Solid Waste Management in Singapore

National Environment Agency

Strategy 1: Waste Minimization

Singapore Packaging Agreement
- Prevent waste generation at source
- Jointly developed by Government, Industry & NGOs; signed Jun 07; valid for 5 years
- Signatories
  - set targets voluntarily
  - formulate action plans to reduce and reuse packaging waste
- 122 signatories

Strategy 2: Recycling

Recycling of Domestic Waste
- National Recycling Programme (NRP)
  - For HDB / Landed Premises
  - Participation rate = 63%
  - Door-to-door fortnightly collection
  - 1,600 centralised recycling depositories
- Mandatory provision of recycling receptacles for all condominiums
- School Recycling Corner Programme (100%)
- Annual Recycling Week
- Public Areas (4,160 recycling bins)

Recycling of Industrial and Commercial Waste
- Used Slag (378,900 tonnes, 99%)
- C & D Waste (921,800 tonnes recycled, 99%)
- Ferrous Metal (1,127,500 tonnes recycled, 94%)
- Wood / Timber (190,000 tonnes recycled, 70%)
- Paper / Cardboard (738,200 tonnes recycled, 53%)
- Horticultural Waste (99,200 tonnes recycled, 40%)
- Food Waste (102,400 tonnes recycled, 16%)
- Plastics (78,100 tonnes recycled, 11%)

Overall Recycling Rate

Closing the Waste-to-Resource Loop
Strategy 3: Waste-to-Energy

A Cost Effective Method of Refuse Disposal as:

- Volume of refuse can be reduced by 90%
- Energy can be recovered for power generation
- Scrap metal can be recovered for recycling

Strategy 4: Reduce Waste To Landfill

- Non-incinerable Waste: 477 t/d (e.g. sludge & slag)
- Incineration Ash: 1,728 t/d

- Trial use IBA in road construction completed

Waste Collection System

Domestic & Trade Premises

- Waste collection privatized in 2001
- Improve collection efficiency and service quality

Industrial & Commercial Premises

- Waste generators are free to engage licensed general waste collectors

Public Waste Collection Sectors

Ang Mo Kio-Toa Payoh
Hougang-Punggol
Woodlands-Yishun
Jurong
Pasir Ris-Tampines
Bedok
Clementi
Tanglin-Bukit Merah

Public Waste Collection Sectors

SemibWaste
Veolia E S
Coles
800 Super
Contract duration: 7 yrs

Waste-to-Energy Plants

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Cost ($)</th>
<th>Capacity (t/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIP</td>
<td>1986</td>
<td>200 million</td>
<td>1,700 (contracted)</td>
</tr>
<tr>
<td>SWTE</td>
<td>1992</td>
<td>560 million</td>
<td>2,100 (contracted)</td>
</tr>
<tr>
<td>TSIP</td>
<td>2000</td>
<td>890 million</td>
<td>3,000</td>
</tr>
<tr>
<td>KSTP</td>
<td>2009</td>
<td>160 million</td>
<td>800 (contracted)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>7,600</td>
</tr>
</tbody>
</table>

Waste Disposed

(Daily Average 1970 – 2010)
Locations of Disposal Facilities

<table>
<thead>
<tr>
<th>Disposal Site</th>
<th>Disposal Fee Per Tonne</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuas IP</td>
<td>$77 +</td>
</tr>
<tr>
<td>Tuas South IP</td>
<td>Same fee applies for Tuas IP, TIP, TSIP to deter non-incinerable waste being disposed of at IP, resulting in damage of equipment</td>
</tr>
<tr>
<td>Keppel Seghers Tuas WTE Plant</td>
<td>Same fee applies for Tuas IP, TIP, TSIP to deter non-incinerable waste being disposed of at IP, resulting in damage of equipment</td>
</tr>
<tr>
<td>Senoko WTE Plant</td>
<td>Higher fees introduced to ensure better distribution of waste to the 4 IPs</td>
</tr>
</tbody>
</table>

Public-Private-Partnership (PPP)

DBOO IP
- The Keppel Seghers Tuas Waste-to-energy Plant is developed under the Design-Build-Own-Operate (DBOO) scheme
- The plant is providing incineration services to NEA over the 25-year period from 2009 to 2034

Divested SIP
- Senoko Plant was divested in Sep 09
- The plant is providing incineration services to NEA over the 15-year period from 2009 to 2024

Semakau Landfill
- A unique environmental solution created entirely out of the sea space
- Commenced operation on 1 Apr 99
- Area: 320 hectares
- Capacity: 220,000 t/year
- Cost: SGD 410 million
- Received (2010): 477 t/d non-incinerable waste
- Estimated lifespan: until 2045

In the longer term...
- Sustainable Development Blueprint
  - Key goals and initiatives for the next 10 to 20 years
  - Boosting our Resource Efficiency, we aim to attain recycling rate of:
    - 65% in 2020 (Intermediate goal)
    - 70% in 2030

Thank you.