INTEGRATED SOLID WASTE MANAGEMENT: CHALLENGE AND FUTURE

YBHG. DR. MOHD PAUZE BIN MOHAMAD TAHA
DEPUTY CHIEF EXECUTIVE OFFICER (TECHNICAL)
SOLID WASTE AND PUBLIC CLEANSING MANAGEMENT CORPORATION
SWCORP
TOPIC FOCUS AREA

VISION TOWARDS YEAR 2020

POLICIES & MECHANISME FRAMEWORK

ISSUES AND CHALLENGES

TRANSFORMATION ACHIEVEMENTS

WAY FORWARD
INTEGRATED SOLID WASTE MANAGEMENT:
VISION TOWARDS 2020
“Achieving growth that is inclusive, sustainable, growth with equity, competitive and progressive…”
– Dato’ Seri Najib Tun Razak, Malaysia Prime Minister
40% LANDFILL DIVERSION

- 16.76 million tonne of waste expected to be generated by Malaysian in the year 2020

- 40% reduction of waste disposed to landfill by year 2020, through:
  - 22% Recycling
  - 80% Intermediate treatment such as Waste to Energy (WtE), Composting and Material Recovery
22% RECYCLING RATE

Household and Commercial Solid Waste Generation

- **Waste Generated** (million tonne per year)

  - **2000**: 6
  - **2007**: 8
  - **2010**: 10
  - **2015**: 12
  - **2020**: 16

- **Recycling rate**
  - Household: 5%
  - Commercial: 22%

- **Waste Composition**
  - Household Waste: 70%
  - Commercial Waste: 30%

- **2020 Projection**
  - **16.76 million tonne** of waste is expected to be generated by Malaysian in the year 2020
  - **Estimated 45,900 tonne/day** in the year 2020
INTEGRATED SOLID WASTE MANAGEMENT:
POLICIES AND FRAMEWORKS
Focus area B
Adopting the sustainable consumption and production

Strategy B5: Managing Waste Holistically

- Through better coordination, encouraging 3R and using waste as resources for other industries
11th Malaysia Plan
Selected Outcome

- DSM: Formulation of a comprehensive demand side management master plan
- 2,080 MW: In renewable energy installed capacity
- At least 20%: Government procurement to be green
- 22%: Recycling rate of household waste

Up to 40%: Reduction in GHGs emission intensity of GDP compared to 2005 level
ACT 672: SOLID WASTE AND PUBLIC CLEANSING MANAGEMENT 2007

- **Waste Category**
  - Household
  - Commercial
  - Construction and Demolition
  - Industry
  - Institutions
  - Public
  - Imported

- **Public Cleansing**
  - Streets, Public Area, Public Toilets, Public Drainage
  - Markets, Hawker Centre
  - Illegal Dumping
  - Beaches
  - Roadside Grass Cutting
  - Removal of Carcasses

• To standardize the level of Solid Waste Management and Public Cleansing across all Local Authorities
• To create an economically and environmentally sound Solid Waste Management Industry
INTEGRATED SOLID WASTE MANAGEMENT: ISSUES AND CHALLENGES
# INCREASING WASTE GENERATION

<table>
<thead>
<tr>
<th>YEAR</th>
<th>2005</th>
<th>2012</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Waste Generated (Tonne/Day)</td>
<td>19,000</td>
<td>33,000</td>
<td>38,200</td>
</tr>
<tr>
<td>Waste disposed in Landfill (Tonne/Day)</td>
<td>18,050</td>
<td>30,129</td>
<td>35,335</td>
</tr>
<tr>
<td>Disposal Percentage</td>
<td>95%</td>
<td>91.3%</td>
<td>82.5%</td>
</tr>
</tbody>
</table>

**Assumption Factors:**

1. Rapid population growth, increase **4%** per year
2. Waste generation rate average from **0.8kg/cap/day** – **1.12kg/cap/day**
3. Increasing recycling rate from 5.0% in 2005 to **17.5%** in 2016
# CHANGES IN WASTE COMPOSITION

<table>
<thead>
<tr>
<th>Main Waste Component</th>
<th>2005 (%)</th>
<th>2012 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic / Food Waste</td>
<td>45</td>
<td>44.5</td>
</tr>
<tr>
<td>Paper</td>
<td>7</td>
<td>8.5</td>
</tr>
<tr>
<td>Plastic</td>
<td>24</td>
<td>13.2</td>
</tr>
<tr>
<td>Metal</td>
<td>6</td>
<td>2.7</td>
</tr>
<tr>
<td>Glass</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Diapers</td>
<td>?</td>
<td>12.1</td>
</tr>
<tr>
<td>Others (textiles,tetrapek,HHW,Leather,etc)</td>
<td>15</td>
<td>15.7</td>
</tr>
</tbody>
</table>

**Notes:**

1. **Food Waste** is still a significantly major component of generated waste (45%) and contains high organic compound.
2. Due to unseparated waste, more than 30% potentially recyclable materials such as paper, plastic, aluminum, glass are still directly disposed in landfills.
3. **Diapers** has become a major component (12.1%).
UNSANITARY LANDFILLS

- Total dependency on landfill. Current in operation landfills are 161 sites
- Only 14 Sanitary Landfill all over Malaysia
- Using an over capacity landfill
- Lack of land especially within major conurbation and corridors
- Increasing Methane gas (CH$_4$) and Green House Gases (GhG) emissions
LANDFILLS IN MALAYSIA

<table>
<thead>
<tr>
<th>STATE</th>
<th>OPERATION</th>
<th>CLOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johor</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>Kedah</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Kelantan</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Melaka</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Negeri Sembilan</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>Pahang</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Perak</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Perlis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Pulau Pinang</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Sabah</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>Sarawak</td>
<td>49</td>
<td>14</td>
</tr>
<tr>
<td>Selangor</td>
<td>8</td>
<td>14</td>
</tr>
<tr>
<td>Terengganu</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Wilayah Persekutuan</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>161</td>
<td>141</td>
</tr>
</tbody>
</table>

OVERALL TOTAL 302
WORLD RECYCLING RATE

Malaysia 17.5% 2015

Data Source: www.atlas.d-waste.com
## POTENTIAL RECYCLING RATE 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
<th>Potential Amount Waste</th>
<th>Potential Recycling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kg / Day</td>
<td>Tonne / Year</td>
</tr>
<tr>
<td>Household and Commercial</td>
<td>40%*</td>
<td>15,326,400.00</td>
<td>5,594,136.00</td>
</tr>
<tr>
<td>Manufacturing Industry</td>
<td>90%**</td>
<td>21,416,445.32</td>
<td>7,817,002.54</td>
</tr>
<tr>
<td>Construction and Demolition</td>
<td>85%**</td>
<td>30,933,358.36</td>
<td>11,290,675.80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>67,676,203.67</strong></td>
<td><strong>24,701,814.34</strong></td>
</tr>
</tbody>
</table>

* Source: Laporan GSR Environmental Consultancy Sdn (2012)
** Source: Laporan DANIDA (2010)
SOLID WASTE DISPOSAL BECOME A CRITICAL ISSUES

Illegal dumpsite still an eyesore 10 years on
Businesses along Jalan Raja Arfah in Segambut affected by mess

Perfect Lifestyle '14
20-22 June
Sona City Convention Centre (BCC) Sibu, Sarawak
www.perfectlifestyle.com.my

Story by DORIS TAN
and photo by JEREMY LIM

Shin business operators in Segambut are suffering from an issue that has been around for more than 10 years. Running near Jalan Raja Arfah, a dumpsite has been incessantly overflowing, leading to health hazards. The dumpsite has become a serious issue for the area, with waste being spread across the streets.

The dumpsite has been a constant issue for the area, with concerns being raised about the potential health hazards posed by the waste. Business owners have reported difficulties in conducting their operations due to the stench and the sight of the waste.

Over RM25mil spent on cleaning rivers in three years
Kuala Lumpur: More than RM25mil has been spent over the past three years to clean up polluted rivers in the country.

For Sungai Klang, the cleaning has been a major task due to the large amount of garbage and rubbish dumped upstream. For most other rivers and tributaries, maintenance cleaning is done weekly or monthly.

Drainage and Irrigation Department’s river basin and coastal management division director Datuk Lim Chow Hock said the cost of cleaning varied, depending on how polluted a river is.

The four most polluted rivers, based on the volume of rubbish thrown into them, are Sungai Klang, Sungai Tebrau, Sungai Skudai and Sungai Pinang.

From 2006 to next year, the Federal Government has allocated RM114mil to rehabilitate rivers, under the “One State One River” programme, which is targeted at the most polluted rivers.

Lim said as most people in Sabah and Sarawak refrain from throwing rubbish into the drains, rivers were not so polluted there.

“If all boats down to having the right attitude and being civic-minded when disposing rubbish, this will be added. The Department of Environment, in its 2012 River Water Quality report, listed 34 rivers under the “polluted” category, based on water quality. Out of the 473 rivers in Malaysia monitored, 161 rivers were deemed “slightly polluted” while the rest were classified as “clean”.

Johor had the most under the category of polluted rivers with 18, followed by Penang with nine, Malacca and Kelantan (two each), followed by Redhu, Perak, Terengganu and Selangor (one each).

Waterway eyesore: Garbage found along Sungai Pirai.
INTEGRATED SOLID WASTE MANAGEMENT:
MAJOR INITIATIVES
MAJOR TRANSFORMATION INITIATIVE

1. Federalization of Solid Waste Management
2. Privatization of Solid Waste and Public Cleansing Services
3. Enhancement on Awareness Programme
4. Waste Technology Utilization for Effective Services and Recovery
FEDERALIZATION OF SOLID WASTE MANAGEMENT

**Solid Waste and Public Cleansing Management Act 2007**
- Enforcement 1 September 2011 in 7 States and Federal Territories (Peninsular Malaysia)
- Provides an Executive Authority to Federal Government on Solid Waste Management and Public Cleansing

**Department of National Solid Waste Management**
- Propose policy, plan and strategies
- Formulate plans for SWM facilities
- Sets standard, specification and codes of practices

**Solid Waste and Public Cleansing Management Corporation**
- Implements and enforces the laws and regulations
- Monitors standards, specifications, codes of practice and compliance
- Implements policies, plans, strategies
- Promotes public participation and to improve public awareness
- Maintains and improves the standards and level of services
Enforcement of Act 672

Development of Regulation of Scheme & Licensing of all categories of solid waste:

- Regulation on Household and Institutions Solid Waste Collection
- Regulation on Development of Prescribed Solid Waste Management Facilities
- Regulation on Construction Solid Waste Collection
- Regulation on Business (Commercial and Industrial) Solid Waste Collection
- Regulation on Transportation Services of Solid Waste Collection
- Regulation on Provision of Public Cleansing Services
- Regulation on Compounding Offences
- Regulation on Separation at Source
IMPROVEMENT ON SOLID WASTE & PUBLIC CLEANSING SERVICES

Introduction on Key Performance Indicator (KPI’s)
- Waste Collection: 24 Key Performance Indicator
- Public Cleansing: 51 Key Performance Indicator

Provision on Waste Storage Bins
- 120L Bins: Landed Properties

New Collection Vehicles
- Compactors
- Catch Basin Cleaner System
- Beach Comber
- High Pressure Jetter

Separation at Source
- Enforcement starts from 1 Sept 2015
- 2+1 Collection
- 38 Drop off Point
- 2,567 Recycling Cage

Public Cleansing
- Grass Cutting
- Road Sweeping
- Drain Cleansing
- Beach Cleansing
- Public Places Cleansing
ENHANCEMENT ON AWARENESS PROGRAMME

- 3R@edu
- 3R@kids
- 3R@Dthru
- 3R@Gov
- 3R@Comm
- Recycling Clubs
- 3R Exhibitions
WASTE RECOVERY THROUGH NEW TECHNOLOGY

- Waste To Energy Facilities
- Construction and Demolition Recovery Facilities
- Landfill Safe Closure
- Organic Waste Facilities
- Integrated Waste Management
INTEGRATED SOLID WASTE MANAGEMENT: CURRENT ACHIEVEMENTS
Improve Service Level

• Key Performance Indicator (KPI) for waste collection to concessionaire:
  – 6 primary indicator
  – 18 secondary indicator

• Key Performance Indicator (KPI) for public cleansing to concessionaire:
  – 15 primary indicator
  – 36 secondary indicator
Provide New Bins

Introduction to 2 (Mixed waste) + 1 (Recyclable, green & bulky waste) Per week Collections
New Collection Vehicle

2011
683
Compactors

2015
914
Compactors

 PRIVATISATION
MODERN AND AUTOMATIC MACHINERY

2011
- 30 Road Sweepers
- 18 High Pressure Jetter
- 14 Catch Basin Cleaner System
- 2 Beach Comber

2015
- 80 Road Sweepers
- 95 High Pressure Jetter
- 81 Catch Basin Cleaner System
- 5 Beach Comber
SEPARATION AT SOURCE
Transforming public mindset
SEPARATION AT SOURCE

Recycling Cage

2015

2,567 units of recycling cage for high rise residency
SEPARATION AT SOURCE
Collection of Recyclables Waste

2015
38 Drop off Recyclables Collection Point
SEPARATION AT SOURCE

New Collection Vehicles

2011
82 Open Tippers

2015
648 Open Tippers
RECYCLING BANKS
Kindergarten and Primary School

3R@EDU: Recycling Bank
1,095 Nos of School

3R@KIDS
1,082 Nos Kindergarten
DRIVE THRU PROGRAM
With Communities

3R@Dthru
185 Nos of Drive Thru Location
PUBLIC AWARENESS EXHIBITION

3R Exhibition
420 Nos of Exhibition
PUBLIC PARTICIPATION THROUGH 3R PROGRAMME

3R@GOV
552 Nos of Government Agencies

3R@COMM
664 Nos of Community

Recycling Clubs
1,712 Nos of Clubs

3R Talk
1,568 Nos of Talk Session

3R@Private Agencies
6 Nos Agencies
WASTE TO ENERGY FACILITY

The First Waste to Energy Facilities in Malaysia

• Located at Taman Beringin, Kuala Lumpur
• Estimated capacity 1000 tonne/day
• Green Emission
• Energy 25MW
• Expected to completed 2019
INTEGRATED SOLID WASTE FACILITY

LADANG TANAH MERAH, NEGERI SEMBILAN

140 Hectar of land area which includes:

Waste to Energy (WtE) Plant
- 600 tonne/day
- Energy 20MW

Anaerobic Digestor
- 5 tonne/day

Construction and Demolition Recycling Centre
- 300 tonne/day

Sanitari Landfill
- 800 tonne/day
INCINERATOR

TIOMAN ISLAND INCINERATOR
CAPACITY: 15 TONNE/DAY

PANGKOR ISLAND INCINERATOR
CAPACITY: 20 TONNE/DAY

CAMEROON HIGHLAND INCINERATOR
CAPACITY: 40 TONNE/DAY
CONSTRUCTION AND DEMOLITION RECOVERY WASTE FACILITY

Capacity : 500 tonne per day

Total CnD Waste 2015 recovered : 1115 tonne per year
WASTE MANAGEMENT INTEGRATED PROJECT AT FRASER HILL

IN COLLABORATION WITH KITAKYUSHU CITY HALL (JAPAN)
- TREATED 500 TONNE/YEAR OF ORGANIC WASTE
FOOD WASTE FACILITIES CENTRE: ANAEROBIC DIGESTER

PULAU TUBA, LANGKAWI
CAPACITY: 500 KG / DAY

KULIM HI-TECH, KEDAH
CAPACITY: 1000 KG / DAY
FOOD WASTE FACILITIES CENTRE: WASTE COMPOSTER

ALAMANDA PUTRAJAYA SHOPPING CENTRE
CAPACITY: 50 KG/DAY

PRESINT 9 (2) PUTRAJAYA PRIMARY SCHOOL
CAPACITY: 50 KG/DAY

MINISTRY OF URBAN WELLBEING, HOUSING AND LOCAL GOVERNMENT, CAFETERIA
CAPACITY: 50 KG/DAY
LANDFILLS SAFETY CLOSURE

RIMBA TERJUN LANDFILL

JABOR JERANGAU LANDFILL

SAFETY CLOSURE LANDFILLS

17 SITES
NATIONAL GUIDELINE

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Guideline on Waste Management System for New Development Residential

Guideline on Waste Management at Construction Site
Standard Operating Procedures
Solid Waste Collection & Public Cleansing
INTEGRATED SOLID WASTE MANAGEMENT: WAY FORWARD
MALAYSIA ASPIRATION BY 2020

13 Integrated Facilities + 22% Recycling Rate → 40% Waste Diversion from Landfill
MALAYSIA ASPIRATION BY 2020

Effective Solid Waste & Public Cleansing Management

- Separation at Source
- 17 Transfer Stations
- 23 Sanitary Landfills
- 44 Landfills Safe Closure
WASTE ECO PARK

The First Waste Eco-Park

- Waste generated from process could become resources to other manufacturing
- Symbiosis with nature
- Zero waste and green emission
- Incentive for Waste Eco Park
MALAYSIA

TOWARDS A CLEAN AND SUSTAINABLE NATION

THANK YOU