



Setting the Scene: Challenges and Opportunities for WTE in DMCs

Ron H. Slangen
Urban Development Specialist
South Asia Department

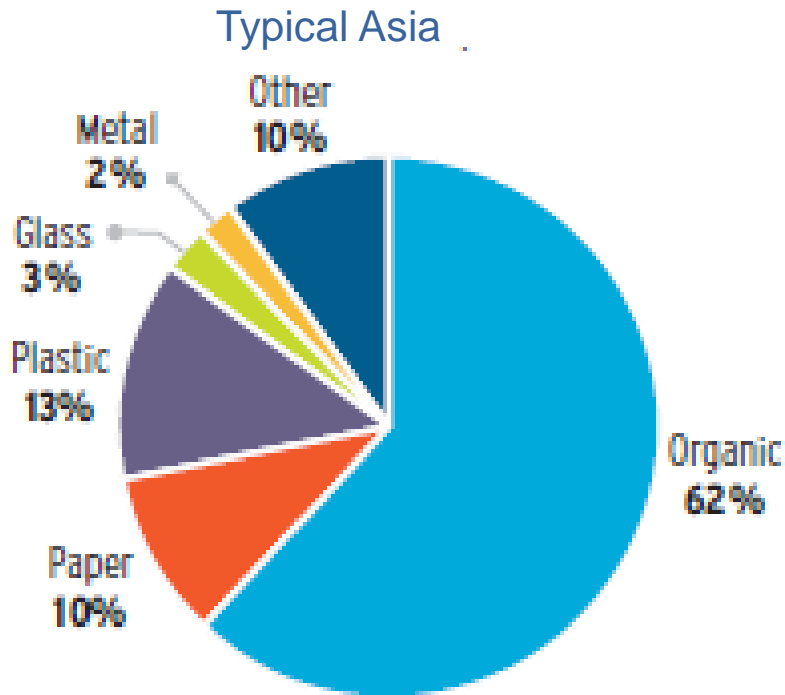
Waste Scenario in Asia

- ▶ Asia accounts for 25% of world's SW generation. Estimated at 40% in 2025.
 - East Asia: 1.8 million tons/day in 2025 (30% of global total)
 - South Asia: 0.57 million tons/day in 2025 (10% of global total)
- ▶ Fastest increases in China:
 - China surpassed US as world's largest waste generator in 2004
 - China estimated to produce 2X as much waste as US in 2030
- ▶ 60-90% of waste is collected in DMCs
- ▶ Open dumping widely practiced (esp. in South Asia)
- ▶ Mixed experience with user charges for SWM in DMCs

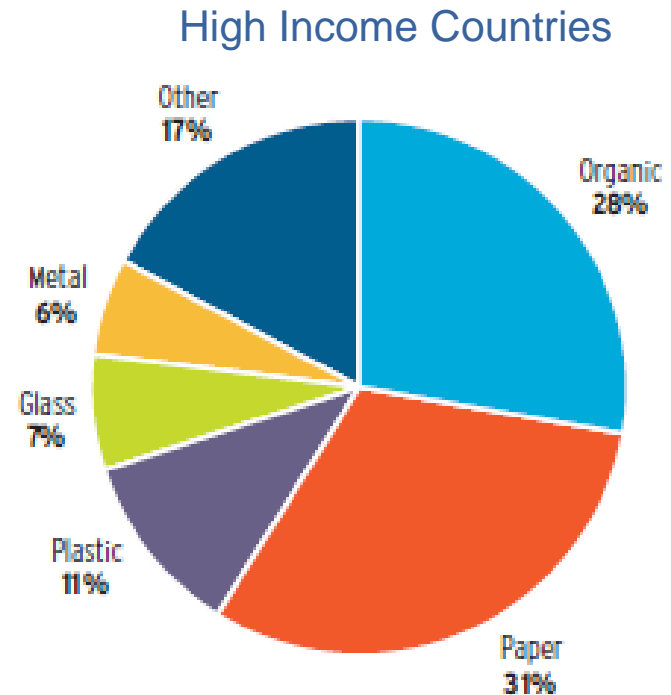


Waste Scenario in Asia

Waste Composition



Calorific value: varies from 700 to 1,700 K/cal/kg (WTE >2,000 k/cal/kg)



Calorific value: varies from 1,700 to 2,700 K/cal/kg (WTE >2,000 k/cal/kg)

Comparison of Waste Treatment Practices

Country (Year)	Untreated	Sanitary Landfill	Composting ^a and Recycling	Incineration
Bangladesh (2001)	88	10	2	0
PRC (2006)	48	43	2	8
European Union ^b	0	45	36	19
Hong Kong, China (2007)	0	55	45	0
India (2001)	60	15	10	5
Japan (2005)	0	8	19	73
Nepal (2001)	70	10	5	0
Singapore (2007)	0	10	0	90
Sri Lanka (2001)	85	0	5	0
United States (2007)	0	54	34	13

Source: United Nations Environment Programme. 2001. *State of Environment in Asia and Pacific*. Nairobi.

Drivers for WTE in DMCs

- ▶ Land scarcity and high land prices
- ▶ Air and water pollution
- ▶ Economic impact of open dumping on tourism and business
- ▶ Demand for alternative energy sources
- ▶ Climate change





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Challenges of WTE in DMCs

- ▶ Low calorific values. High moisture content, high inerts
- ▶ Social issues with waste pickers
- ▶ Overly optimistic waste projections by vendors
- ▶ Site selection near energy grids
- ▶ High capital and O&M costs
- ▶ Weak and unreliable cash flows
- ▶ Low electricity tariffs
- ▶ High tipping fees. Cities unable or unwilling to pay
- ▶ Need for stable energy demand and prices
- ▶ Limited env. pollution control and monitoring
- ▶ Lack of skilled workers and weak facility management



Key Criteria for WTE Success

- ▶ Need more accurate data on future waste quantity
- ▶ Meet calorific value requirements
- ▶ Establish reliable cash flows – electricity tariffs (feed-in tariffs), tipping fees
- ▶ Enter power purchase agreement with utility
- ▶ Encourage long term concession (25 years). Minimum waste supply guarantees
- ▶ Raise public awareness and confidence
- ▶ Comply with environmental standards
- ▶ Well functioning SWM system



ADB Support for WTE

- ▶ 6 WTEs in China (132 MW), \$100 million loan, PSOD
- ▶ National level WTE support to MOUD in India, \$0.5 million TA, SAUW
- ▶ Small-scale pilots (e.g., biodigesters in India, etc.)

Questions for Scaling Up

- ▶ What are good models to learn from and replicate?
 - ▶ How to structure WTE projects to generate sustained cash flows in DMCs?
 - ▶ What are good contract models for allocating risk and attracting private sector?
 - ▶ How to overcome technology risks considering high upfront costs in DMCs?
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