IMPLEMENTATION OF 3R IN INDONESIA

The 2nd Meeting of the 3R Regional Forum in Asia
Kuala Lumpur, 4-6 October 2010
The Background

- **General Facts**
  - Area: 1.9 million km² (world’s 15th largest, 9 times larger than the size of Korea)
  - Climate: Tropical
  - Population: 230 million (4th in the world); over 300 tribes including Jawa (35%), Sundanese (13.6%), Aceh, Balinese, etc.
  - Language: Bahasa Indonesia
  - Industry structure: Mostly Oil and Gas, Agriculture and Manufacturing
  - Maintained over 6% growth rate by stabilizing inflation through controlling local oil price and taxes on telephone and electricity, and lowering Central Bank’s interest rate.
Waste Management Status

**Waste Management Implementation**

- Waste Management in Indonesia is regulated by two Laws i.e. Law No. 32/2009 for Industrial Waste and Law No. 18/2008 for Municipal Solid Waste (MSW)
- To implement Law No. 18/2008, MOE Indonesia is currently formulating 3 drafts of government regulations including Waste Minimisation, Waste Handling, and Waste Specific Management
- Conducting 3R implementation by building pilot projects, giving subsidies, providing 3R facilities esp. composting facilities
- Developing eco-industries project in industrial zone
- Conducted e-waste inventory

![Waste Management Diagram]

- **Generated Waste**
  - Municipal Solid Waste (MSW)
    - Contains Hazardous
    - Non Hazardous
  - Industrial Solid Waste
    - Hazardous
  - Electronic and Electrical Waste (e-waste)
    - Hazardous
MSW Management

Source and Characteristic of MSW

- MSW generation in nation wide is about 176,000 ton daily
- Composition by source: household waste (48%), market waste (24%), commercial waste (9%), street and public facilities waste (5%), and others (14%)
- Compostable organic waste is dominated the MSW composition in Indonesia however the number of this type of waste tends to decrease. Meanwhile plastic and paper waste increase significantly.

## MSW generation

<table>
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<tr>
<th>Year</th>
<th>MSW generation (unit: kg/capita/day)</th>
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<tbody>
<tr>
<td>1995</td>
<td>0.8</td>
</tr>
<tr>
<td>2000</td>
<td>1.0</td>
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<tr>
<td>2010</td>
<td>2.1</td>
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## MSW Composition by Source

- Household: 48%
- Market: 24%
- Commercial: 9%
- Street & public facilities: 5%
- Others: 14%
3R in MSW Management

Shifted Paradigm of Solid Waste Management in Indonesia

PRIOR

- WASTE
  - COLLECTION
  - TRANSPORTATION
  - DISPOSAL

PRESENT

- WASTE
  - REDUCE
  - REUSE
  - RESIDUE
  - TRANSPORTATION
  - TREATMENT
    - SANITARY LANDFILL/ WASTE TO ENERGY
    - CLEAN DEVELOPMENT MECHANISM
MSW Management

3R Status

- MSW handling: collected (69%), buried (10%), composted & recycled (7%), open burned (5%), unmanaged (10%)
- Coverage of MSW collecting services in nation wide is about 40-50%
- There are composting activities at any scale including household, community, mid to big composting
- Portion of composted waste in 2010 is about 0.5% of total MSW
- Recycling activities is mainly conducted by informal stakeholders
- By law, we have started to change our MSW management paradigm i.e. from collect-transfer-dump into reduce at source and resource recycle

Current MSW Handling

Source: Indonesian domestic solid waste statistics in year of 2008
Industrial Waste Management

Source and 3R Implementation of Industrial Waste (PROPER Industries)

- Industrial waste is mostly considered as hazardous
- Major industries in Indonesia as follows: basic and chemical, energy, miscellaneous, agriculture, mining, and oil & natural
- The largest 3R implementation of industrial waste is in agriculture industry. The utilisation of waste is mainly used for fuel at own factory
- Another major industrial waste that utilised as 3R is ash as building material
- Some cement industries is already utilised waste as co-generation or co-processing activities

Holcim Indonesia Own Two Cement Plants:
- Located at Cilacap Central Java
- Located at Narogong West Java

Each Plants has been co-processing wastes at temperature > 1800°C

For 2010, waste energy recovery within Narogong Plant is estimated:
- 100.000 ton for Industrial Hazardous Waste
- 120.000 ton for Biomass Recovery
- 20.000 ton for Sorted Municipality Solid Waste (in bales)

Calculated Energy coloric value – Thermal Substitution Rate with saving due to utilization of waste is about 10 %

Source: Utun Sutrisna, AMC/CMA
3R Implementation of Industrial Waste

I. Existing Krakatau Steel Plant (Gas Bases)
   Capacity 2 mio Ton per year
   - Iron Making
   - Steel Making
   - Sludge
   - Cement Plant
   - Atomizing
   - Recovery

II. New Krakatau Steel Project Posco (Blast Furnace)
   Capacity 3 mio Ton per year
   - Coke Oven
   - Iron Making
   - Steel Making
   - Off Gas Recovery
   - 1. Power Plant
   - 2. Recycle Gas
   - Hight silica slag 20 – 25 %
   - Cement Plant
   - Atomizing
   - Recovery

Source: Utun Sutrisna, AMC/CMA
E-Waste Management

Source and 3R Implementation of e-Waste

• The absence of such regulation would give difficulties in collecting data on e-waste from households which considered as the largest consumers of electronic products.
• There is no obligation for producers to manage, “take back” their obsolete products indicates that there is no liable part responsible for generation of e-waste including its management.
• The Ministry of Environment has formulating regulation or policy on electronic waste treatment and disposal.
• Further study on e-waste inventory should be focused on:
  1. Data collecting from Specific Sources
  2. Data collecting from Recycle Facilities
  3. Data collecting of Post Consumer Electronic Products
3R Implementation of Industrial Waste and e-Waste

3R of e-Waste Industry

Source: PT Teknotama Lingkungan Internusa
# The Current Capacity & Constraints of 3R

## Institutional Aspects
- Need comprehensive strategy on waste management and 3R both national and local level
- Need institutional capacity and human resource development particularly in local level
- Need a clear and fair role and responsibility among stakeholders including informal sector

## Building Awareness Aspects
- Need to implement a extensive campaign programmes and activities
- Need to educate people in early ages through educational system and institution
- Need a strong collaboration among stakeholders

## Policy and Regulation Aspects
- Need comprehensive legal framework of waste management and 3R
- Need a complete technical regulations that regulate standards, mechanism, criteria, etc.
- Need a complete technical guidelines

## Financial Aspects
- Need to set up a reasonable budget allocation for waste management and 3R especially at local level
- Need involvement of private sector for building waste management and 3R infrastructure
- Need support from international through bilateral and multi-lateral cooperation
The Policy Direction of 3R

**Benchmarking**
- Comprehensive Regulations
- Integrated Planning and Coordination
- Measurable Goal and Target
- Community Awareness

**Implication**

1. **Define Legal Framework**
   - Integrate and synergise central and local regulations
   - Define clear role and responsibility among line ministries and local agency

2. **Integrated Waste Management**
   - Integrate up stream and down stream activities
   - Integrate to related policies such as ecosystem, spatial planning, water & air pollution, green development, etc.

3. **Manage Quantitative Goals**
   - Set management target according to prevention principle
   - Minimize waste generation, maximize reuse and recycle

4. **Manage Extensive Campaign**
   - Promote 3R to community at all level
   - Set campaign programme with well-defined target and method
The Policy Direction of 3R

**Vision**

**Establish 3R Society**

**Minimisation**

- Establish basis for environmentally waste management

**Waste Transform**

- Consider resource circulation, establish efficient recycling system

**Proper Management**

- Expand waste management infrastructure, such as technology, finance, facility, etc.

**Management Advancement**

- Advance waste management policy through information and science orientation

**Direction**

**Target**

- Prevent generation and promote reduction at the source of generation
- Promote reuse, recycling and energy recovery

- Create basis for value management for resource circulation
- Promote energy transform of waste

- Expand waste treatment and disposal facility
- Establish and advance hazardous waste management system

- Improve accuracy and reliability of waste-related statistical data
- Improve efficiency through public-private cooperation

**Comprehensive Regulations**

**Integrated Planning & Coordination**

**Measurable Goal & Target**

**Measurable Goal & Target**
The Plan

Establish 3R Society in Waste Management

- Rational role assignment for economic subject
- Expansion of voluntary waste recycling system led by manufacturer
- Creation of basis for national waste statistics survey
- Technology development for accelerating waste recycling

Phase 1
Establish 3R Society in Waste Management

Phase 2
• Adjust waste-related legal system and improve assortment system
• Establish integrated waste management system
• Promote waste management using information system
• Start compensation and penalty system

Phase 3
• Establish information system
• Establish integrated waste management system
• Establish waste management governance
• Introduce new waste disposal technology
• Develop and apply waste management model meeting globalization and internationalization

~2010
• Adjust role assignment for waste management

~2015
• Establish waste management infrastructure and adjust system

~2020
• Genuine operation of New waste management system
### The Achievements

<table>
<thead>
<tr>
<th>Category</th>
<th>Achievements</th>
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</table>
| **Law and regulations**   | • Established the basis law of MSW Management  
• Working on draft of 2 implementing regulations i.e. waste minimisation and waste handling  
• Studying on preparing the content of the 3\textsuperscript{rd} implementing regulation i.e. specific waste management |
| **Pilot Projects**        | • Developed several pilot projects of 3R implementation both city-scaled and community-based in some cities  
• Disbursed subsidies for 3R facilities development to local governments |
| **Capacity Development**  | • Established co-generation/co-processing  
• Conducted seminars, workshops, and trainings  
• Monitored and evaluated 3R implementation performance of local governments |
| **Raising Awareness**     | • Community-based 3R and composting  
• Conducted 3R campaigns both national and local level  
• Published campaign medias including video, books, magazines, poster, leaflet, etc.  
• Improvement in efficiency through competitive cooperation between private and public sector |
| **Informal Sectors**      | • Recycling industries have been established for 20 years  
• Estimated 90% of recyclables (PET, paper, metal) are recycled by informal sectors  
• This sectors also recycle e-waste at small scaled activities |
City-scaled Composting
Community-based 3R
Community-based 3R

Community able to turn waste into value added items, like compost and recycle product. The waste volume from household level also decrease → less waste to dumping sites

Composter Unit

Compost : green fertiliser at no cost

Biopores : for water conservation

Greener and Cleaner Community

Preserving traditional herbal plants

Greening

Community taking ownership

Adding Value to Packaging Waste

Waste segregation

Recycle Product

Trashion Product

Creating leader and reviving social value

Independent community

Government commitment to build the program further
3R Infrastructures Development


- Waste reduction of 20% through 3R Implementation through 250 projects stimulant
- Increase waste collection coverage area of 60%
- Improvement of landfill sites in 210 cities
- Improvement of vehicle of 3R is about 250 units
- Emission reduction project in 240 cities (to reduce 0.0048 Gton by 2020)
- Establish CDM project in 15 cities (supported by KFW and World Bank)

<table>
<thead>
<tr>
<th>PRIORITY ACTIVITIES</th>
<th>TARGET</th>
<th>INDICATOR</th>
<th>OUTCOME INDICATOR</th>
<th>TARGET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement of Solid Municipal Waste Infrastructures</td>
<td>210 cities/district</td>
<td>Landfill Revitalitation/Development</td>
<td>Number of Inhabitants served by solid waste infrastructure</td>
<td>55 60 70 70 60 210</td>
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<tr>
<td></td>
<td>250 units</td>
<td>Solid Waste Collection Facilities</td>
<td>Number of Inhabitants served by solid waste infrastructure</td>
<td>0 75 60 63 52 250</td>
</tr>
<tr>
<td></td>
<td>250 locations</td>
<td>3R Facilities</td>
<td>Number of Inhabitants served by solid waste infrastructure</td>
<td>50 75 39 43 43 250</td>
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3R Infrastructures Development
**Conclusion and Recommendation**

<table>
<thead>
<tr>
<th>Conclusion</th>
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<tbody>
<tr>
<td>● 3R has been put as mainstream policy and strategy in waste management in Indonesia</td>
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<td>● Implementing regulations of waste management law are currently being formulating</td>
</tr>
<tr>
<td>● Most local governments are still having less concern to promote and implement 3R in waste management</td>
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<tr>
<td>● In fact, informal sector is ‘the power of recycling’ industry in Indonesia</td>
</tr>
<tr>
<td>● The standards, criteria, procedures, and guidelines are to be set up</td>
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<tr>
<td>● The future policy direction is being developing</td>
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<table>
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<tr>
<th>Recommendation</th>
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<tbody>
<tr>
<td>● Indonesia needs international support from both UN Bodies and Donor Agencies</td>
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<td>● 3R Regional Forum should transform into actions</td>
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<td>● Public private partnership mechanism could be an option for implementing 3R especially in infrastructures and facilities development</td>
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