



**motivate our planet**

# DOWA Group Companies

## E-Scrap Recycling @ DOWA Global Environmental Business

DOWA Group is providing environmental management services in the fields of recycling, waste treatment, Soil remediation and logistics etc. using our extensive experience and technological expertise developed in our long-standing history in Japan.

- DOWA ECO-SYSTEM takes advantage of our advanced technology which was originally developed in DOWA's long-standing mining and refine operations to extract precious metals such as gold and silver that are present in ores in very small concentrations
- Currently, we can recycle as many as 22 different metallic elements using advanced metallurgical technologies. The recovered metal resources are brought back into society as newborn products such as accessories, electric substrates, films, electrical wires, Solutions, catalyst, shield and so on.



## MAEH Served

- Electronics
- Electroplating
- Hospitals
- Pharmaceutical



## Our Services

We process a wide scope of difference materials, from high grade components to low grade waste materials

- Assurance in-house recovery and treat
- Cleaning services
- Advice of the process and ensure customers maximize their recovery
- We assured our customers 100% of all material received, processed in-house. And guarantees no chance of customers touchy innovation appeared in the market.



Scrap Film



Scrap LED Lead Frame



Scrap Flex/Trim



PCB Board

A circular graphic of a green tree with many small leaves, symbolizing a recycling process.

We Recover  
Precious  
Metal from  
Various form  
of materials

## The wide variety of metal recycling



CPU



Mobile phone



Conector



Circuit Board



Metal scrap



Metal scrap



Au

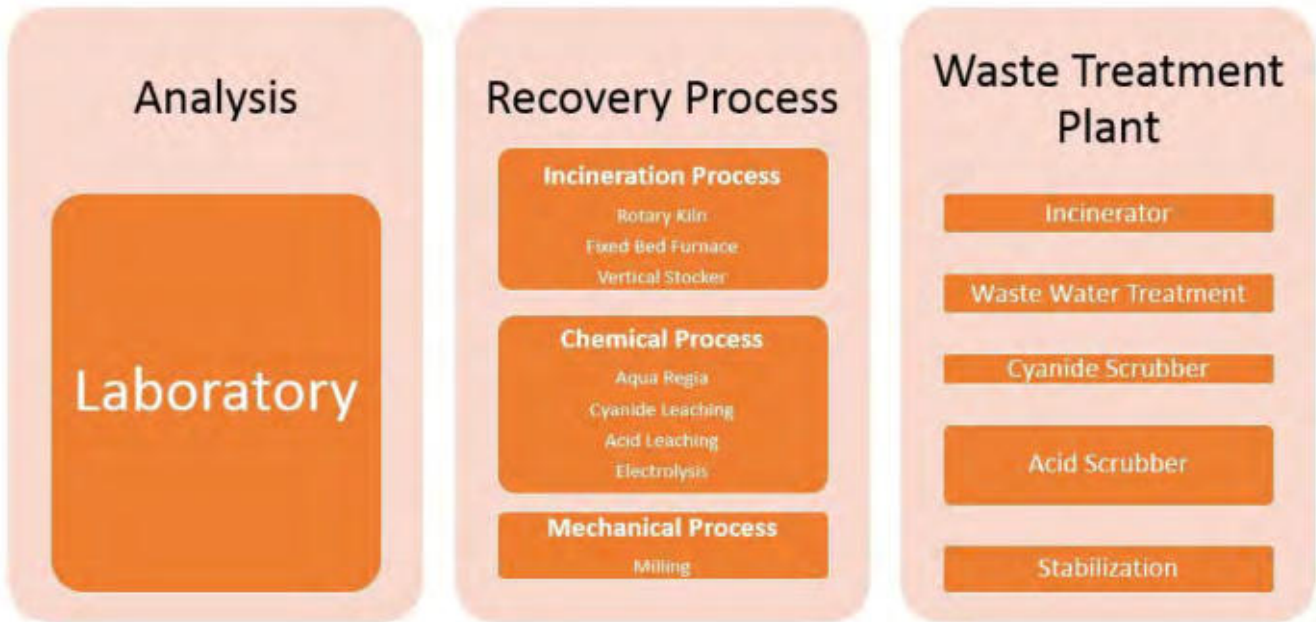


Ag



Cu

# Our Facilities And Process



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## Laboratory

Our In-house Lab facility basic is to guarantee ideal execution of our recuperation procedure, along these lines expanding valuable metal recuperation.

Clients' materials are sent to our in-house Lab for analysing and to decide their valuable metal substance.

Our Lab uses a mix of drying, pounding, processing, screening and partitioning strategy to plan agent tests for concoction process and decide the metal content by utilizing Inductive Coupled Plasma (ICP- OES)

## **Incineration Process**

This process is designed for materials that couldn't directly treat with only chemical process. (eg. Resin, Filters, sludges, wipes, wafer die attached with plastic)

Through incineration, a better reaction surface is achieved in the ashes form and therefore more efficient for further precious metal extraction.

## **Chemical Process**

Cyanide leaching removes gold from materials with surface or visible gold (eg. LED Lead Frame, connector, Shield, Target, PCB Board etc.).

As this process involves cyanide, all relevant safety and security measures are strictly implemented and adhered to for maximum safety to operators and the environment.

Materials are loaded into titanium barrels and then immersed into a cyanide-based solution for particular evacuation of surface gold. The resulting gold-saturated solution is then sent for electrolysis for further gold recovery.

Acid leaching extracts precious metals that are embedded in solid electronic scraps. Materials are fed into reaction tank where they are dissolved. The precious metals present in the liquid are then extracted by selective precipitation.

Electrolysis recovers gold from gold-saturated solutions. Gold present in the solution are plated onto the cathodes. The resulting gold flakes are then removed from the cathodes for further recovery & refinery.

# **Our Commitment**

## **Governance**

- We will aim at being an open, transparent company to society
- We will respect international agreements and strive to prevent corruption such as bribery
- We will make procurement considering CSR

## **Safety**

- All employees will take part spontaneously in safety activities to improve the level of safety and hygiene in the workplace, based on our basic philosophy of “safety is the top priority.”
- We are committed to preventing accidents at work and supporting health of employees.

## **Environment**

- We will provide customers(Clients and local communities) with products and services that contribute to building a resource-recycling society.
- We will reduce environmental burden and risk in our business activities
- The management and employees together take part in environmental conservation activities
- We will promote business activities considering biodiversity

## **Society**

We will promote social contribution appropriate with community standards together communities

**DOWA**

**DOWA**

**DOWA Holdings official opening of the new  
Modern Asia Environmental Holdings  
26 April 2019**

**Coverage Report**



## DOWA

<b>Date</b>	26/4/2019
<b>Publication</b>	The Business Times
<b>Headline</b>	Dowa launches new Modern Asia Environmental Holdings in Singapore
<b>Link</b>	<a href="https://www.businesstimes.com.sg/consumer/dowa-launches-new-modern-asia-environmental-holdings-in-singapore">https://www.businesstimes.com.sg/consumer/dowa-launches-new-modern-asia-environmental-holdings-in-singapore</a>

THE BUSINESS TIMES

## Dowa launches new Modern Asia Environmental Holdings in Singapore

The merged entity will offer incineration, recycling and precious metal recovery capabilities under one roof



From left: Mr Kobayashi, president, MAEH; Japanese ambassador to Singapore Mr Yamazaki; guest-of-honour Mr Tan, CEO, National Environment Agency; and Mr Kimio Matsumoto, director, Dowa Eco-System Co Ltd. The opening of MAEH in Singapore will bring pioneering waste management technology to S-E Asia, putting the region closer to realising a zero-waste circular economy. PHOTO: MODERN ASIA ENVIRONMENTAL HOLDINGS

Singapore

JAPANESE waste management and recycling solutions provider Dowa has announced the formation of the new Modern Asia Environmental Holdings (MAEH), the result of a merger of existing Dowa facilities in Singapore, Technochem Environmental Complex Pte Ltd (Technochem) and Dowa Eco-System Singapore Pte Ltd (ESG).

The merged entity will offer incineration, recycling and precious metal recovery capabilities under one umbrella.

Technochem specialises in water treatment, industrial cleaning services, incineration of waste and the sale of solvents and chemicals. It also runs Dowa's first vertical combustion incinerator outside Japan, and the first of its kind in South-east Asia, where most incinerators tend to lie flat.

Last updated 26/4/2019

### DOWA ECO-SYSTEM Consolidates Singaporean Subsidiaries and Holds Inaugural Ceremony for New Company MAEH

## DOWA

Date	26/4/2019
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THE BUSINESS TIMES

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By Jay Parmar  
jayp@spn.com.sg

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This incinerator occupies a smaller physical footprint than most, and uses a super low air ratio combustion method to reduce fossil fuel consumption.

ESG, meanwhile, focuses on precious metal recovery using a hydrometallurgy process. This enables it to recover gold, silver and palladium from electronic waste, such as printed circuit boards.

At a ceremony on Thursday to mark the merger, National Environment Agency chief executive officer Tan Meng Dai stressed the growing importance of managing both toxic industrial waste and waste from electronic products – the two core business areas of MAEH.

"The Environmental Services industry is a key partner in Singapore's journey towards becoming a zero-waste nation," he said. "I am heartened to note that MAEH has taken a proactive business optimisation approach to better synergise their business operations in Singapore."

MAEH president Hidaki Kobayashi said MAEH could contribute significantly to "the creation of a zero-waste circular economy that will sustain the long-term development of South east Asia".



From left: Mr Kobayashi, president, MAEH; Japanese ambassador to Singapore Mr Yamazaki, guest of honor; Mr Tan, CEO, National Environment Agency; and Mr Kanno Matsumoto, director, Dowa Eco-System Co Ltd. The opening of MAEH in Singapore will bring pioneering waste management technology to S-E Asia, putting the region closer to realising a zero-waste circular economy. PHOTO: MODERN ASIA ENVIRONMENTAL HOLDINGS

"Singapore provides us with an excellent environment to test bed some of our state-of-the-art waste management and recycling solutions," he added.

Also at the event was Japan's ambassador to Singapore Jan Yamazaki, who praised Dowa's efforts to protect the environment and the "mark they have made in South east Asia".

Dowa isn't done yet. Having developed proprietary ash smelting technology to produce slag from ash – which can be used for road construction – and implemented it in Japan, MAEH has plans to bring it to the Republic in the near future.

Founded in Yamaguchi prefecture in 1884, Dowa now has overseas operations in Singapore, Indonesia, Myanmar and Thailand, with a staff strength of almost 1,500 across the region.

Last updated 26/4/2019



## **motivate our planet<sup>®</sup>**

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



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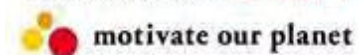
## ABOUT US

*MAEH is a premier solutions provider of industrial chemical waste management services in Singapore.*

*We deliver safe and proper total waste management solutions that are in compliance with local, as well as international standards.*



A member of **DOWA**



### *Factory*

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KOSAKA is the origin of DOWA. KOSAKA is located in the northern part of Japan (TOHOKU area).



DOWA was started as a mining company. In order to treat Complex Ore (Black Ore), DOWA invested in smelting technologies.



KOSAKA Mining was a leading Non-ferrous Mine in Japan.



DOWA Office of Mining Business in the old days in KOSAKA.



Current DOWA Head Office in Tokyo. Our environmental business is the biggest within the 5 business entities.



Eco System Chiba is the biggest incinerator near Tokyo in Japan. DOWA owns many Environmental Technologies which contributes to society.



Green Fill Kosaka is the biggest landfill, which is located in north Japan, near Kosaka.



Recycling factory



DOWA has developed environmental businesses in Southeast Asia. PPLI is a landfill



BPEC is an incinerator in Thailand.



GEM is a landfill in Myanmar.



In Singapore, Technochem was founded in 1982 as an incineration company.



Vertical Stoker, an incinerator in Singapore, is first of its kind in South East Asia.



MAEH in 2019 - an amalgamation of Toxic Industrial Waste Treatment and Precious Metal Recycling Process.

## Our Services

MAEH offers the highest quality services for the collection, transportation, treatment, incineration, disposal and recycling of toxic industrial wastes and other materials. It is important that a high standard is maintained throughout the entire waste management procedure in order to minimise the impact on our environment. Good waste management solutions result in cleaner and healthier environments, improved living conditions and sustainable business models.



### Waste Collection

Our waste collection services incorporate the highest quality checks and are entirely compliant with the necessary regulations and are supported by our highly efficient Collection and Transportation Support Team to ensure that your waste is collected in a proper and safe manner.



### Waste Incineration

Incineration is used mainly in the treatment of hazardous organic liquid and solid wastes, which cannot be economically treated via other methods. MAEH has an on-site rotary kiln incinerator manufactured by ABB/Alstom that is regularly maintained to ensure optimum safety and operation standards and MAEH installed the first Vertical Stocker in Year 2017 for solid hazardous waste including pharmaceutical and chemical waste.



### Biological Wastewater Treatment

This kind of wastewater treatment is generally done using efficiently designed Sequencing Batch Reactors to allow industrial effluents to be disposed of without endangering human health or causing unacceptable damage to the natural environment. MAEH's wastewater treatment consists of a combination of physical, chemical, and biological processes to remove solids, organic matter and sometimes, nutrients from wastewater, until the accepted regulation parameters are met.



### Physical Chemical Treatment

Current methods for the treatment of inorganic liquid wastes are being used in MAEH. Each process is customised to match the different characteristics of the waste, which include corrosive, reactive, and oxidising substances, or a combination of these. MAEH also recovers metal hydroxides from spent etchant wastes.

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### Solidification and Stabilisation

Solidification and stabilisation is a widely used treatment for the management or disposal of a broad range of contaminated medias and wastes, particularly those contaminated with substances classified as hazardous. This treatment involves mixing a binding reagent into the contaminated media or waste, and is an important step in protecting human health and the environment by immobilising contaminants within the treated material. Solidification and stabilisation is a pre-treatment process prior to sending the waste for incineration or to be placed in modern eco-landfills.



### Laboratory and R&D Facilities

MAEH has its onsite fully equipped laboratory that supports the facility by conducting routine and non-routine analysis in a timely, professional manner. Physical and chemical analyses performed in the laboratory include fingerprint tests on all incoming wastes, wastewater parameters, solvents, oils and solids analysis of all types of waste.



### Precious Metal Refining

MAEH works in collaboration with Recycling Factory in precious metal recoveries and refinings. Some of these include the recovery of gold, silver, copper, nickel and palladium.

