

DOWA's Environmentally Sound Management of E-waste

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DOWA ECO-SYSTEM CO., LTD.

Overview of DOWA Group

Founded	1884 in Japan
Net Sales	JPY 588 billion (USD 4.1billion)
Employees	7,200
Global Network	over 100 plants and offices



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

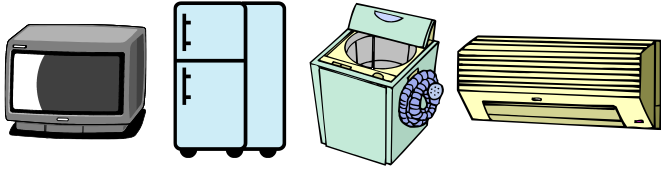
DOWA's Waste Management & Recycling

Inputs

E-scrap



Home Appliance



Automobile Shredder Residue



Industrial waste



Outputs

Nonferrous Metals Precious Metals



Secondary Materials (Fe, Al, Plastics, etc.)

Energy

Landfill / Road material

Dismantling, Separation



Intermediate Treatment (Incineration/ WtE)



Smelting

-Pyrometallurgy
-Hydrometallurgy



Extract Various Metals – Recycling Smelter complex

Collaboration of 3 smelters enables efficient recovery of various metals without environmental pollution



Zinc concentrate, Steel dust



Metal scrap



Printed circuit Board, etc.



Auto spent catalyst



Akita Zinc

Zn, In, Ge, Ga, Cd, H₂SO₄

Residue
(Ag, Pb, etc.)

Zn residue



Kosaka Smelting & Refining

**Au, Ag, Cu, Pb, Bi, Sn,
Sb, Se, Te, NiSO₄, etc.**

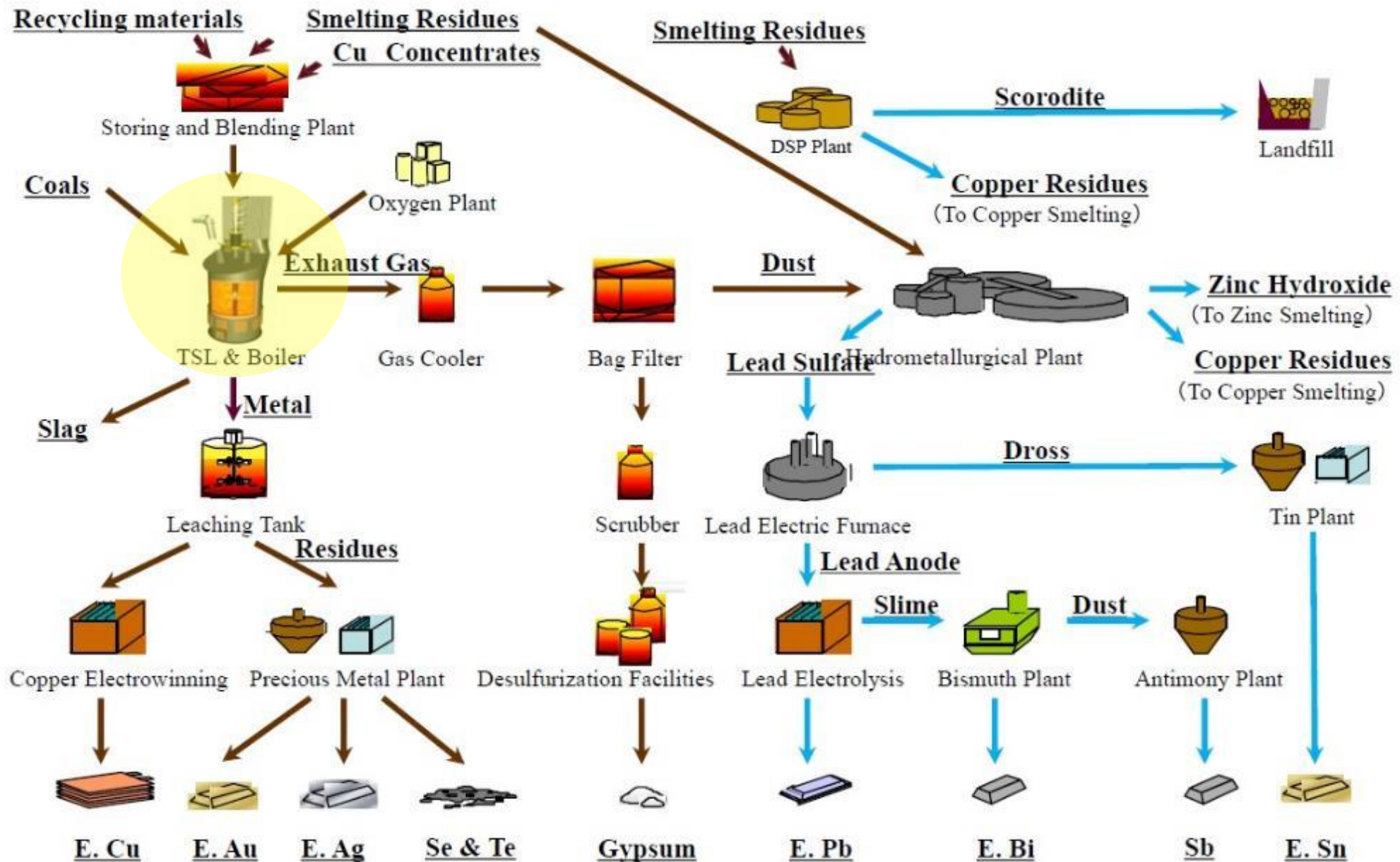
PGM
residue



Nippon PGM

Pt, Pd, Rh

Process Flow of Kosaka Smelting & Refining



Our Global Trade of E-Waste

Global Marketing Network



Kosaka Smelter Complex

Nurnberg

NY

Bangkok

Singapore

Jakarta



Auto Spent Catalyst



Printed Circuit Board

Topics: Changing E-waste flow in Asia

Changing E-waste Flow

Southeast Asia

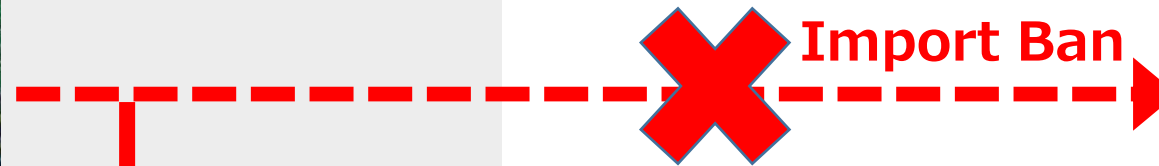


E-waste

Import based on the Japanese Basel Law



Importer
(Japan)



Import Ban

Importer

Pollution
(Air, Soil, Water)

Improper
Smelter



Crude Metal

- ✓ Recently, the number of small smelters in Southeast Asia has been increasing.
- ✓ In many cases, they lack exhaust gas treatment technology and may cause environmental pollution.
- ✓ Japan is promoting international resource circulation.

DOWA's challenge :

Home Appliance Recycling in Thailand

Roleplay Simulation WEEE in Thailand

WMS, DOWA's subsidiary in Thailand, conducted roleplay simulation of WEEE recycling cooperated with governmental agency. Fluorocarbons were recovered and destroyed.



DOWA's challenge :

Li-ion Battery Recycling

Li-ion Battery (LIB) Recycling

✓ **Rapidly growing of LIB waste stream**



✓ **To be more important to circulate critical metals (Co, Ni, Li, etc.)**

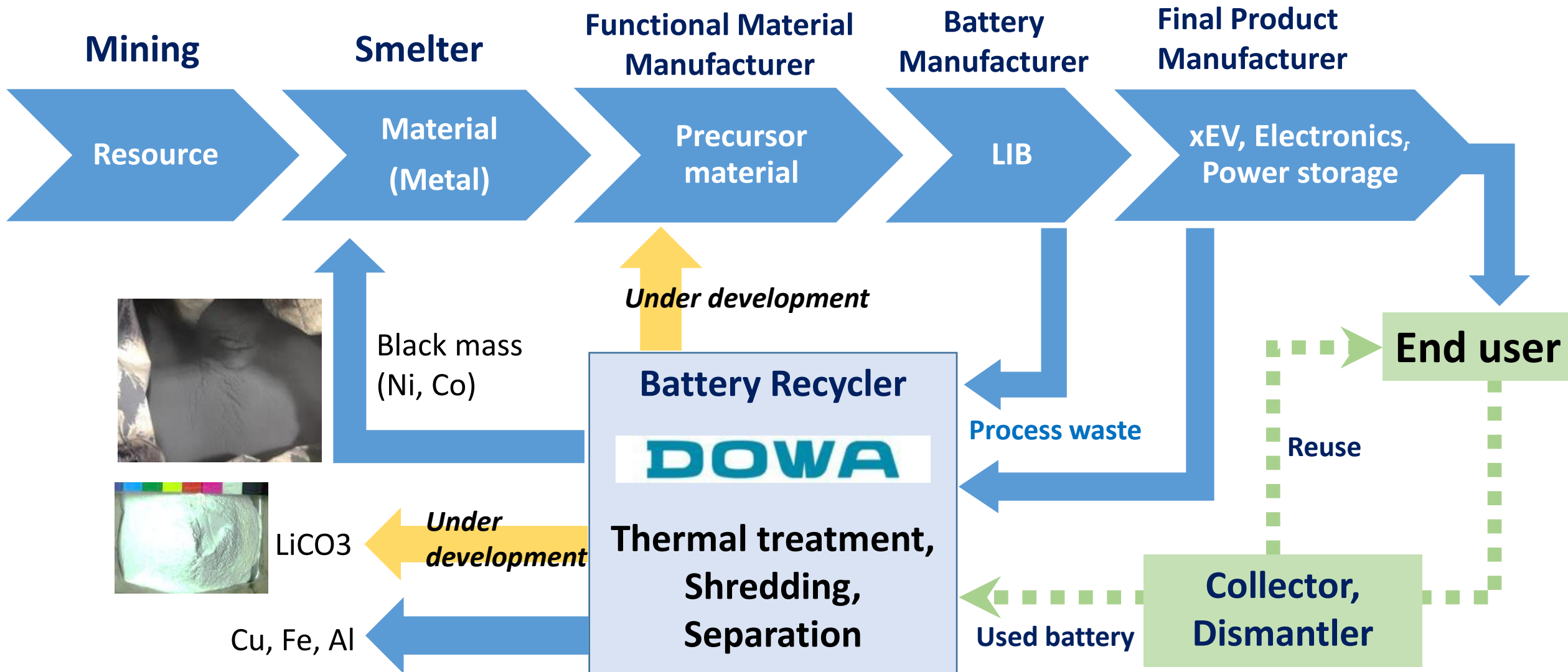
✓ **LIB recycling involves HSE Risks**

- Electrical shock
- Fire and/or Explosion
- Easy to generate harmful acid (HF)



DOWA has developed a safe and efficient recycling process that combines thermal treatment and physical separation.

Recycling loop of LIB



Thank you.



<https://www.dowa-eco.co.jp/en/>