Toward Sustainable Society

Kitakyushu City’s Best Practices and Available Technologies in the 3Rs

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The City of Kitakyushu
Waste Turned Valuables

Treatment plant for Municipal solid waste produces Materials for construction and iron

10% created from waste

1% created from waste
Utilization of Slag

Concrete drainage ditch

Concrete block on the pedestrian road
Slag in Shinmoji treatment plant is certified by Japanese Industrial Standards (JIS)

JIS A 5031  (Concrete product)
JIS A 5032  (Asphalt paved road)

Main contents of the standard

1. Contents of hazardous materials
   Cadmium, Lead, Chromium, Mercury, etc.

2. Contents of chemical materials
   Calcium, Sulfur, Iron, Chloride, etc.

3. Physical character
   Density, Water absorption, Shape, etc.
Shaft furnace type gasification and melting furnace

- **Waste**: 5% of the quantity waste
- **Coke**: 4% of the quantity waste
- **Limestone**: 4% of the quantity waste
- **Pyrolysis and gasification zone**: Recovery of combustion gas and energy
- **Melting zone**: 240t/day × 3
- **Combustion chamber**: 1,100°C
- **Drying and preheating zone**: 300°C
- **Limestone**: 4% of the quantity waste
- **Molten materials**: 1,800°C
- **Exhaust gas treatment equipment**
- **Steam generation efficiency**: 21%
- **Steam**: 400°C, 40 kg/cm²
- **Exhaust gas**: treatment equipment
- **Steam turbin**: Electric power
- **Generator**: Generation efficiency 21%

**Recovery of material:**
- **Slag**: 10% of the quantity waste
- **Metal**: 1% of the quantity waste
Generation of Electricity in Shinmoji Plant in 2010

**Generation**
85,700 MWh

**Shinmoji Incineration Plant**
Consumption
38,600 MWh (45%)

**Electric Power Company**
Collection Office

46,900 MWh (55%)
449 million yen
200 MWh (0.2%)
Kitakyushu Eco-town Power Receiving Association (Established by law)

Recycling Facility (Home appliance, Automobile, PET etc)

Composite Core Facility (furnace)
- Capacity: 320 t /Day
- Output: 14,000kw
  (*Self-Using: 3,300kw)

Power supply
- About 4,500kw

Treatment of Leavings

Industrial Waste such as shredded waste and CFC, etc.

Resource Recovery of Slag and Metal

Power Supply From Composite Core Facility
The reduction effect immediately after the revision of the collection system of household-related waste
(The total amount of waste collected from July to December, 2006)

<table>
<thead>
<tr>
<th>From July to December, 2006</th>
<th>(For comparison) From July to December, 2003</th>
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<tbody>
<tr>
<td>93,484 tons</td>
<td>126,815 tons</td>
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→ Reduction of about 33,300 tons, with the reduction rate of 26%

Right before the revision

Immediately after the revision
The early-morning manner improvement campaign

A scene of the starting day of the sorting system of plastic containers and packaging

• About 13,200 persons attended the early-morning guidance throughout the city.
  (About 11,700 citizens, 1,550 city employees)
• The total number of attendants during the 10 days from 6:30 to 8:30 am counted to about 100,000 persons.
  (There is no similar example in other cities of the same size.)
Basic concept of the revision on Domestic waste collection system

1. Further promotion of recycling and reduction of waste
2. Securement of fairness of the cost sharing
3. Sharing of a certain degree of responsibility by the citizens as the dischargers
4. A large amount of cost related to waste treatment and recycling

- Enrichment of the recycling and separation system
- Improvement of the awareness toward reduction by the revision of the charge

Putting the two schemes together

To aim at the reduction of waste by 20%
Technology transfer of Kitakyushu Asian Center for Low Carbon Society

Establishing business model for technology transfer, from packaging of technology to financial support

Energy business

- Kitakyushu Eco-Town
  Zero-emission type resource recycling base by collaboration of projects

- Multipurpose coal gas manufacturing technology of Electric Power Development Co., Ltd.

- Organic thin-layer solar panel by Mitsubishi Chemical Corporation

- Geological survey by Japan CCS Co., Ltd.

- Inverter of Yaskawa Electric Corporation

Recycling business

Water business

Kitakyushu Asian Center for Low Carbon Society

- Packaging technologies
- Improvement of technologies to satisfy the needs
- Marketability survey
- Support demonstration experiment
- Support application for subsidy
- Financial and information support
- Dispatch business mission, etc.

Utilization of city-to-city network

Institute for Environment Cities of Asia
(62 cities of 18 countries of Asia-Pacific region)

The Organization for the East Asia Economic Development
(10 cities of Japan, China and Korea)
## Major projects promoted

As the Japanese government promotes the export of eco-friendly infrastructure, we aim at building a model of the “export of city infrastructure” through our major projects in Indonesia, India and China.

### 1 Indonesia (Surabaya City project)

**Surabaya** is the second largest city in Indonesia, with three million population.

Surabaya has difficulties in industrialization, due to its low quality and unstable supply of electricity.

- Sophistication of national industrial estates, etc; Introduction of advanced systems of waste water and material treatment

### 2 India (Promotion of industrial artery project in Delhi, Mumbai)

**Gujarat State (Surat City, Dahej district)** is a major industrial area in India.

Not only the introduction of excellent Japanese environmental technologies but also the building of an eco-city is expected.

- Support for the construction of an eco-town (Surat City), Participation in the Smart community project (Dahej district)

### 3 China (MOU Conclusion with China Beijing Environment Exchange, Cooperation regarding Dalian eco-town, etc.)

**Dalian City** is an ecological model city in China.

The goal is to build an eco-city by developing residential areas beyond the framework of the Recycling Industrial Park.

- Support for eco-town planning; Participation of Japanese companies in individual recycling projects