Waste to Energy with elaborate planning

KURIBAYASHI Kenji

‘Sky Park’ of Marina Bay Sands
JFE Engineering Construction

JFE Engineering Corporation

“WITH THANKS TO MARINA BAY SANDS HOTEL, SINGAPORE”
For the **GREEN ECONOMY** and **GREEN GROWTH** of Myanmar

Myanmar's Bridge to the Future

JFE Engineering is contributing to economic development in emerging countries by helping to upgrade infrastructure, such as highway and railroad bridges. Over the years, JFE Engineering has been actively constructing bridges in Myanmar, including the soon-to-be-completed Malun Bridge. Residents have eagerly awaited completion of this key infrastructure, which is expected to support Myanmar's burgeoning economy.
Waste-to-Energy

EPC
Share No.1 in JAPAN 50% (2011)
Reference in Japan since 1968
Over 155 plants (328 Furnaces)

O & M
Operation 76 Plants
Maintenance 156 Plants

Gasifying & Melting
Stoker & others
Environment

Waste-to-Energy

- **Italy**
  - Gasifying 308t/d x 2

- **China**
  - Stoker 500t/d x 3
  - Stoker 400t/d x 2

- **Taiwan**
  - Stoker 300t/d x 3

- **Malaysia**
  - Fluidized Bed 240t/d x 1

- **Thailand**
  - Fluidized Bed 110t/d x 1
  - Stoker 70t/d x 2

- **Italy**
  - Gasifying 308t/d x 2

Reference

- **7 plants**
- **14 Furnaces**
# Biogas Power Generation System

<table>
<thead>
<tr>
<th>Name</th>
<th>Yokohama North Sludge Center Biogas Generation System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Japan</td>
</tr>
<tr>
<td>Type</td>
<td>Biogas from Sewage Sludge</td>
</tr>
<tr>
<td>Capacity</td>
<td>4.5MW (0.9MW x 5)</td>
</tr>
<tr>
<td>Completion</td>
<td>2010</td>
</tr>
</tbody>
</table>
## Sludge Incinerator

<table>
<thead>
<tr>
<th>Name</th>
<th>Yanagishima sludge incineration system</th>
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</thead>
<tbody>
<tr>
<td>Country</td>
<td>Japan</td>
</tr>
<tr>
<td>Type</td>
<td>Fluidized bed sludge incinerator</td>
</tr>
<tr>
<td>Capacity</td>
<td>180t/d (dewatered sludge)</td>
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<tr>
<td>Completion</td>
<td>2000</td>
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</tbody>
</table>

## Sewage Water Treatment Plant

<table>
<thead>
<tr>
<th>Name</th>
<th>Iriezaki waste water treatment center</th>
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</thead>
<tbody>
<tr>
<td>Country</td>
<td>Japan</td>
</tr>
<tr>
<td>Type</td>
<td>Anaerobic-Anoxic-Oxic process using carrier</td>
</tr>
<tr>
<td>Capacity</td>
<td>64,500m³/day</td>
</tr>
<tr>
<td>Completion</td>
<td>2011</td>
</tr>
</tbody>
</table>
“water-energy” nexus from “Waste Management” point of view

Direct Disposal

Domestic Waste

Direct Landfill
(start from hygienic issue)

Pest, Odor, Soil/Water Pollution, Fire ⇒ Decades-long Pollution

Incineration requires Energy

Incineration with Generating (Waste to Energy)

...............suitable for Myanmar
History of Waste Management in Japan

Former Conditions

1930's
Fukagawa Garbage Treatment Plant

1957
Bell collection by handcarts

1970's
Direct landfill disposal of large-sized waste

Present Conditions

2010's
Shin-Koto Incineration Plant

2010's
Waste collection

2010's
Landfill site

Source: Study Council on International Cooperation for Waste Management
Clean Association of TOKYO 23
Waste Management Trajectory in Japan

**NO WASTE MANAGEMENT**


**START WASTE MANAGEMENT**

+ 1900 WASTE CLEANSING LAW
  > LOCAL GOVERNMENT RESPONSIBILITY
  > INCINERATION AS PRIORITY
  + 1903 Mechanical INCINERATOR Start

- 1880s~ PANDEMIC (CHOLERA, PEST, etc.)
+ OPEN BURNING
+ UNSANITARY ENVIRONMENT

**MODERN WASTE MANAGEMENT**

+ 1970 WASTE MANAGEMENT AND PUBLIC CLEANSING LAW
+ Waste-to-Energy Plant START
+ 1990 DIOXIN Guideline
+ 1999 DIOXIN Law

**RECYCLE**

+ 1991 Promotion Law
+ 1995 Container/Packaging
+ 1998 Home Appliance
+ 2000 Recycle Basic Law
+ 2000 Construction /Food /Car

**PROTECT HUMAN HEALTH from UNSANITARY ENVIRONMENT**

**WASTE INCREASE BY GOOD ECONOMY**

RAISED IMPROPER TREATMENT

**THERMAL RECYCLING**

EMISSION CONTROL

To SUSTAINABLE SOCIETY
Date Completed: March 1991
Capacity: 300ton/day x 2 lines
Power Output: 11,000 kW
Technology transfer should include both software (e.g. public management, waste collection system) and hardware (technology and facility operation and maintenance).

Many waste management projects failed due to substandard of waste input:
- Lack of public participation on waste separation at source
- Lack of efficient waste collection system

Sometimes, technology that transferred to developing countries is too advanced and expensive:
- Lack of skill and budget for maintenance, thus most of its lifetime is shorter than expected.

Source: Dr. Janya Sang-Arun, Policy researcher, Sustainable Consumption and Production Group, Institute for Global Environmental Strategies (IGES)

The important keys to avoid confusion of waste management:
- Suitable, reasonable and clear laws and regulations
- Appropriate Public - Private cooperation
- Reasonable funding scheme for construction and operation

Elaborate Planning, most suitable for Myanmar
Scenario to the appropriate waste management development

- Ongoing supporting program from Japan (by Public and private sector)
- JICA Partnership Program (JICA / TOKYO)
- Low-carbon Yangon city through JCM project formulation (MOEJ / IGES)
- FS of Installation, Operation and Maintenance of WtO in Greater Yangon (MOEJ / JFEE etc.)
- Incineration Plant (Design, Engineering, Construction)
  - Small Size
  - Large Size
- Standards and Regulations
- Operation and Maintenance
- Ready to further cooperation

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JFE’s proposal for environmentally sustainable cities in Myanmar

JFE’s “Waste to Energy (WtoE)” facility will realize:

1) The power generation will contribute to stabilize power supply in residential area nearby.
2) The ash from WtoE is cleaner than contaminated dumped waste.
3) The volume of landfill will drastically decrease and the lifetime of existing landfill site will extend (no need to find a new site).
4) The risk of unexpected environmental impact will decrease; water pollution, pest, epidemic, etc.
Thank you for your kind attention.

http://www.jfe-eng.co.jp/en/