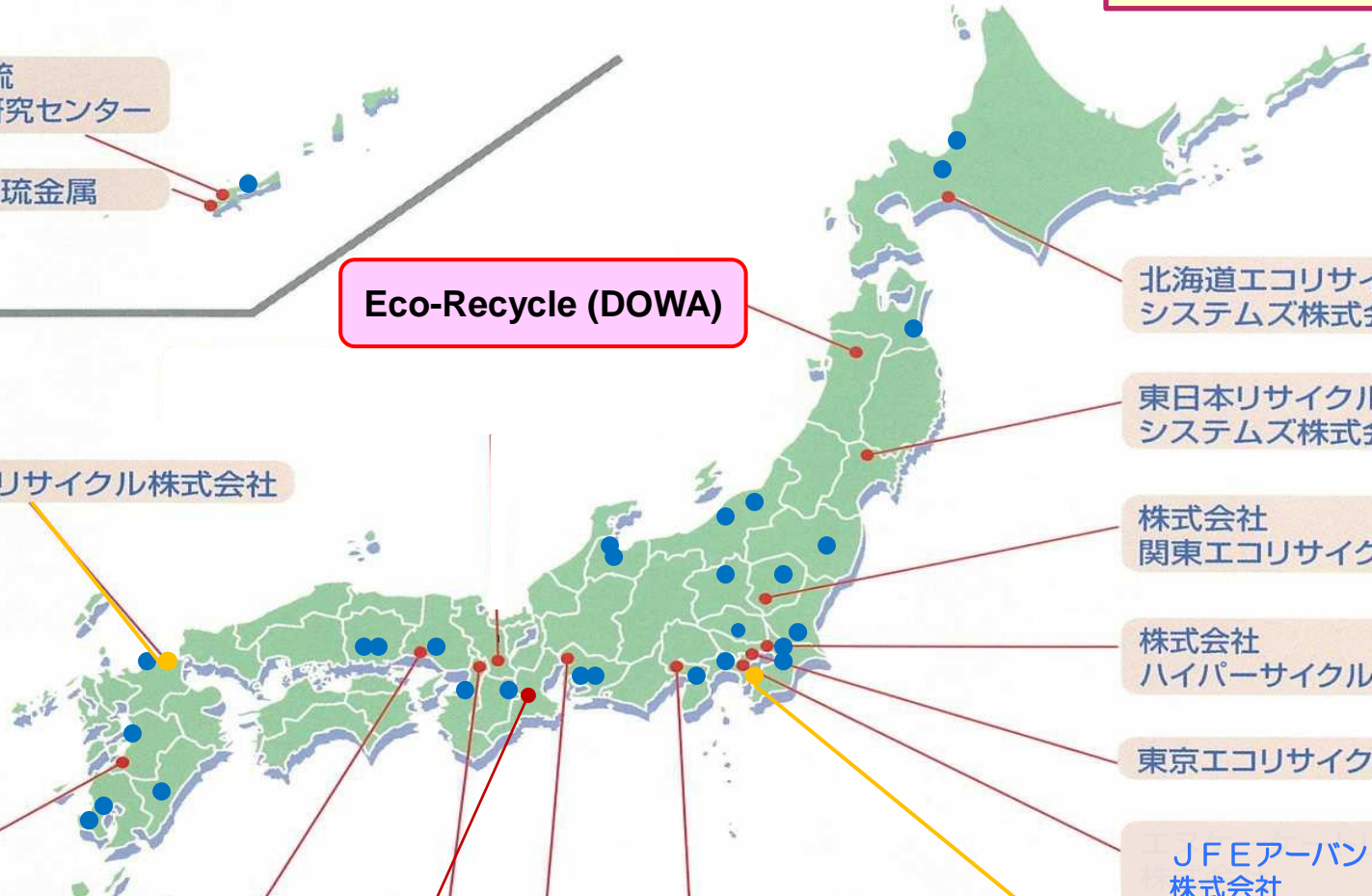
株式会社アール・ビー・エヌ

株式会社富士エコサイクル

グリーンサイクル株式会社

関西リサイクルシステムズ株式会社

関西リサイクルシステムズ(株)第二工場



# CFCs Treatment in DOWA



End Users



Dispose



Collection and Storage



CFCs Extraction



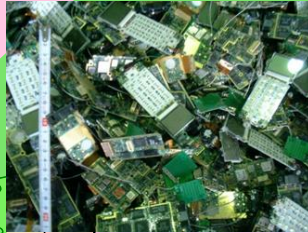
Stored in Cylinder



Thermal Destruction

# 3R Framework in Asia

**Recycling and suitable treatment system in each country.**



**Establishment of inter-Asian recycling system**

# Key Points from our experience

## **1. Collection**

How to collect recyclables/waste efficiently.

## **2. Recycle/Treatment**

How to treat recyclables/waste properly, flexibly.

Expansion of processing menus in line with local trends in environmental laws and regulations and changes in the industrial structure.

## **3. Waste to Energy, New Technology**

Promote energy recovery and reuse, and to recycle the recovered materials as much as possible.

# Thank you



DOWA ECO-SYSTEM CO., LTD.

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