

e-waste recycling at DOWA

November 7th ,2018

DOWA ECO-SYSTEM CO.,LTD.

Introduction of DOWA

e-waste recycling

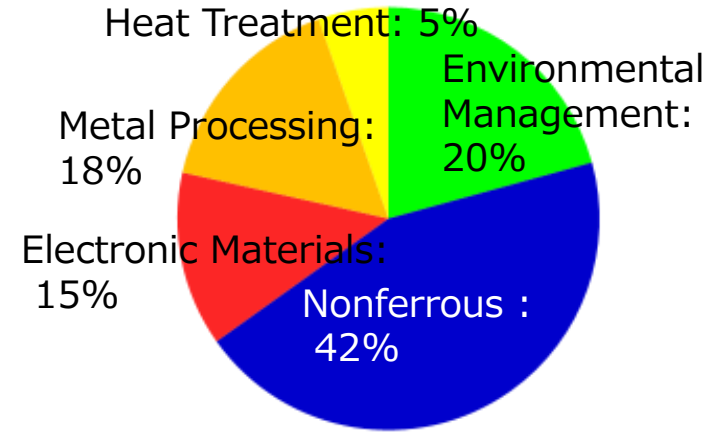
Global expansion

eco-friendly recycling system in Asia

DOWA Group

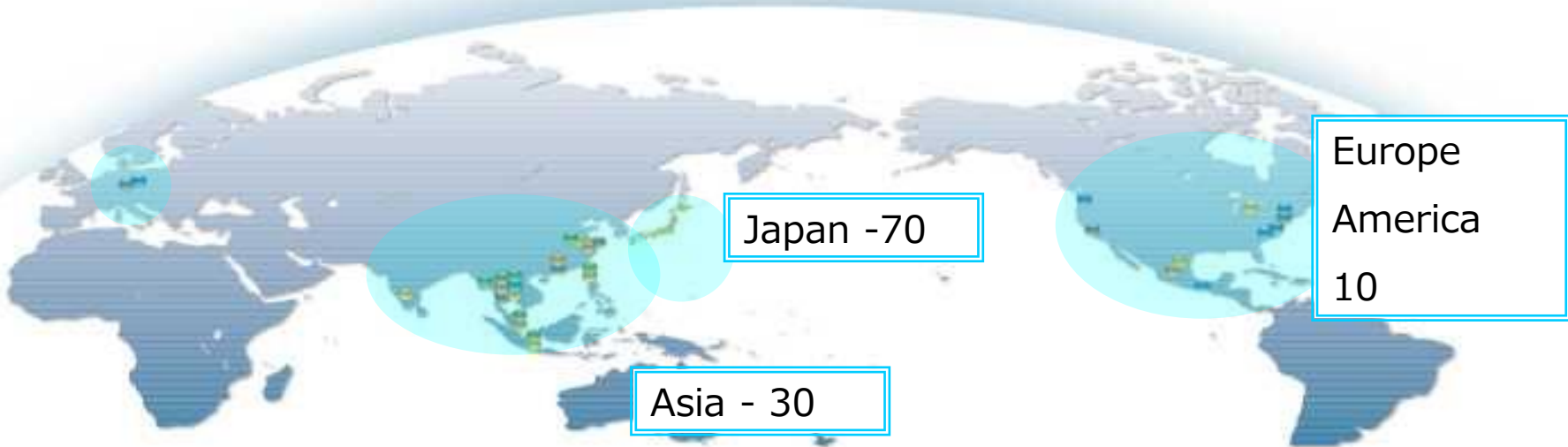
- **Foundation** 1884
- **Capital** 330million USD
- **Sales** 4,280million USD ※
- **Employee** 6,500 ※
- **DOWA Global Activity**

...Over100 Network



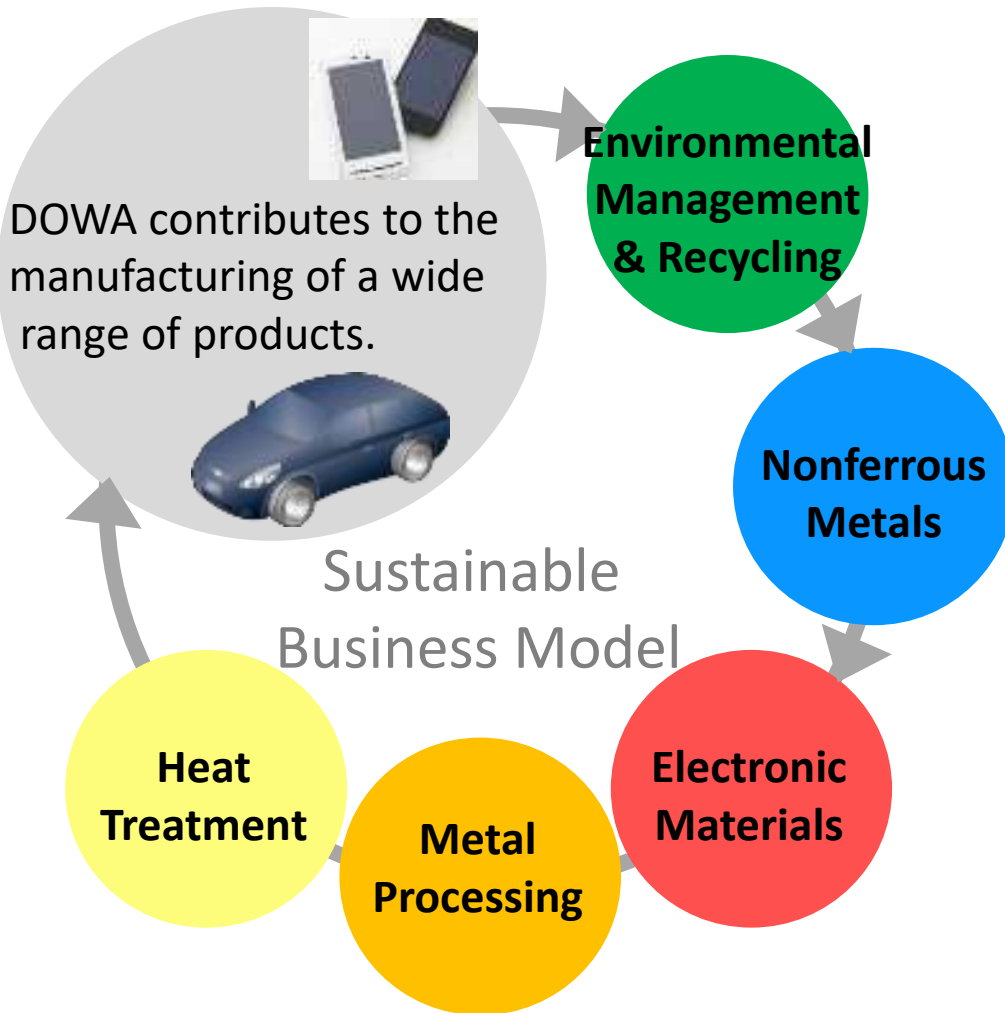
Sales by Business Segment ※

※ Fiscal Year 2017



Five Core Businesses

DOWA Group comprises five main businesses diversified from its success in mining and smelting operations.



Environmental Management & Recycling —DOWA ECO-SYSTEM CO.,LTD.—

Offering comprehensive services in waste treatment, soil remediation, and recycling.

Nonferrous Metals —DOWA METALS & MINING CO.,LTD.—

Recovering of more than 20 types of metal from various raw materials.

Electronic Materials —DOWA ELECTRONICS MATERIALS Co.,LTD.—

Developing cutting-edge technologies in making semiconductors, electrical and magnetic materials.

Metal Processing —DOWA METALTECH CO.,LTD.—

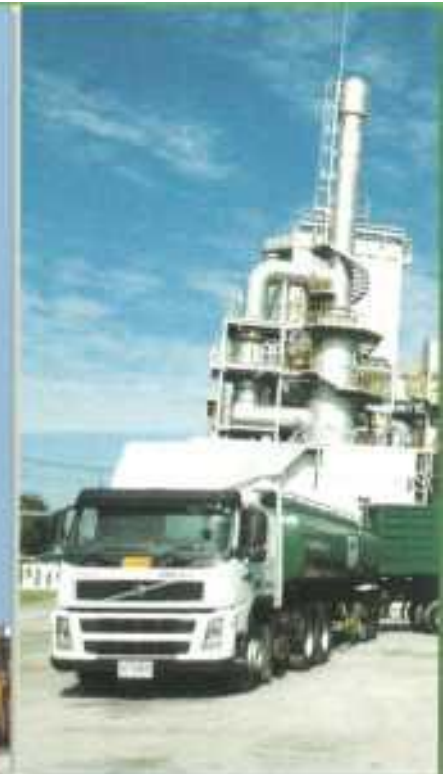
Supplying high-performance copper alloys, electroplated products and metal-ceramic substrates.

Heat Treatment —DOWA THERMOTECH CO.,LTD.—

Supplying industrial furnaces and high quality commercial heat treatment services.

DOWA ECO-SYSTEM

- **Sales** 928million USD ※ ※ as of Mar 2018
- **Employee** abt2,500 ※ -abt50% employees in overseas-
- **Services**



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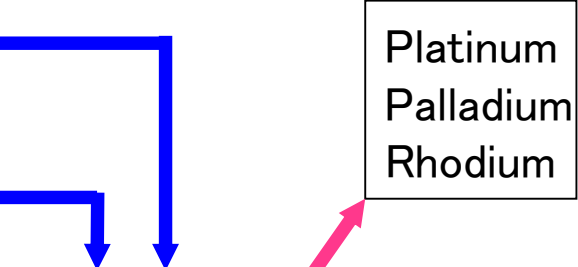
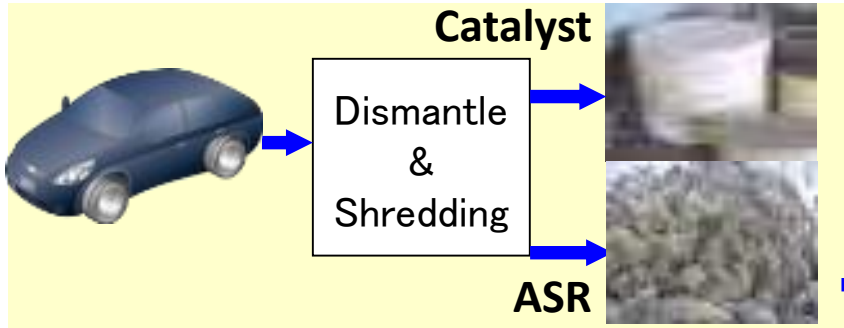
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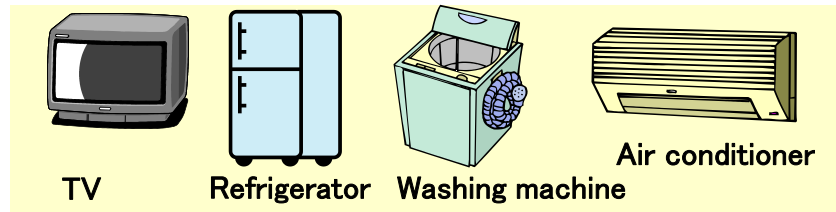
Overview – Focus Metal Recycling

ASR **Market** **Dowa's Activities**
Automobile - Domestic ← →



Platinum
Palladium
Rhodium

E-waste
Household Appliance - Domestic

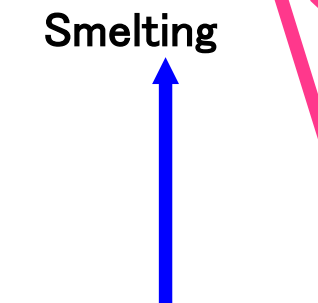
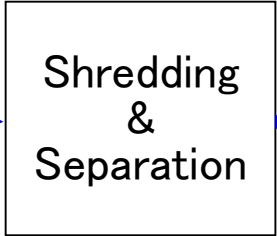


Gold



Silver

E-scrap - World Wide



Copper

Household appliance dismantling

(AC/WM/RE/TV)



Eco-Recycle

- Capacity: 150K unit per year
- Employee : 50
- Operation : since 2001
- ☞ Dismantling by manual operation
Flexible operation

Eco-Recycle

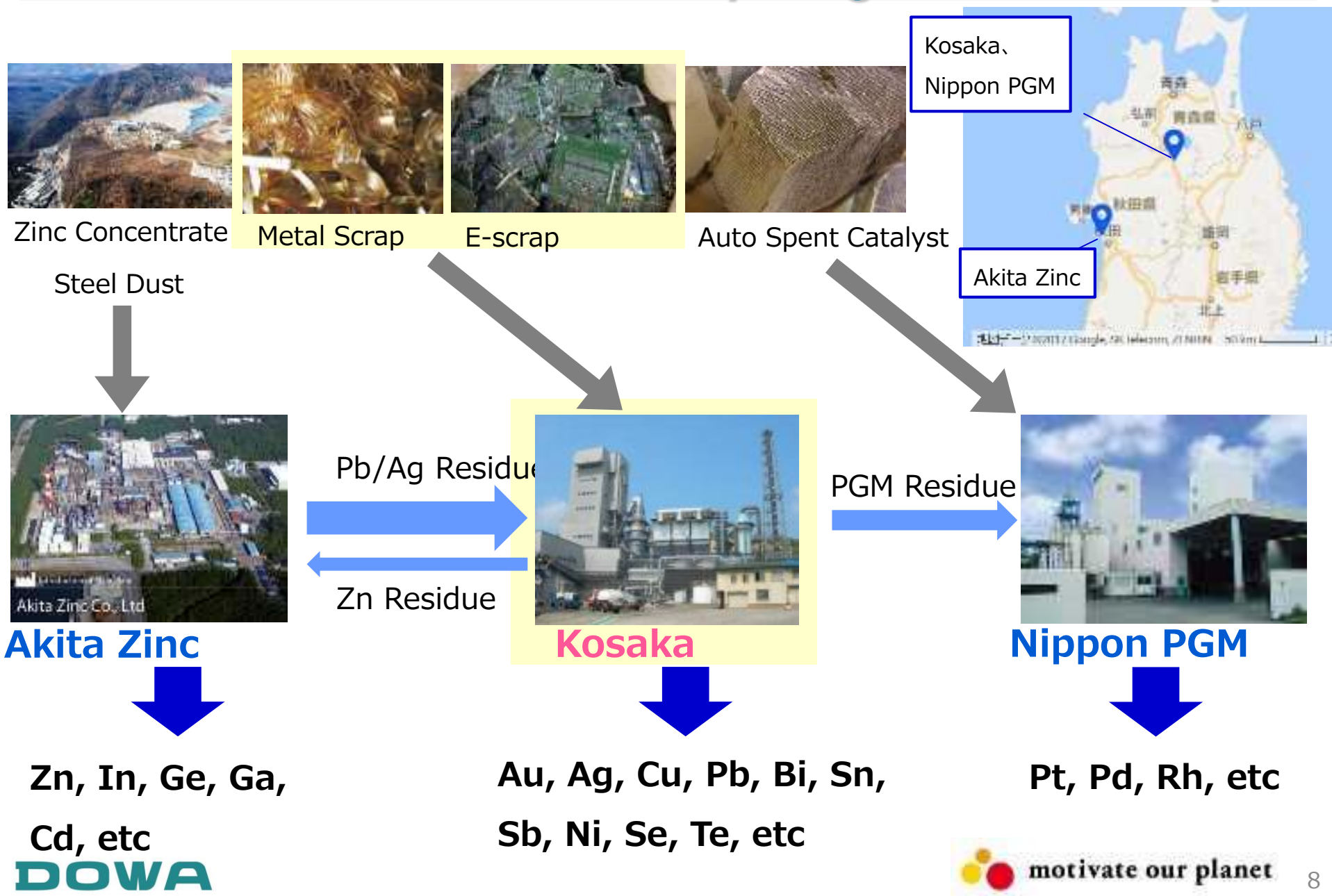
Act-b



Act-b Recycling

- Capacity: 300K unit per year
- Employee : 80
- Operation started from year 2001
- ☞ High efficient operation supported by automation.

Extract Various Metals – Recycling Smelter complex



History of Kosaka

Silver
Mining/Smelting

1861 Silver Vein found / Start Mining by Gov
1884 Mine disposed of by Gov to DOWA

Copper
Mining/Smelting

1902 Start Open Pit Mining (**KUROKO**)
Start Complexed Copper ore Smelting



Complex materials
Custom Smelting

1980 Start E-scrap smelting
/Overseas concentrate

1985 High Yen recession

1994 Domestic mines closure

Recycling Smelting

2008 Install
New Furnace / Process

Component	KUROKO	General Conc.
Au	50 g/t	20
Ag	1500	150
Cu	20 %	28 ~ 30
Pb	4	0.1 ~ 0.3
Zn	5	0.1 ~ 0.4
As	0.5	0.01 ~ 0.04
Sb	0.5	0.01 ~ 0.03
Bi	0.04	<0.01

【Kosaka】

Advanced Smelting Technology for complex material

- Various Metals recovery
- Safety treatment of Hazardous



motivate our planet

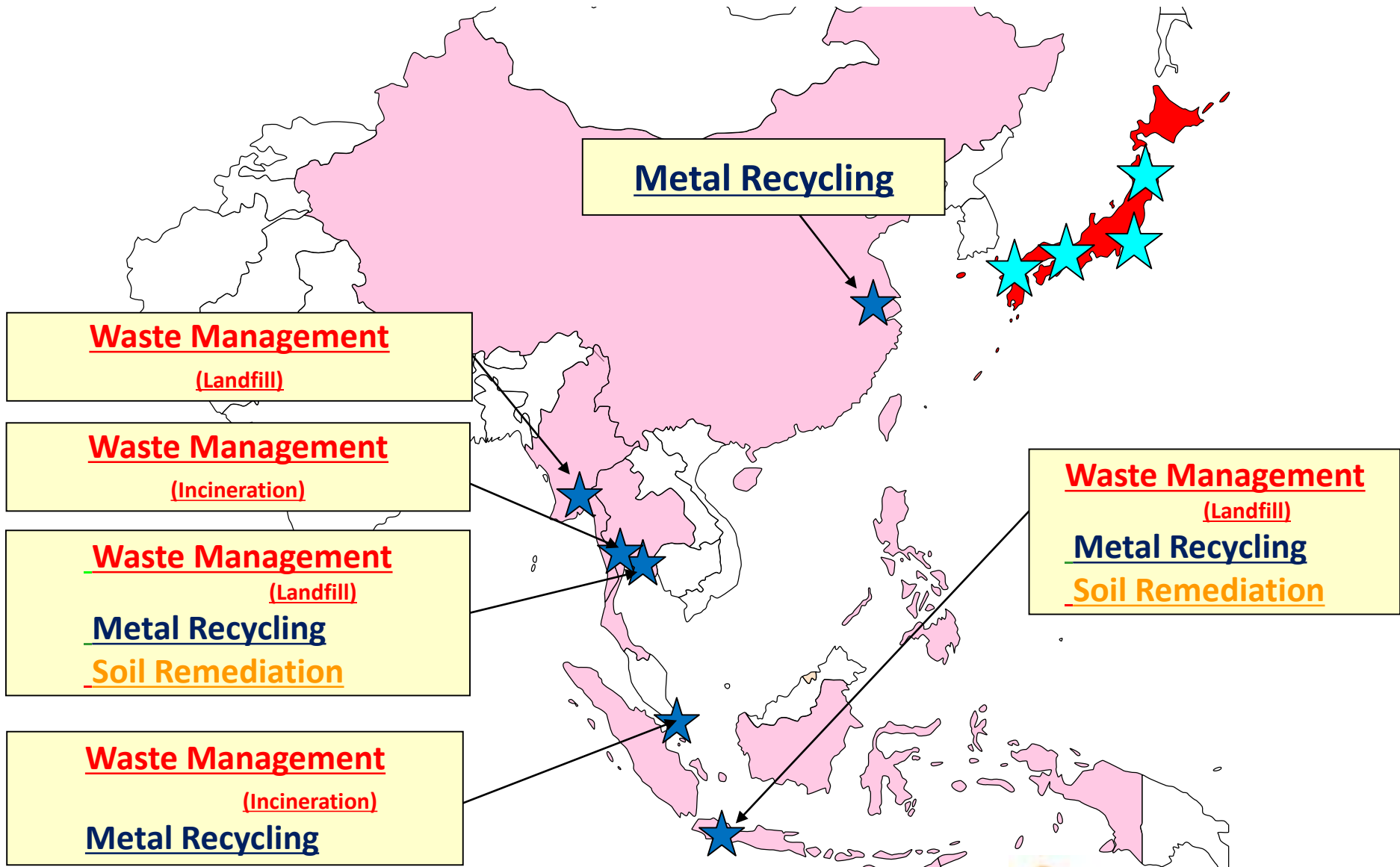
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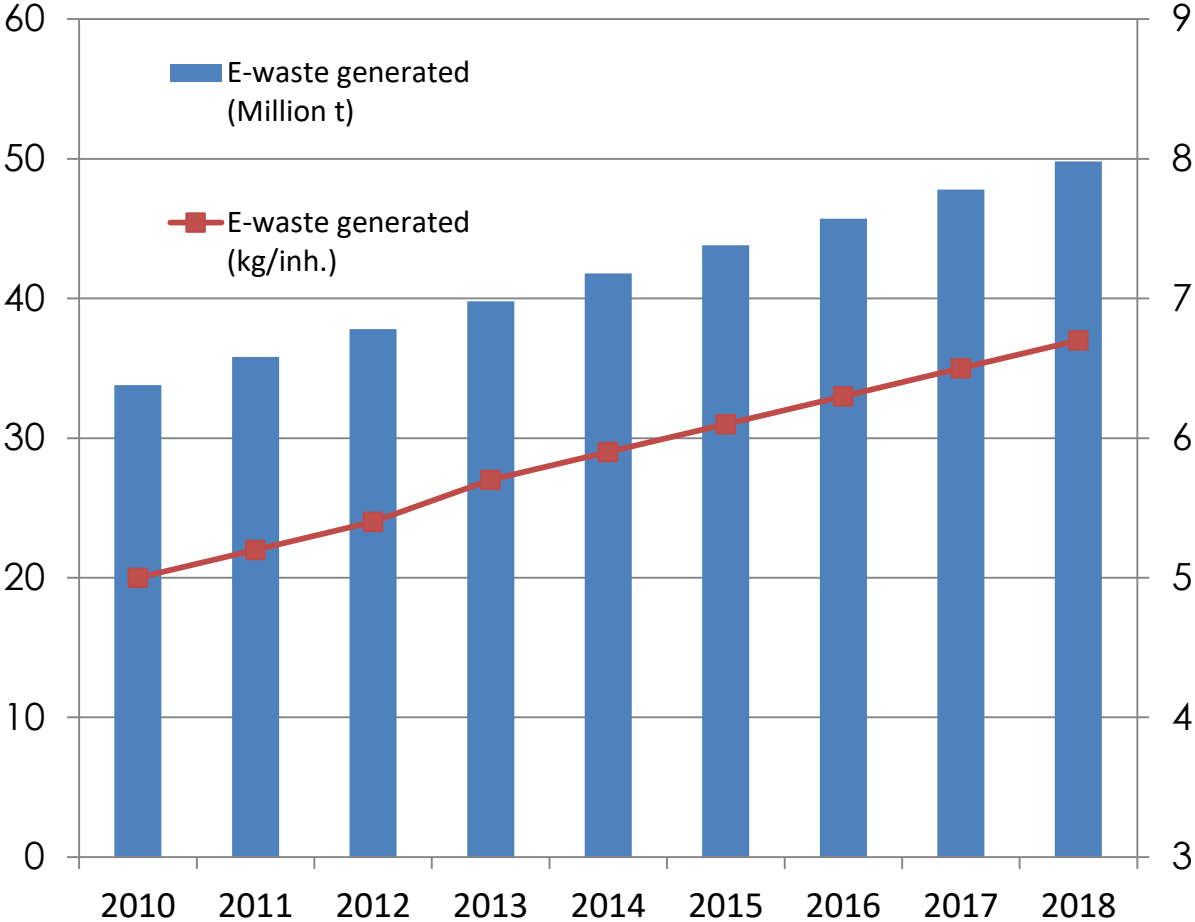
Global expansion

eco-friendly recycling system in Asia

DOWA's Network in Asia



Global quantity of E-waste generated



*Data: UN University report
•Global E-Waste Volume Hits New Peak in 2014

Global trade of E-waste

Global Marketing Network

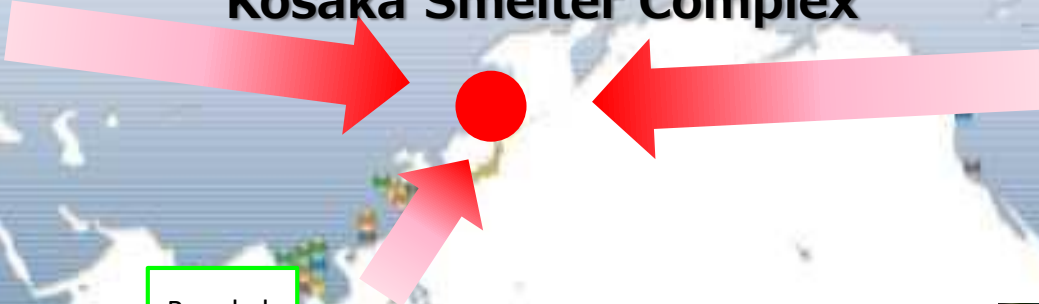


Kosaka Smelter Complex

Nurnberg

NY

Bangkok



Auto Spent Catalyst



Printed Circuit Board

China



DOWA environmental management Co., Ltd



- **Company** **DOWA Environmental Management Co., Ltd.**
 - **Foundation** 2003
 - **Business Activity** Precious Metals recycling, Electronic appliances recycling
- ➔ **The first Japanese company to advance environmental / recycling business in earnest.**

Singapore



- **Company** **DOWA ECO-SYSTEM SINGAPORE Pte.**
 - **Foundation** 2012
 - **Business Activity** Precious Metals Recycling
- ➡ **Precious metal recovering through Chemical process**
Pretreatment for Kosaka smelter complex

Thailand (Incinerator and Landfill)



Bangpoo Environmental Complex Co., Ltd. (BPEC)

A Joint Venture Project with Industrial Estate Authority of Thailand (IEAT)



Eastern Seaboard Environmental Complex Co., Ltd. (ESBEC)

Landfill for Non Hazardous waste, Waste blending, WWWE recycling.

Indonesia (Landfill & Integrated Waste Management)



PT. PRASADHA PAMUNAH LIMBAH INDUSTRI (PPLi)

5% share owned by Indonesian Government.

Only one integrated waste management facility in Indonesia.

Myanmar (Landfill)



GOLDEN DOWA ECO SYSTEM MYANMMAR Co., Ltd.

**420,000 m² area in Thilawa Special Economic Zone.
Just started operation in Dec/2015.**

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JMIA Members

Approach for traceability e-waste from overseas

Japan Mining Industry Association (JMIA)

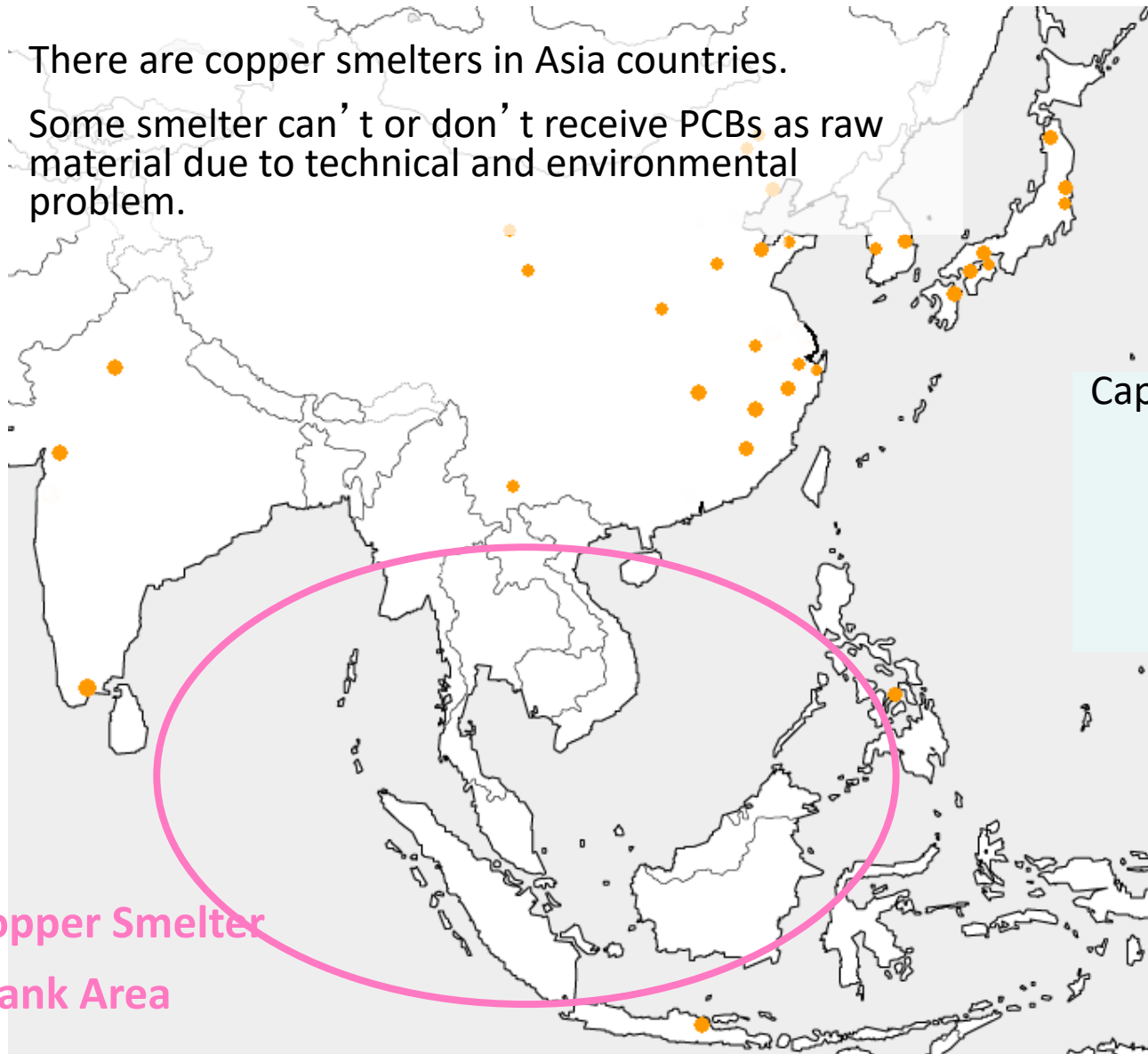
Industrial organization representing mining and smelting companies producing non-ferrous metals such as gold, silver, copper, lead, zinc and nickel in Japan.



Proper recovery precious and base metal from E-Scrap in Asia

There are copper smelters in Asia countries.

Some smelter can't or don't receive PCBs as raw material due to technical and environmental problem.



Capacity ton per month

Japan : 17,000 ton

Korea : 5,000 ton

China : ???

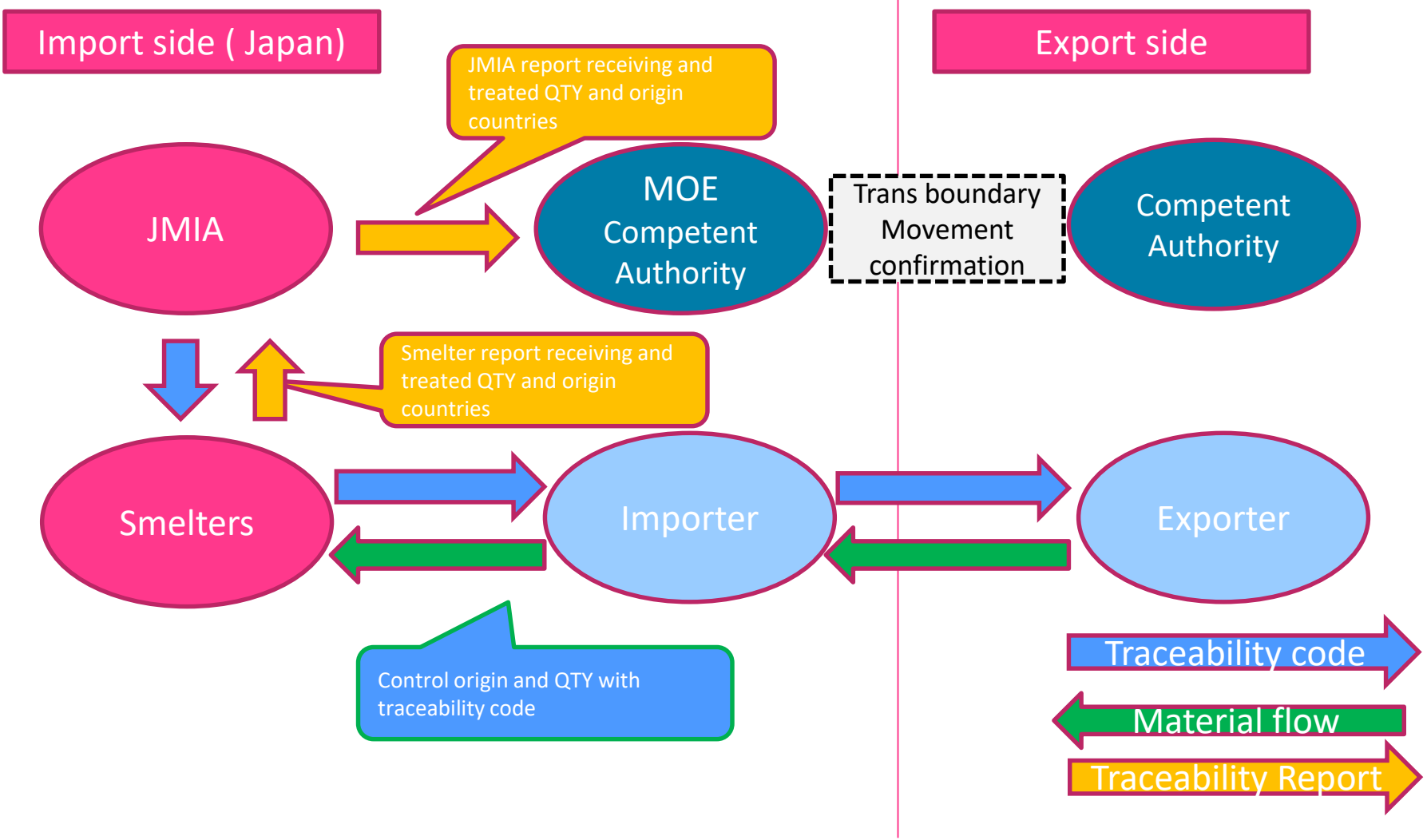
(non official data)

● Copper smelter location

Copper Smelter

Blank Area

Green List items traceability system



Smelters Compliance with JMA rule

List of establishments that declare compliance

2018.8.1

Company	Plant	Address
DOWA HOLDINGS CO.,LTD	KOSAKA SMELTING & REFINING CO.,LTD	60-1, Otarube, Kosakakouzan, Kosaka-machi, Kazuno,Akita, 017-0202, Japan
DOWA HOLDINGS CO.,LTD	ECO-System Recycling CO.,LTD. East Japan Plant	1781-3 Nitte, Honjo-shi, Saitama-ken, 367-0002, Japan
DOWA HOLDINGS CO.,LTD	ECO-System Recycling CO.,LTD. West Japan Plant	1 Chome-3-1, Kaigandori, Minami-ku, Okayama-ken, 702-8045, Japan
DOWA HOLDINGS CO.,LTD	ECO-System Recycling CO.,LTD. Northern Japan Plant	Sugisawa-96, Kosakakozan, Kosaka-machi, Kazuno-gun, 017-0202, Akita-ken, Japan
MITSUI MINING & SMELTING CO., LTD.	Takehara Refinery	1-5-1, Shio-machi, Takehara-shi, Hiroshima, 725-0025, JAPAN
Kamioka Mining and Smelting Co., Ltd.		1-1 Shikama, Kamioka-cho, Hida City, Gifu, 506-1196 JAPAN
Mitsui Kushikino Mining Co., Ltd.	Recycling & Smelting Plant	12955 Mitsui, Ichiki Kushikino, Kagoshima, 869-0068, Japan
Sumitomo Metal Mining Co., Ltd.	Toyo Smelter & Refinery	145-1, Funaya-Aza-Shinchi-Otu, Saijyo, Ehime 793-0005, Japan
Ohkuchi Electronics Co., Ltd.		1755-2, Ohkuchi-Ushio, Isa, Kagoshima 895-2501, Japan
Mitsubishi Materials Corporation	Naoshima Smelter & Refinery	4049-1 Naoshima-cho, Kagawa-gun, Kagawa 761-3110, Japan
Onahama Smelting & Rifining Co., Ltd.	Onahama Smelter & Rifinery	1-1 Nagisa, Onahama, Iwaki-shi, Fukushima 971-8101, Japan
JX Nippon Mining & Metals Corporation	HMC Department, Hitachi Works	3453, Miyata-cho, Hitachi-shi, Ibaraki 317-0055 JAPAN
JX Nippon Environmental Services Co., Ltd.		3453, Miyata-cho, Hitachi-shi, Ibaraki 317-0055 JAPAN
Pan Pacific Copper Co., Ltd.	Saganoseki Smelter & Refinery	3-3382 Saganoseki, Oita-shi, Oita-ken 879-2201, Japan
JX NIPPON MIKKAICHI RECYCLE CO., LTD.		8, Tenjinshin, Kurobe-shi, Toyama 938-0042 Japan
JX NIPPON TOMAKOMAI CHEMICAL CO., LTD.		152, Yufutsu, Tomakomai-shi, Hokkaido, 059-1372, Japan
JX NIPPON TSURUGA RECYCLE CO., LTD.		1, Wakaizumi-cho, Tsuruga-shi, Fukui 914-0027 Japan

Expanding traceability e-waste in Asian network (Stop informal materials flow)

Encourage eco-friendly recycling system in Asia

Exchange information of regulation and law for e-scrap each countries.

Establish common rule for e-waste materials movement in Asia

Simplification a permission exporting e-waste to authorized Japanese smelters

Speed up approval of transit e-waste to Japan



Dowa Future

- Contributing to environmental improvement in Asia
- Contributing to Recycling-oriented society
- Expanding services - Low-Carbon emission



Thailand -donate the school library-



Malaysia -donate the school facility



motivate our planet

Our Mission at DOWA ECO-SYSTEM is to discover, nurture and bring to life the ideals of people and companies who share our planet