

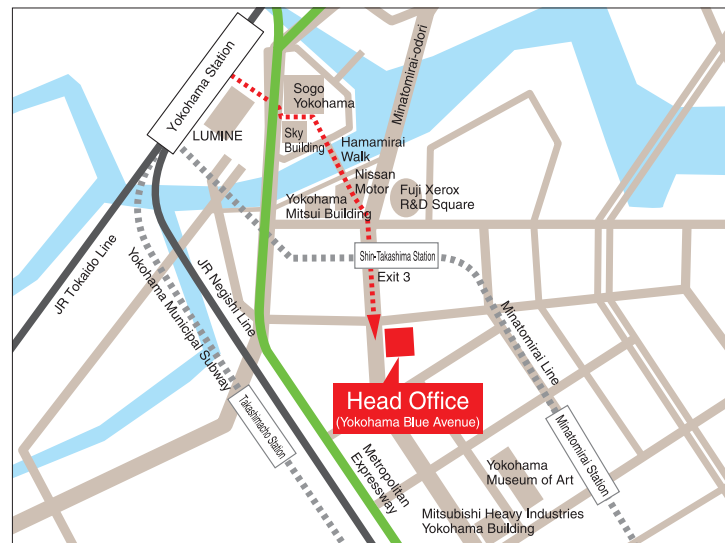


# M H I E C

Company Profile

<http://www.mhiec.co.jp/>

Yokohama Blue Avenue Bldg., 4-4-2, Minatomirai, Nishi-ku,  
Yokohama, Kanagawa 220-0012, Japan  
Phone +81-45-227-1280  
(Main/General Affairs & Personnel Department)



# Our VISION



The primary objective of waste treatment is creating a beautiful and clean urban environment. The challenge now is to expand and improve upon that objective. The throwaway economic model of the past, “mass production, mass consumption and mass dumping,” has become “regenerate, recycle, and reuse.” The new paradigm of global recycling and low-carbon society to protect the environment is becoming the new universal target.

We at Mitsubishi Heavy Industries Environmental & Chemical Engineering Co., Ltd. (MHIEC), have been cultivating technology and applications to treat and reuse waste appropriately for more than half a century. Our ambition is to assist in building clean cities, without any waste and to help conserve our limited resources.

**Our goal is to be a provider of expertise and technology, and to improve the quality of life in our cities whilst protecting the planet and its resources.**

In Japan, we have been working on creating a recycling, low-carbon society. We are also working on conserving and improving the urban environment, and promoting the use of energy from waste to support strong economic growth in Asia and elsewhere around the world. To do this, we, as an essential unit of Mitsubishi Heavy Industries (MHI) Group, bring together a wide variety of technologies and engineering expertise to work on and contribute to the development of a clean society and sustainable industry. Our goal is to utilize this technology and expertise to make the world a cleaner and happier place.

Mitsubishi Heavy Industries Environmental & Chemical Engineering Co., Ltd.

**MHIEC**

# Our VALUES

## Construction, Maintenance, Recycling.

### Total Engineering: - Covering all Stages of the Waste Treatment System

Evaluating economic efficiency as part of the process of creating a business plan, designing the plant and equipment, procurement, construction, commissioning and operations, maintenance, inspection, proposals for improvements and modifications to achieve more energy savings—we undertake all of these processes. The result is that we envisage the lifecycle of a waste treatment plant with a comprehensive approach, and bring the advantage of this holistic approach to our clients and partners.

As an expert plant engineering group, we use our experience and advanced technologies to propose a plant with excellent environmental performance.

#### What we can do

We are totally engaged in the planning of the plant construction and after-sales maintenance, and always remain ready to assist our customers.

We make proposals that respond to our customers' needs such as long-term comprehensive operation which covers operation management, maintenance, and procurement of utilities, etc. over a long period of time, as well as plant renovations and improvements so that plants can remain in use for an extended period of time.

#### Improving the Recycling Society

We have been working on more efficient operation such as high efficiency power generation, recycling and construction of the plants. With these advantages and our management knowhow, we will further improve the recycling society.

#### Life Cycle Cost Reduction

As a result of our in-depth knowledge, we can make proposals to reduce the operation and maintenance cost required for about 20 years after the plant has been constructed.

#### Regional Disaster Management Base

Our plant works not only as a treatment facility but can also work as a regional electrical source that combines waste power generation, solar energy generation, secondary cell, etc. Our plant is designed to be earthquake-resistant and to have an ensured supply of water, which allows the plant to be used as a regional disaster management base.



#### Group companies that provide Operation Management

##### Jukan Operation Co., Ltd.

##### Nishinohon-JKO Co., Ltd.

With their advanced technology and close cooperation with the customers as well as MHIEC, Jukan Operation and Nishinohon-JKO ensure safe and stable operation and help maintain efficient management. Jukan Operation and Nishinohon-JKO also contribute to the local community by training and hiring local people as employees.

# Our TECHNOLOGY

## Environmentally-Friendly Performance and Economic Efficiency Next-Generation Plant Engineering to Support a Sustainable Society

Waste treatment plants must be capable of first-class performance, but should also demonstrate a high level of environmentally-friendly performance and economic efficiency.

MHIEC provides plant engineering with excellent sustainability by taking full advantage of the comprehensive strengths of the MHI Group.



### Municipal Solid Waste-to-Energy Plant

MHIEC has two types of incineration, the stoker furnace and the gasification furnace. Waste can be incinerated and detoxified efficiently by locating each piece of equipment rationally. We also adopt various different automation systems, which enable easy operation management with fewer operators. This plant fully enforces environmental measures, reducing the volume of ash, cleaning the exhaust gas, and recycling the slag, and is also capable of using residual heat in a variety of different ways.



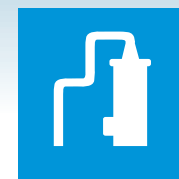
### Sewage Sludge Treatment Plant

The sewage sludge treatment plant enables stable and clean treatment of sewage sludge provided by sewerage treatment plants. In the technology of sludge drying and incineration, MHIEC has been accumulating knowledge and developing a number of products. With this knowledge, MHIEC provides design, manufacturing, construction and after-sales service. In recent years, energy saving and energy creation have been more in demand, as well as security and safety. The energy savings of a low-powered centrifugal dryer and the energy creation of sludge incineration make a contribution not only to sewage treatment but also to environmental protection and conservation for society as a whole.



### Industrial Waste-to-Energy Plant

The industrial waste-to-energy plant incinerates mainly the high-calorie, industrial waste provided by industry, reduces the volume of the waste, then detoxifies and stabilizes it. In recent years, in addition to the proper treatment and recycling of various types of waste, an industrial waste power generation plant, as a complex recycling waste facility, works on reducing CO<sub>2</sub> by collecting energy and proactively promoting waste power generation. There are some cases where plants equipped with an incinerated ash recycling facility sell detoxified ash as a recycled product.



### MGPS™ Electrochlorination System

MGPS™ is used in power generation plants, seawater desalination plants and LNG terminals that use a large quantity of seawater to prevent marine life, such as shellfish and seaweed, etc., from adhering to pipes, condensers and vaporizers adjacent to the seawater by injecting sodium hypochlorite, which is produced through the electrolysis of natural seawater, into an intake channel. With our long-term achievements, we have been able to achieve stable operation and we guarantee beneficial economic performance by using our unique high-performance electrodes.

# Our STAGE

MHI Group provide  
Comprehensive waste treatment  
solutions, both locally and globally

## Japan

Drawing on our wealth of service and technology knowhow, we can propose solutions that respond to various local needs.



## Global

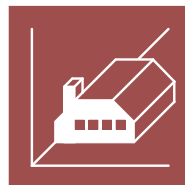
We have installed more than 30 Waste-to-Energy plants all over the world, mainly China and South-East Asian countries.

### ■ Combustion Technology



We have been accumulating achievements and technology knowhow over a long period of time. With these achievements and our technology, we can propose the best combustion technology for the target to be treated. In recent years, we have developed new combustion technology that aims for the reduction of NOx and the reduction of exhaust gas, and have focused on developing technology that responds to a wide variety of our customers' needs.

### ■ Piping and Spatial Design Technology



In order to fulfill every function, such as process flow and maintenance within the limited space of the plant, we design piping which is suitable for every process condition. We also simulate the design with a 3D plant model that integrates the space structure of the complicated plant. By doing so, we can provide a design for a plant with a high level of reliability.

### ■ Renovation to use Waste Treatment Plant for an Extended Period of Time



In recent years, we have seen an increase in the demand for renovating an existing waste incineration facility to use it for an extended period of time due to a variety of social reasons and backgrounds. We refer to maintenance data acquired during inspections of the actual conditions of each facility and the wide range of our accumulated knowhow to propose the best renovation and core equipment updating plans for our customers' facilities.

### ■ Remote Operation and Management of Plant with ICT



In order to respond to highly developed system and life cycle cost (LCC) reduction management, we monitor and support the operation status of the plant from a remote location. We also analyze the process data, etc., and make suggestions for safe and secure operation.

## ■ Global Expansion of Municipal Solid Waste-to-Energy Facilities

### China (Beijing)



Interest in waste-to-energy has been increasing in China where economic growth has been significant in recent years and we have installed a large number of plants in China. With respect to the project for the Shougang Group that treats the largest amount of waste (3,000 t/day) in China, we designed the plant and provided the major equipment (stoker).

### Taiwan (New Taipei City)



In Hsintien and Shulin, we installed plants that were the largest size seen at that time under full-turnkey contracts, which means we undertook all the processes of design, construction, commissioning and warranty.

### Singapore



We installed 3 plants (i.e. TIP, SIP, and TSIP) out of the 4 plants that currently exist in Singapore today. The TSIP plant, which was built in 2000 in response to their waste treatment needs, achieves the largest amount of treatment (4,320 t/day) in Singapore, which is one of the largest capacity plants in the world, making a major contribution to urban sanitation.

### Macau



In Macau, where advanced economic growth with their growing tourist business is being experienced, we constructed 3 plants as the first phase in 1992. In the second phase, we installed 3 more plants that doubled the treatment capacity. These plants are the only municipal waste treatment plants in Macau and make a major contribution to the development of the city.

# Our PRINCIPLES

## MHI Group CSR Action Guidelines

We strive to move the world toward a more secure future. Through our technology, our business practices and our people, we:

### Care for the Planet

We are eco-conscious, and engineer environmentally-friendly technologies that improve sustainability and protect the Earth

### Create a More Harmonious Society

We embrace integrity and proactive participation to solve societal challenges

### Inspire the Future

We cultivate global talent to share a vision and desire to move the world forward for generations to come

## MHI Group Global Code of Conduct

As a global company, the MHI group employs thousands of individuals from different backgrounds, nationalities and cultures. The MHI group as a company must operate with a single corporate culture that enables it to compete successfully in the global market while maintaining our reputation as a company of high integrity\* and ethics. The Code of Conduct describes how the MHI group employees should conduct themselves.

## Basic Policy on Human Rights

The MHI group endeavors to fulfill its responsibilities for the protection of human rights in order to continue truly contributing to social progress in accordance with the MHI creed. We act in line with the "Guiding Principles on Business and Human Rights" adopted by the U.N. Human Rights Council and endeavor never to act in ways that elicit or facilitate human rights violations by others or other negative actions or effects.

## Policy for Safety, Health, Quality and Environmental Amenity

### Basic Policy

We, MHIEC, shall endeavor, in the management of our operations, to satisfy all of the quality requirements of our customers, to provide products and services that contribute to the preservation of the Global Environment, and to minimize all risks to safety, health, and the environment that may arise during all processes in which we engage in the phases of development, design and engineering, procurement, manufacturing, erection, commissioning, operation, and after-sale service, for environmental installations we provide, and shall contribute to the development of society through our unremitting endeavors to improve these activities.

### Guidelines

1. Establish, maintain, and improve a management system in harmony with safety, health, and environmental interests, with a clear understanding of our responsibilities and authorizations.
2. Appropriately follow all relevant rules, regulations, and other requirements.
3. Have all employees and staff members of the organization concentrate their efforts into the promotion of positive action for safety, health, quality, and the environment in every phase of operation and in the performance of their job duties.
4. Define objectives and set clear targets for each divisional activity in the company organization, and continuously improve the effectiveness of the management system through these actions.
5. Identify risk factors for industrial accidents and environmental pollution, and minimize risk exposure in order to prevent undesirable effects on safety, quality, and the environment. While doing so, strengthen activities to maintain comfortable and hygienic working environments.
6. Promote action for reducing, reusing, and recycling waste and saving resources and energy, and develop and provide products and services to contribute toward these objectives.
7. Ensure that all employees working in the company and all people involved in company activities understand this policy, and strengthen the awareness of safety, health, quality, and environmental amenity.

## Certificate <ISO9001 and ISO14001>

Business, design, development, engineering, procurement, manufacturing, construction site management, installation, commissioning, maintenance and modification of waste treatment and heat recovery equipment, sewage sludge treatment plant and other environmental equipment and its auxiliaries.

## Authorization

Yokohama Local Contribution Company

