Mercury containing Waste
Capacity Building & Institutionalization

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2010/3/19
United Nations Environment Programme
Division of Technology, Industry and Economics
International Environmental Technology Centre
Mandate

• UNEP Government Council decision (GC 25/8) on Waste Management GC25/8 implementation of an Integrated Waste Management (IWM) approach.

• The Bali Declaration, by Conference of Parties under Basel Convention, on Waste Management for Human Health and Livelihood re-confirms this decision.

• UN Commission on Sustainable Development (CSD) has also agreed to undertake waste as one of the focus areas for CSD 18
UNEP Activities on Waste

- ISWM Plan for Wuxi New District, China – Mar 08
- ISWM Plan for Pune City, India – Aug 08
- ISWM Plan for Maseru City, Lesotho – June 09
- ISWM Plan for Matale City, Sri Lanka – Oct 08
- ISWM Plan for Novo Hamburgo, Brazil – Aug 09
- ISWM Plan for Nairobi, Kenya – In progress
- ISWM Plan for Bahir Dar, Ethiopia - In progress
- ISWM Training Package on ISWM - online
- Regional Training for Africa in Mauritius – Mar 09
- Regional Training for Asia-Pacific in Osaka – Oct 09
- South-South Cooperation on ISWM – Bali 2008
UNEP Activities on Waste

• **E-waste management:**
  Manuals on E-waste Inventory - online
  Manual on E-waste Management - online
  E-waste management Plan for Phnom Penh City, Cambodia

• **Converting agricultural waste biomass into a resource:**
  Compendium of Technologies - online
  Piloting in Nepal, Pakistan, Philippines and Sri Lanka — In progress
  Recycling of waste palm trees in Malaysia — under development

• **Converting waste plastic into a resource:**
  Compendium of technologies -
  Baseline/Piloting in India, the Philippines and Thailand

• **Waste management in the context of climate change**

• **Destruction Technologies for Hazardous Waste** — 2010-11
Publications on Waste

- Resource Augmentation in Viet Nam
- E-waste Inventory Manual
- E-waste Management Manual
- Waste Characterization & Quantification
- Assessment of Waste Management System
- Target Setting and Issues of Concern for ISWM
- How to develop ISWM Plan
- Compendium of Technologies for Converting Waste Agricultural Biomass into Resource
- Compendium of Technologies for Converting Waste Plastics into Resource
- Assessment Methodology for Waste Plastics
- Sustainability Assessment of Technologies (SAT) Framework (Draft)
- Waste and Climate Change
Proposed functions of UNEP-led strategy

1. Strengthening national institutions
2. Strengthening national networks
3. Supporting preparation of country programmes
4. Building awareness and capacity
5. Supporting development of appropriate regulations and policies
6. Technology identification and selection
7. Funding incremental costs of hardware and operations
8. Supporting international networking and cooperation
9. Enabling stakeholder involvement
Key Areas for Capacity Building

1. Data collection – technical capacity, cost and time

2. Development and implementation of ISWM or WEEE/E-waste management plan based on 3R approach covering:
   - Identification of appropriate policies (regulatory and fiscal) and development of a policy framework
   - Identification and implementation of environmentally sound technologies (EST)
   - Risk management, especially for informal sector
Key Areas for Institutionalization

1. Inventory Cell – Due to dynamic nature of data

2. Implementation of WEEE/E:
   - Coordination among various departments managing different waste streams
   - Stakeholders’ participation (waste generators, service providers, regulators/government, recyclers and community)
Capacity building of local partners on E-waste Inventory and Management:

Training and application of manuals through pilot projects

E-waste Inventory and Management: Training and application of manuals through pilot projects

E-waste Inventory and Management: Training and application of manuals through pilot projects

2010/3/19

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Awareness Raising

1. Government (National & Local) – All relevant departments
2. Stakeholders (waste generators, service providers, informal and formal businesses)
3. Civil society and academia
4. Project Team
Capacity Building

Project team consists of:
- National government (Environment, Industries, Customs, etc.)
- Local government (provincial and local government)
- Local experts from academia and non-profit organizations
Data/Information Collection

1. WEEE / E-waste Inventory
2. Current management system for WEEE / E-waste
   (Policies/Regulations, Institutions, Financing Mechanisms, Technology and Stakeholders’ role)
Capacity Building through Fieldwork and Deskwork
Major EEE Markets in PP
Formal & Informal Sectors
## E-waste Inventory

<table>
<thead>
<tr>
<th>Year</th>
<th>TV</th>
<th>PC</th>
<th>MP</th>
<th>Fridge</th>
<th>Air Con.</th>
<th>Washing Machine</th>
<th>Total</th>
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<td>380627.75</td>
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<td>23524.00</td>
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<td>2016</td>
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<td>32580.81</td>
<td>30095.06</td>
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<td>2018</td>
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<td>139911.21</td>
<td>851637.30</td>
<td>46184.10</td>
<td>54556.21</td>
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<td>2019</td>
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<td>143862.16</td>
<td>929820.20</td>
<td>65124.09</td>
<td>76763.43</td>
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<td><strong>1556770.59</strong></td>
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# E-waste components

<table>
<thead>
<tr>
<th>Year</th>
<th>Iron</th>
<th>Non Iron Metals</th>
<th>Glass</th>
<th>Plastic</th>
<th>Electronic Component</th>
<th>Others</th>
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<tr>
<td>2008</td>
<td>3079.60</td>
<td>607.16</td>
<td>1344.61</td>
<td>1190.69</td>
<td>618.63</td>
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<td>2009</td>
<td>3215.72</td>
<td>654.27</td>
<td>1631.38</td>
<td>1321.58</td>
<td>670.42</td>
<td>575.46</td>
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<td>2010</td>
<td>3352.26</td>
<td>704.19</td>
<td>1963.86</td>
<td>1466.61</td>
<td>729.53</td>
<td>616.22</td>
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<td>2011</td>
<td>3612.69</td>
<td>781.28</td>
<td>2329.34</td>
<td>1638.02</td>
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<td>844.78</td>
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<td>732.19</td>
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<td>3658.63</td>
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<td>839.82</td>
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<td>2015</td>
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<td>1075.45</td>
<td>4431.73</td>
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<td>2016</td>
<td>4630.82</td>
<td>1179.69</td>
<td>5231.77</td>
<td>2859.79</td>
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<td>1003.68</td>
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<td>2017</td>
<td>4882.07</td>
<td>1284.10</td>
<td>6046.56</td>
<td>3192.85</td>
<td>1424.08</td>
<td>1082.34</td>
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<tr>
<td>2018</td>
<td>5968.98</td>
<td>1629.66</td>
<td>6630.21</td>
<td>3612.52</td>
<td>1553.40</td>
<td>1295.49</td>
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<td>2019</td>
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<td>1991.58</td>
<td>7277.99</td>
<td>4091.08</td>
<td>1690.06</td>
<td>1558.87</td>
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## Waste Inventory for WND, China

<table>
<thead>
<tr>
<th>Types of Waste according to the source generation</th>
<th>Baseline Study (2006)</th>
<th>2010</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal waste from residential and commercial sources</td>
<td>333</td>
<td>390</td>
<td>560</td>
</tr>
<tr>
<td>Municipal waste from industries</td>
<td>82</td>
<td>100</td>
<td>140</td>
</tr>
<tr>
<td>Municipal waste from all sources</td>
<td>415</td>
<td>490</td>
<td>700</td>
</tr>
<tr>
<td>Industrial non-hazardous waste</td>
<td>586</td>
<td>692</td>
<td>988</td>
</tr>
<tr>
<td>Industrial hazardous waste</td>
<td>82</td>
<td>97</td>
<td>138</td>
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<tr>
<td>Hospital waste – total</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Hospital waste – hazardous</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Sludge</td>
<td>8</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>Construction &amp; demolition debris</td>
<td>32,805</td>
<td>38,733</td>
<td>55,333</td>
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</table>
Waste Inventory for Maseru, Lesotho

- Hazardous: 12.5%
- Glass: 9.1%
- Cans: 3.4%
- Scrap Metal: 3.6%
- Biodegradables: 23.9%
- Plastics: 14.5%
- Paper: 22.5%
- Other: 10.6%
Waste Inventory for Pune, India

Figure 4.4: Source wise Quantity of Waste Generation in Pune

United Nations Environment Programme
Division of Technology, Industry and Economics
International Environmental Technology Centre
Matale- Sri Lanka

**Existing Material Flow**
- Treatment at source: 2T
- Material Recovery for recycling: 7 T
- Discarded after resource recovery: 2 T
- Transfer stations: 40 T
- Landfill: 20 T
- Total Solid Waste: 47 T
- Reuse & recycling: 5 T

**Future Material Flow**
- Present Recycling: 4.44 T
- Fish & Meat Waste: 1.5 T
- Treatment for resource recovery: 15 T
- Composting: 8 T
- Biogas: 9 T
- Final Disposal: 10.7 T
- Textile: 1.16 T
- Plastic: 1.48 T
- Paper: 2.67 T
- Saw Dust & King Coconuts: 3.22 T
- C&D Waste: 5 T

2010/3/19
## Nairobi, Kenya

<table>
<thead>
<tr>
<th>Zone</th>
<th>Area_km²</th>
<th>Zonal total (tonnes/day)</th>
</tr>
</thead>
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<tr>
<td>Embakasi</td>
<td>182.7826587</td>
<td>1257.370058</td>
</tr>
<tr>
<td>Dagoretti</td>
<td>37.13374206</td>
<td>225.0527028</td>
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<tr>
<td>Westlands</td>
<td>98.5996449</td>
<td>601.7034426</td>
</tr>
<tr>
<td>Kasarani</td>
<td>86.15649606</td>
<td>488.828118</td>
</tr>
<tr>
<td>Makadara</td>
<td>19.60399945</td>
<td>136.9982422</td>
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<tr>
<td>Kamukunji</td>
<td>6.524124738</td>
<td>44.03501624</td>
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<tr>
<td>Starehe</td>
<td>9.13651373</td>
<td>691.1738564</td>
</tr>
<tr>
<td>CBD</td>
<td>2.613841564</td>
<td>5.228662047</td>
</tr>
<tr>
<td>Lang'ata</td>
<td>93.09927529</td>
<td>482.9907384</td>
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<tr>
<td>Nairobi</td>
<td>696.1</td>
<td>3923.724558</td>
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<table>
<thead>
<tr>
<th>Category</th>
<th>5 Day Total</th>
<th>Daily</th>
<th>%</th>
<th>5 Day Total</th>
<th>Daily</th>
<th>%</th>
<th>5 Day Total</th>
<th>Daily</th>
<th>%</th>
</tr>
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<tr>
<td>Organic</td>
<td>7.31</td>
<td>1.46</td>
<td>59.0</td>
<td>6.66</td>
<td>1.33</td>
<td>57.6</td>
<td>9.75</td>
<td>1.95</td>
<td>63.0</td>
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<td>Paper</td>
<td>1.90</td>
<td>0.38</td>
<td>15.3</td>
<td>1.20</td>
<td>0.24</td>
<td>10.4</td>
<td>1.09</td>
<td>0.22</td>
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<tr>
<td>Plastic</td>
<td>1.87</td>
<td>0.37</td>
<td>15.1</td>
<td>1.80</td>
<td>0.36</td>
<td>15.6</td>
<td>1.72</td>
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<td>Glass</td>
<td>0.26</td>
<td>0.05</td>
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<td>0.25</td>
<td>0.05</td>
<td>2.2</td>
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<td>Metal</td>
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<td>0.03</td>
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<td>Others</td>
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<td>0.18</td>
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<td>1.39</td>
<td>0.28</td>
<td>12.0</td>
<td>1.76</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>12.39</strong></td>
<td>2.48</td>
<td><strong>100.0</strong></td>
<td><strong>11.56</strong></td>
<td>2.31</td>
<td><strong>100.0</strong></td>
<td><strong>15.48</strong></td>
<td>3.10</td>
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<td>Per Cap/kg/daily</td>
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<td></td>
<td></td>
<td>0.45</td>
<td></td>
<td></td>
<td>0.52</td>
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Implementation of the Plan

Technologies
1. Technical Feasibility
2. Voluntary Measures
   1. Technical Feasibility
   2. Economic Viability
   3. Implement-ability

Policies (Regulatory & Fiscal)
1. Technical Feasibility

Implementation Strategy
(Financing, Human Resources, Institutional Aspects, Timeline-Schedule, etc.)

Monitoring & Feedback Mechanism

Detailed Schemes based on Strategic Action Plan (Measures)
- Institutional, Policy and Regulatory
- Technological/Infrastructure (Projects)
- Voluntary
Global Platform on Waste Management (GPWM)

Supported by: International Agencies, Governments, Forums, MEAs, GC, COPs, CSD
Future Activities

1. Regional training workshop for Asia-Pacific on WEEE/E-waste—tentatively August 2009 in Osaka, Japan

2. Pilot projects on E-waste management

3. ISWM plans for cities

4. Destruction technologies for hazardous waste, e.g. mercury containing wastes

5. Global Platform on Waste Management