

# Project for developing a Low Carbon Society through “Waste to Energy Technology” in Penang, Malaysia

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# General Information about Penang

**Penang**

**Enlarged view**



- **Population: 1.6 million**
- **Area: 1,046 km<sup>2</sup>**
- **Industry**

Electrical, electronics, exact instrument, metal, etc

**Tourism**  
**Agriculture**

# Project for a low carbon society through “Waste to Energy Technology” in Penang

## OBJECTIVE

Realization of Co-benefit for solving various waste problems through contributing to reduce GHG by promoting an efficient Penang's SWM policy and introducing a Japanese green innovative technology with combination of energy generation

## OUTLINE OF THE PROJECT

To reduce CO2 emissions and improve environment problems by establishing a comprehensive SWM model including 1) efficient waste separation and collection systems by NGOs, 2) utilizing “Waste to Energy” technology, and 3) reducing final waste volume

## MAIN ACTIVITIES

1. Feasibility study of technology
2. Capacity building (Training, workshop)
3. Support for creating a SWM model
4. Creation of MRV Methodology

### PENANG, MALAYSIA

Penang State Government  
Municipal Council of Penang Island (MPPP)  
Municipal Council of Seberang Perai (MPSP)  
Business Enterprises, institute and Citizens,  
etc.

Implementation  
Collaboration &  
Cooperation

## IMPLEMENTATION CHART

MOE JAPAN



GEC

Collaboration

KAWASAKI  
CITY

JFE  
Engineering

IGES

# Project for a Low Carbon Society through “Waste to Energy Technology” in Penang

## MAIN OBJECTIVE in FY2013

**Conducting a feasibility study for creating a concrete project towards FY 2014**

## SCHEDULE in FY2013

**1. Kick-off meeting and study visit (in Penang) : 20-22 August 2013**

- Understanding and identifying the needs in Penang

**2. Feasibly study for adopting a Japanese technology: from August to December 2013**

- Conducting by JFE Engineering (Assessment of methane fermentation treatment using organic wastes, electricity generation with biogas, etc.)

**3. Study visit to Kawasaki city: 10-13 September 2013**

- Carrying out a site visit to the industrial area in Kawasaki

**4. Workshop in Penang: 21 January 2014**

- Proposing collaborative area in the project for FY 2014 (technologies to be adopted, building a comprehensive SWM model, etc.)



# Kick-off meeting in Penang

- Date: 20 August 2013
- Participants: 60
- Conclusion of MOU (Memorandum of Understanding) between Penang State Government and Kawasaki City



# Training in Kawasaki City

- Date: 10-13 September 2013
- Place: Kawasaki City, Yokohama City
- Number of participants from Penang : 12 (Penang State Government, MPPP, MPSP, Penang Green Council, Zero Waste Malaysia).
- Site visit: Recycling Facility for Solid Waste and Fluorescent Light Biomass Power Generation facility





# Current solid waste management in Penang

## Transfer Station



## Landfill sites



## Recycling

### Resource Recovery



### “Food to Food”

### programme at School



### Sanitary Landfill



# Solid waste management

No.	Item	MPPP (Penang Island )	MPSP (Seberang Perai)	Unit
1	Quantity of waste generated annually	288,377	528,275	Tonnes/year (2012)
2	Quantity of waste generated daily	790	1447	Tonnes/day (2012)
3	Quantity of waste generated per capita	1.07	1.47	Kg/capita/day
4	Total number of households in the city	189,829	195,829	Households
5	Percentage of municipal budget used for solid waste sector	25	43	Percent



# Solid waste management

## 1 Waste Composition at landfill sites

Type of Waste	MPSP		MPPP	
	Tonnes	%	Tonnes	%
Food	605.84	50%	206.23	33%
Yard & Garden	148.99	12%	59.86	10%
Paper	54.12	5%	176.15	28%
Plastics	208.10	17%	89.89	15%
Textile/Rubber	38.48	3%	19.02	3%
Metal	43.36	4%	29.09	5%
Hazardous	2.69	0%	1.92	0%
Others	98.42	8%	37.74	6%
<b>Total</b>	<b>1,200.00</b>		<b>619.90</b>	

Source: Satang 2003

## 2 Estimation of Construction and Demolition Waste in Penang, 2005-2025

C&D Waste (TPY)	2005	2010	2015	2020	2025
<b>MPPP</b>	438,840	477,943	516,390	553,526	<b>601,979</b>
<b>MPSP</b>	511,150	563,328	616,044	668,386	<b>726,892</b>
<b>Penang</b>	<b>949,990</b>	<b>1,041,271</b>	<b>1,132,434</b>	<b>1,221,912</b>	<b>1,328,871</b>

## **Assistance from Kawasaki City / JFE Japan to achieve a Low Carbon Society**

- 
- **Establishing a legal framework**
  - **Using Kawasaki's Innovative Technology for waste treatment and resource recovery**
  - **Fluorescent Lamp recycling**
  - **Waste to Energy Projects**
  - **C&D Waste**
  - **JCM Mechanism**

# Proposal Report - Developing a Low Carbon Society through Waste to Energy Technology - by Penang State Government



PENANG STATE GOVERNMENT

## PROPOSAL

### DEVELOPING A LOW CARBON CITY

Through Waste to Energy Technology

Penang State Government

11/11/2013

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to achieving a Low Carbon  
Society
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# Assessment of feasibility studies in FY2013

## *Considerations of project implementation through “Waste to Energy Technology”*

- **Contribute to the waste separation at source**
- **Promoting 3Rs to make the best use of independent and inventive ideas in each community**
- **Further promoting the diversion of wastes from landfill by introduction of “Waste to Energy technology”**
- **Stabilization the amount of waste collected concerning “Waste to Energy” and use of energy creation**
- **Improvement of waste management system projects including a Low Carbon Society**
- **Ensure the understanding and cooperation of stakeholders (Business enterprises, institute and citizens, etc)**

# Assessment of feasibility studies in FY2013

## Feasibility of the project (Tentative)

Project	Feasibility of the project
Waste to Energy Technology	Biomass power generation using wood chips or discarded wood from C&D waste
	RDF using green waste, waste mixed, or waste plastic
	Other reduction and power generation technologies
Improvement of Treatment Waste	Fluorescent lamp recycling
	Resource recovery through crushing and separation from C&D waste
	Improvement of compost technology

# Project for Waste to Energy technology

8.1. Waste Composition Data  
Source: Waste composition at landfill sites

Type of Waste	MPSP		MPFP	
	Tonnes	%	Tonnes	%
Food	926.84	50%	208.24	33%
Yard & Garden	145.90	12%	59.90	10%
Paper	54.12	3%	1.68.16	26%
Plastics	206.10	17%	89.90	15%
Textile/Rubber	38.48	3%	19.32	3%
Metal	13.16	1%	29.34	5%
Hazardous	2.69	0%	1.62	0%
Others	99.42	5%	37.71	6%
Total	1,208.80		619.80	

Source: Sereng 2008

**Final disposal of large volume of waste**

Waste composition data at landfill sites

**Proposal of project**

Biomass power generation using wood chips or wooden pallets



**Low recycling rate and improper treatment**

Disposal of C&D waste at Jelutong landfill site and illegal dumping



**Kawasaki training**

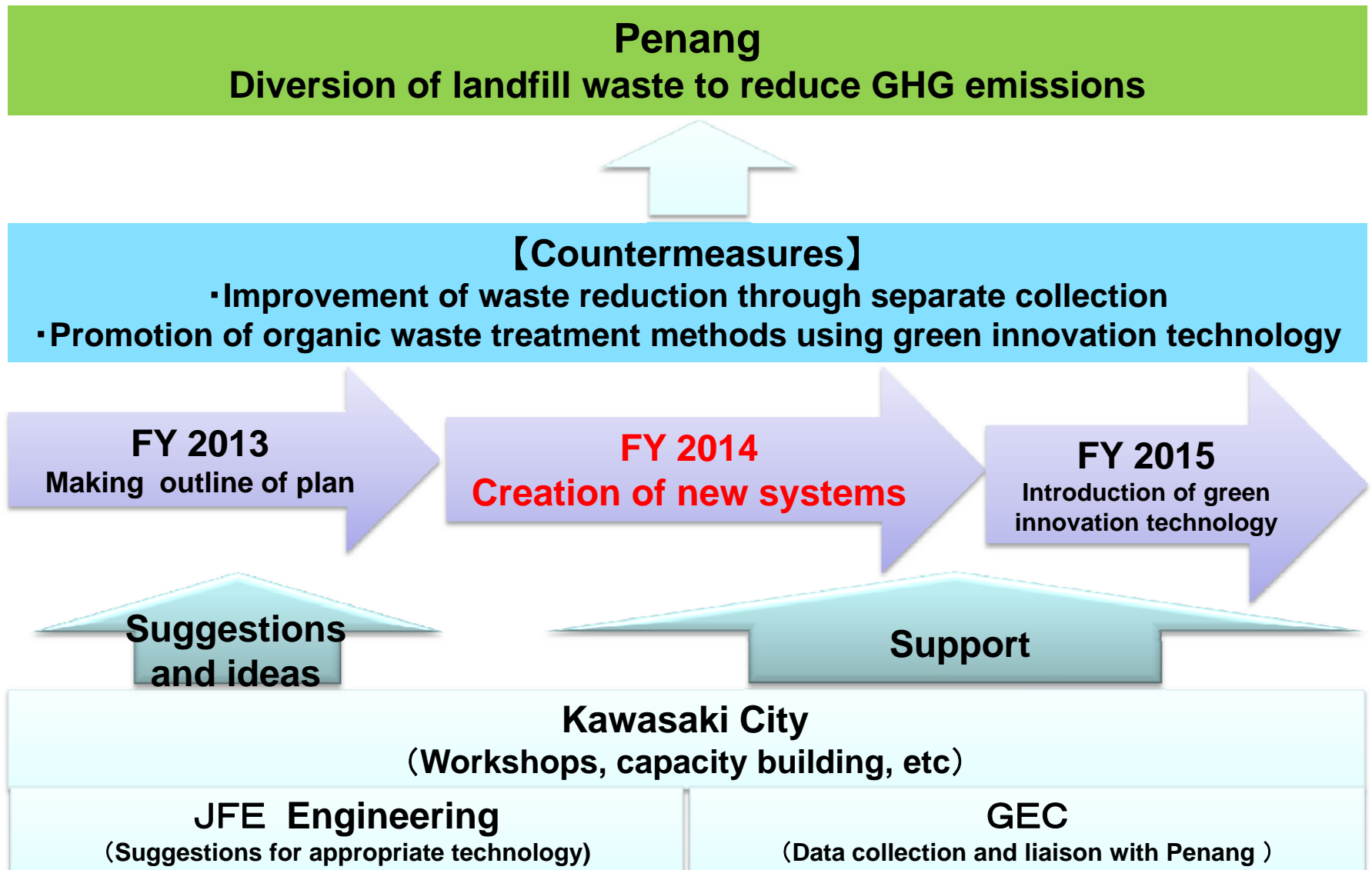
Field visit to Kawasaki Biomass generation site



**Feasibility study for FY 2014**



# Process for Penang low carbon society project



# Supporting the creation of new systems

## BASIC VIEWPOINT

**Supporting the creation of new systems toward developing a Low Carbon Society through “Waste to Energy Technology” in Penang by using the combined experience and achievement of Japan and Kawasaki City.**

### Reduction Measures

Waste separation at source, promotion of recycling, etc.

### Proper Waste Collection and Management

Wood waste, food waste, C&D waste, hazardous waste, etc.

### Public Education and Awareness

3Rs incentive to business enterprises, institutions and citizens.

### Concept and Recent Development of the Joint Crediting Mechanism (JCM)

# Activities in FY 2014

## **1 Project for Waste to Energy technology**

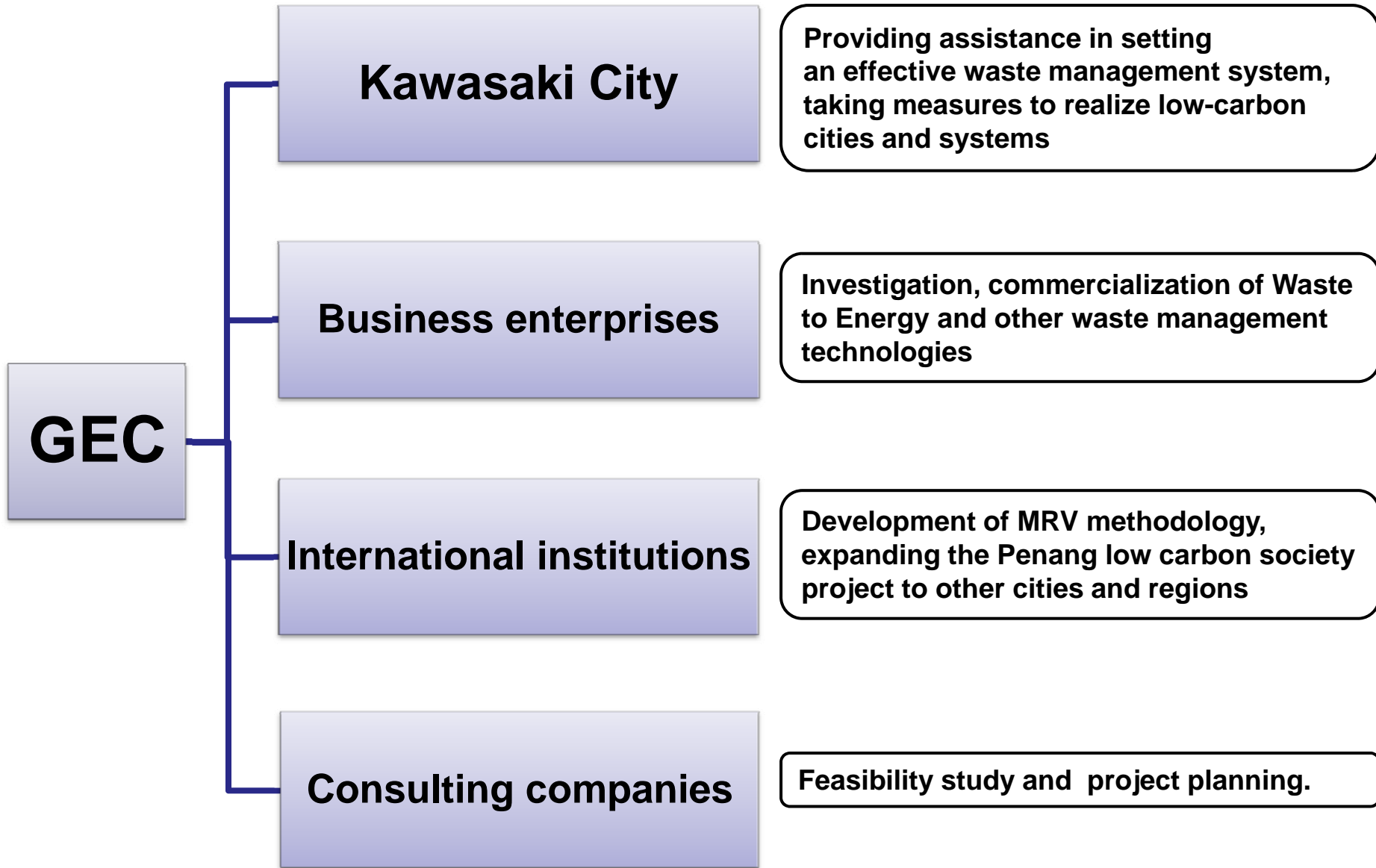
- ◆ Conducting a feasibility study for biomass power generation using wood chips or wooden pallets

## **2 Supporting the Creation of New waste management systems in Penang**

- ◆ Waste separation at source and promotion of recycling treatment in Penang through the information exchange, expertise and capacity building.



# Implementation chart



***Thank you for your kind attention***

