MAKING PENANG A LIVEABLE CITY
- Good Integrated Solid Waste Management

Khor Hung Teik
Zero Waste Malaysia
In collaboration with the Penang State Government
21 March 2013
Penang State and City Overview

- Penang State = Penang Island Municipal Council (MPPP) and Seberang Perai Municipal Council (MPSP)
- Tropical climate with monsoons April – September
- Current population (2010 Census):
  - MPPP 741,300
  - MPSP 868,500
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<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>MPPP</th>
<th>MPSP</th>
<th>Unit</th>
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<tbody>
<tr>
<td>1</td>
<td>Quantity of waste generated annually</td>
<td>288,377</td>
<td>528,275</td>
<td>Tonnes/year (2012)</td>
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<tr>
<td>2</td>
<td>Quantity of waste generated daily</td>
<td>790</td>
<td>1447</td>
<td>Tonnes/day (2012)</td>
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<td>3</td>
<td>Quantity of waste generated per capita</td>
<td>1.07</td>
<td>1.47</td>
<td>Kg/capita/day</td>
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<td>4</td>
<td>Total number of households in the city</td>
<td>189,829</td>
<td>195,829</td>
<td>Households</td>
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<td>5</td>
<td>Percentage of municipal budget used for solid waste sector</td>
<td>26</td>
<td>43</td>
<td>Percent</td>
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</table>

**Waste Composition** *(Source: Derived from Satang Report 2003)*

<table>
<thead>
<tr>
<th></th>
<th>Organic</th>
<th>Paper</th>
<th>Plastic</th>
<th>Metal</th>
<th>Glass</th>
<th>Other</th>
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<tr>
<td>i</td>
<td>43</td>
<td>28</td>
<td>15</td>
<td>5</td>
<td>0</td>
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</tbody>
</table>

percent
Waste Generation & Recycling in Penang, 2005-2013

Chart 1: Total Waste Generation for Penang (2005-2012)

Chart 2: Total Recyclables Collected for Penang (2005-2012)
Overview of MSWM system

- MSW from Penang Island (Before the bridge construction)
  Transported to Batu Maung TS ➔ barged to Pulau Burong Landfill
  (During the bridge construction)
  Transported to Ampang Jajar TS via the First Penang Bridge ➔ compacted ➔ transported to Burong Landfill

- MSW from North/Central Seberang Perai
  Transported to Ampang Jajar TS ➔ compacted ➔ transported to Pulau Burong Landfill

- MSW from South Seberang Perai
  Directly transported to Pulau Burong Landfill
Strategy 1: Waste Separation at Source

Strategy 2: Waste Diversion from the landfill

Strategy 3: Incentivising the System

Strategy 4: Capacity Building & Awareness Programmes

Strategy 5: Looking Ahead
**Samples of Implemented Projects & Activities**

### Waste Minimisation, Resource Recovery and Diversion from the landfill

- Promote waste minimisation programmes & waste diversion from the landfill
- Develop a better managed solid waste management system through the upgrading the existing landfill at Pulau Burong to a Level IV Sanitary Landfill with leachate treatment.
- Set up buy-back centres, material recovery facilities or resource recovery centres to divert waste away from the landfill.
- E-waste - Collect used PCs & peripherals under the Dell-Sunshine-Penang Island Municipal Council Programme, JICA Household e-waste collection programme
- Collect used cooking oil from eateries, restaurants, food complexes.
- Collect food and organic waste for composting and processing into bio-liquid fertilizer.
- Green waste static fermentation using the Groundswell process for top soil production
- Implemented the “100 steps to cleanliness” project using 3R illuminated bins along major streets
- Established “smoke-free” zones for Penang.
- Banned the giving of free plastic shopping bags in Supermarkets / Hypermarkets to reduce the carbon footprint – No Free Plastic Bag Regulation.
- Banned the use of Styrofoam food containers.
- Enforced the closed house system for pig-farming activities.
- Collection of used roadside banners to be turned into shopping bags.
- Green awards for practitioners – Greens School, Green Office, Green Citizen, Green industry etc.
- Promote more Zero Waste communities
RECYCLE BANK

- Collected
- Segregated
- Weighed
- Recorded in Bank Book
- Stored
- Sold to recycling agent
'CLEANER GREENER PENANG’ COMMUNITY PROGRAMMES,
NO FREE PLASTIC BAG CAMPAIGN:

- Penang - 1 Jul 2009 (Mon, Tues, Wed)
  - 1 Jan 2011 (Everyday)
- Selangor - 1 Jan 2010 (Every Saturday)
- Federal - 1 Jan 2011 (Every Saturday)
  - Retailers, Supermarkets, Hypermarkets, Departmental Stores
  - 2008 - 25.2 mil / yr 2.5 mil bags/month, now less than half
  - 20 cents per plastic Bag following the polluter pays policy
2010 - 44 Food complexes on the Island

2011 - Education Phase for all restaurants, shops, night markets licensed by MPPP & MPSP

1 Dec 2012 - Total Ban on Polystyrene Food Containers In Penang
Penang’s Organic Waste Policy
- Suggestions for Improvement

OBJECTIVES

1. To divert the amount of organic waste (putrescibles) from the Pulau Burong Sanitary Landfill and moving towards a total ban in the long term.

2. To reduce the costs of collection, transfer and treatment of organic waste for the local authorities by treating organic waste at source.

3. To incentivise organic waste treatment by private and community efforts through costs savings by local authorities.

4. To emulate nature and return all organic outputs to food production, parks and gardens and energy production thereby completing the nutrient cycle to ensure a sustainable food supply and security.
BAGAN AJAM WET MARKET WASTE COMPOSTING PLANT
Heng Ee High School Canteen waste Collection (3,000 students)

Bayan Baru Hawker Complex Food Waste Collection
Groundswell Static Fermentation Process
Waste to top soil

Stage 1: Picking Incoming Waste
Stage 2: Inoculating With Starter & Seeder
Stage 3: Turning & Respraying
Stage 4: Curing

4-6 weeks
8-12 weeks
1. Building more Zero Waste Communities
2. Food Waste, Bulk Waste & Green Waste Recovery using the Groundswell Process
3. Food to Food - Sustainable Organic Waste Management to Agriculture Training Centre, Seberang Perai using the Groundswell Process
4. Zero discharge system for pig farming area with conversion of pig waste into bio-gas, compost or algae cultivation.
5. Identifying more other activities and projects for strategies and approaches for the implementation of the Penang’s Organic Waste Policy — such as waste separation at source
TERIMA KASIH