

Technological and financial barriers and capacity needs of public waste management utilities for ISWM

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Structure of Presentation

- Situation in developed and developing countries
- Changing waste management practices and composition
- Barriers in developed and developing countries
- Technology for newer waste streams
- Success and failure of technology
- Financial barriers for technological advance
- Capacity needs for technological advance
- Addressing barriers

Situation in Developed Countries

- Stringent legislations
- Good awareness levels
- User fee systems prevalent
- State-of-the-art technology
- Commendable segregation
- Waste with lesser inerts and organics but higher packaging and paper



Segregated Garbage Bin in a Railway Station in Germany

Underground garbage collection method in Spain



Photo Courtesy:
Alterenergys

<http://dtn.earthworksrecycling.com>

Situation in Developing Countries



Children picking waste in India

- High population
- Urbanization on the rise
- Poor collection (30-60 %) despite low per capita generation
- Incapacity to meet waste service cost

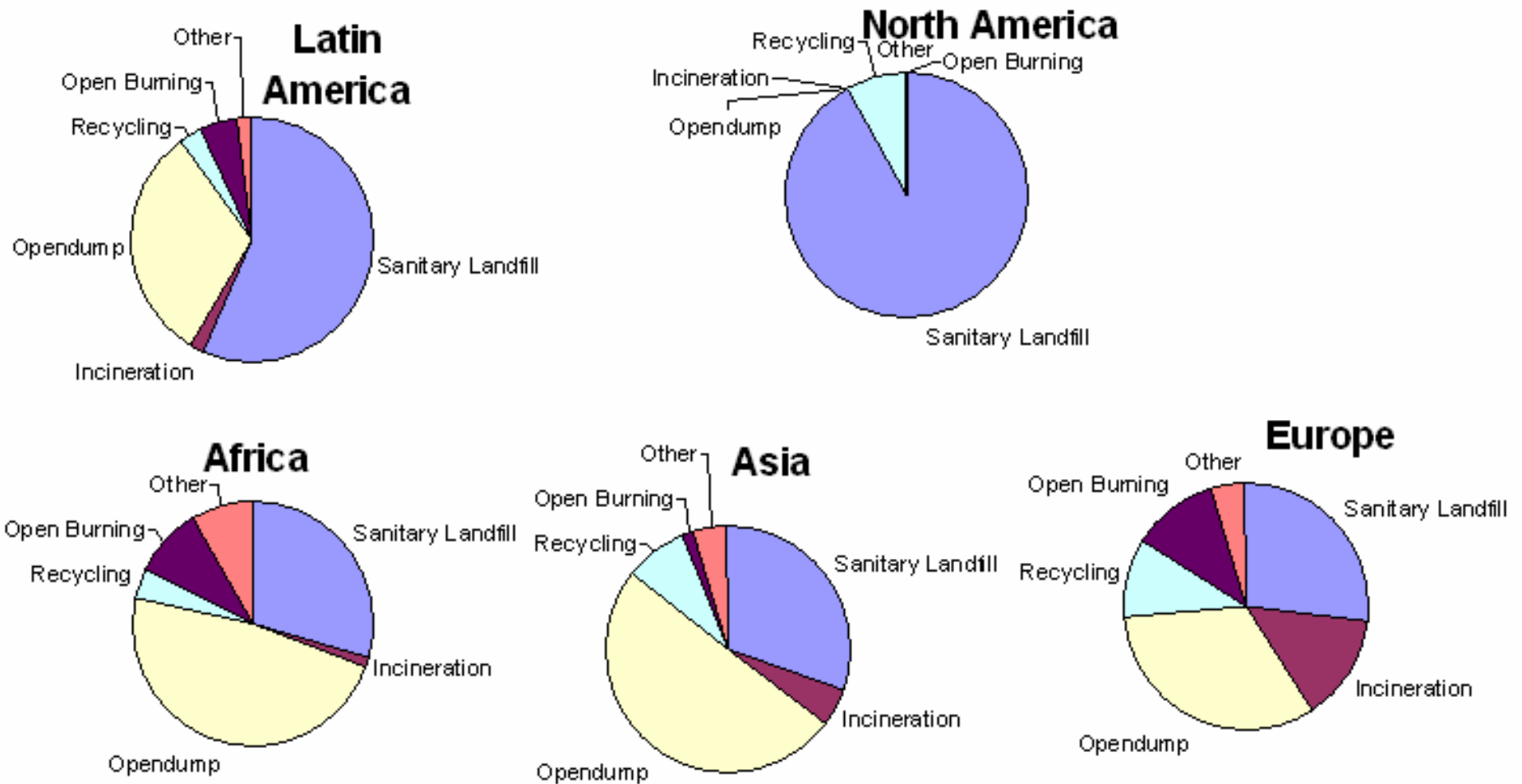
- Clandestine dumping, open burning
- Unorganized recycling
- Health & Environmental risks
- Greatest waste challenge faced by Indonesia, Philippines, Parts of People's Republic of China and India



Women sorting wires in People's Republic of China

Photo Courtesy:
GYSD 2009

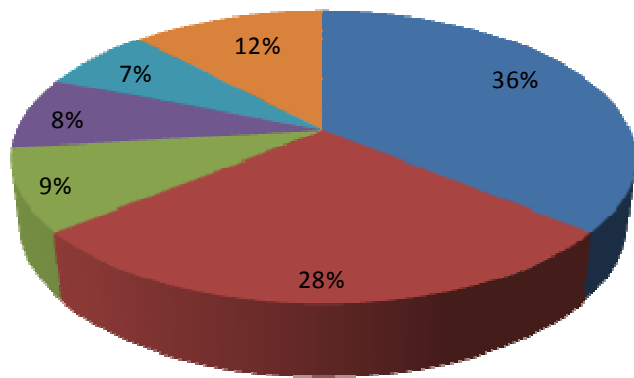
Changing waste management practices



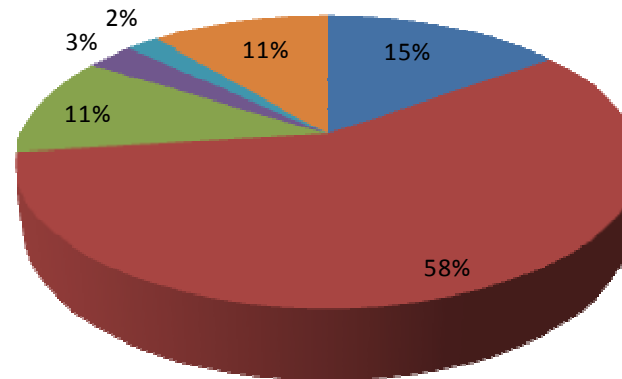
Source: Chandak 2008

Changing Waste Composition

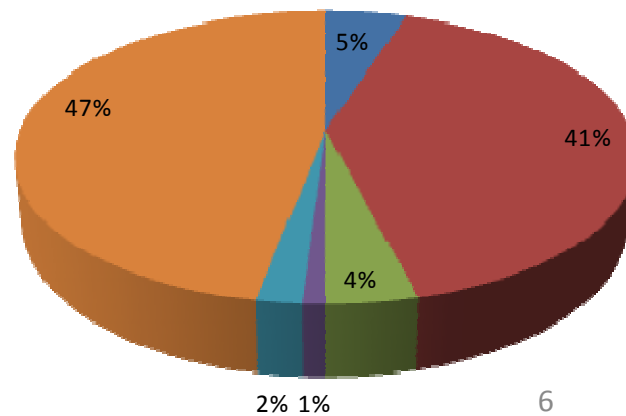
High-Income countries



Middle-income countries



Low-income countries



- Paper
- Organics
- Plastics
- Metals
- Glass
- Others

Barriers in developed and developing countries

General

- Lack of data, information and hence knowledge on waste scenarios
- Scoping of waste related problems limited to downstream sections of the life cycle
- Link between waste and resource not understood
- Communication is complex due to interplay of stakeholders from diverse areas
- Lack of comprehensive regulations
- Weak enforcement of policy and legislation
- No national associations or city champions in waste management
- Choice of technology mostly vendor-driven

Barriers in developed and developing countries

Barriers to the advent of private sector for supporting technologies in developing countries

- Resistance from informal sector
- Defining role of rag-pickers effectively tough given the furtive behaviour of the group
- Imbalanced contracts
 - Contracts lacking clarity – insufficient definition of roles and responsibilities of partners, profit sharing
 - Covering risks in short term and long term contracts becomes tough

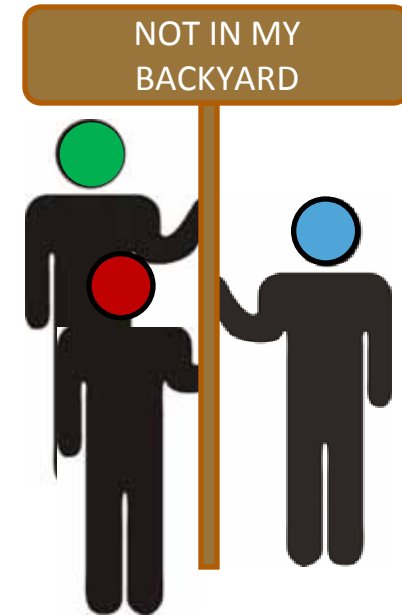
Public Private
Partnerships

PPP

Barriers in developed and developing countries

Lack of Public Support

- Not In My Backyard (NIMBY)
- Aversion to private sector
- Low awareness levels
- Less preference for recycled products



Barriers in developed and developing countries

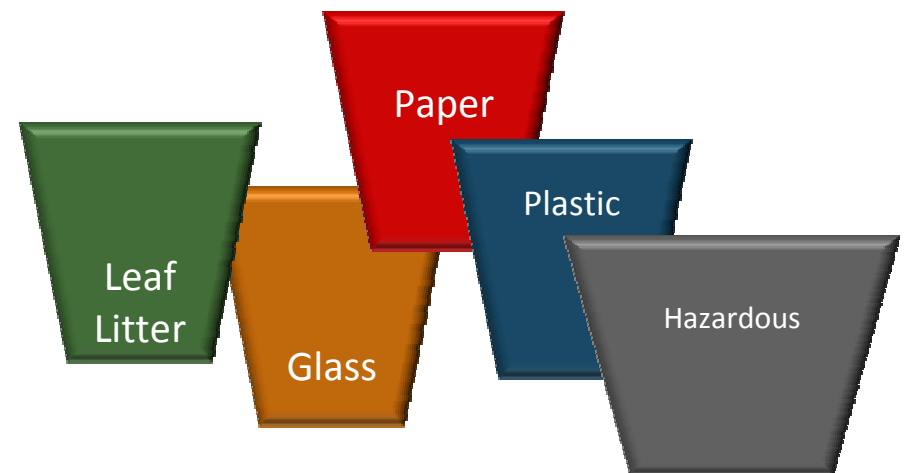
Policy barriers

- Lack of policies for special waste streams such as plastics, C&D and electronic waste
- Incomplete or poor enforcement
- Lack of subsidies for cleaner technology options
- Lack of penalties
- No reward systems

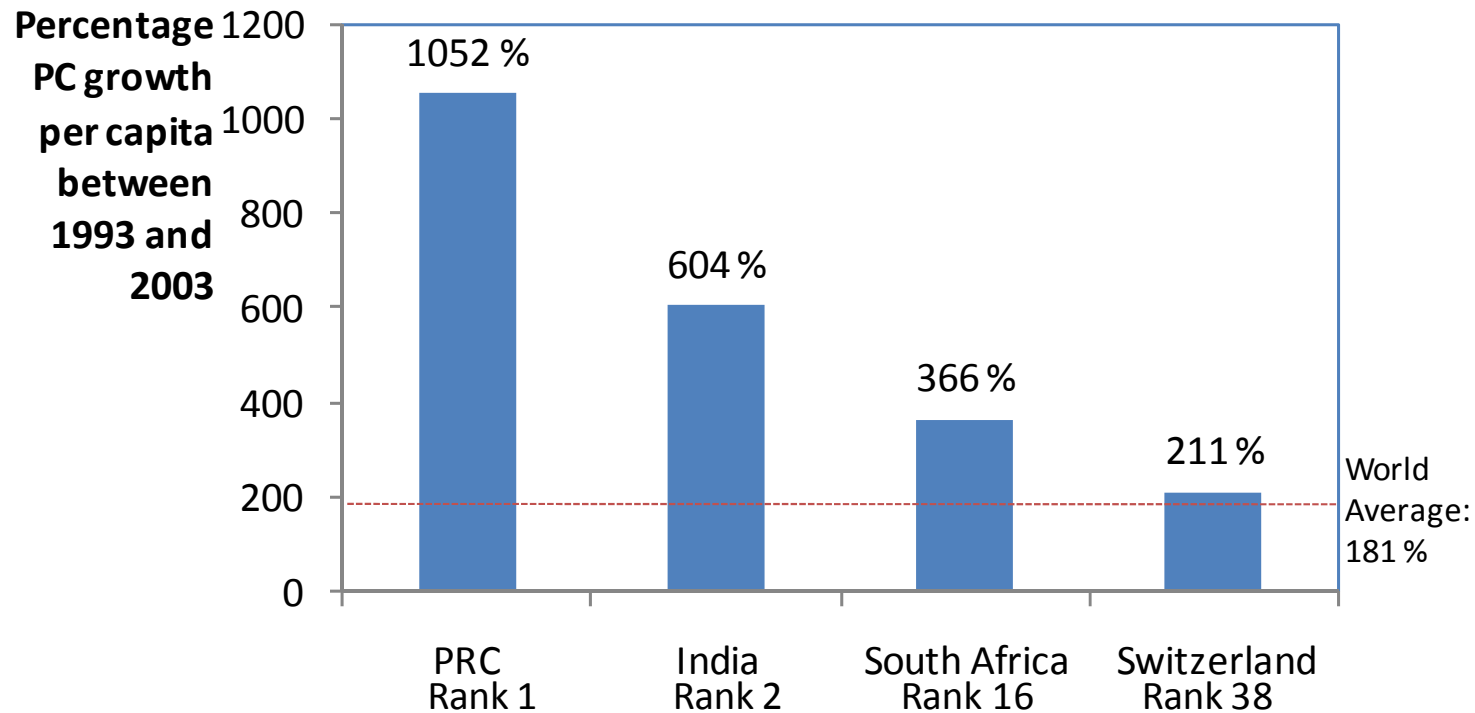
Barriers in developed and developing countries

Upstream Gaps

- Unsustainable design
 - Shorter life of products
 - Amenability of the products for recycling
- Higher cost of recycling as compared to disposal
- Little or inadequate segregation at source
- Lack of awareness in generators
- Poor collection coverage
- No user fee or service charges



Need for addressing New Waste Streams

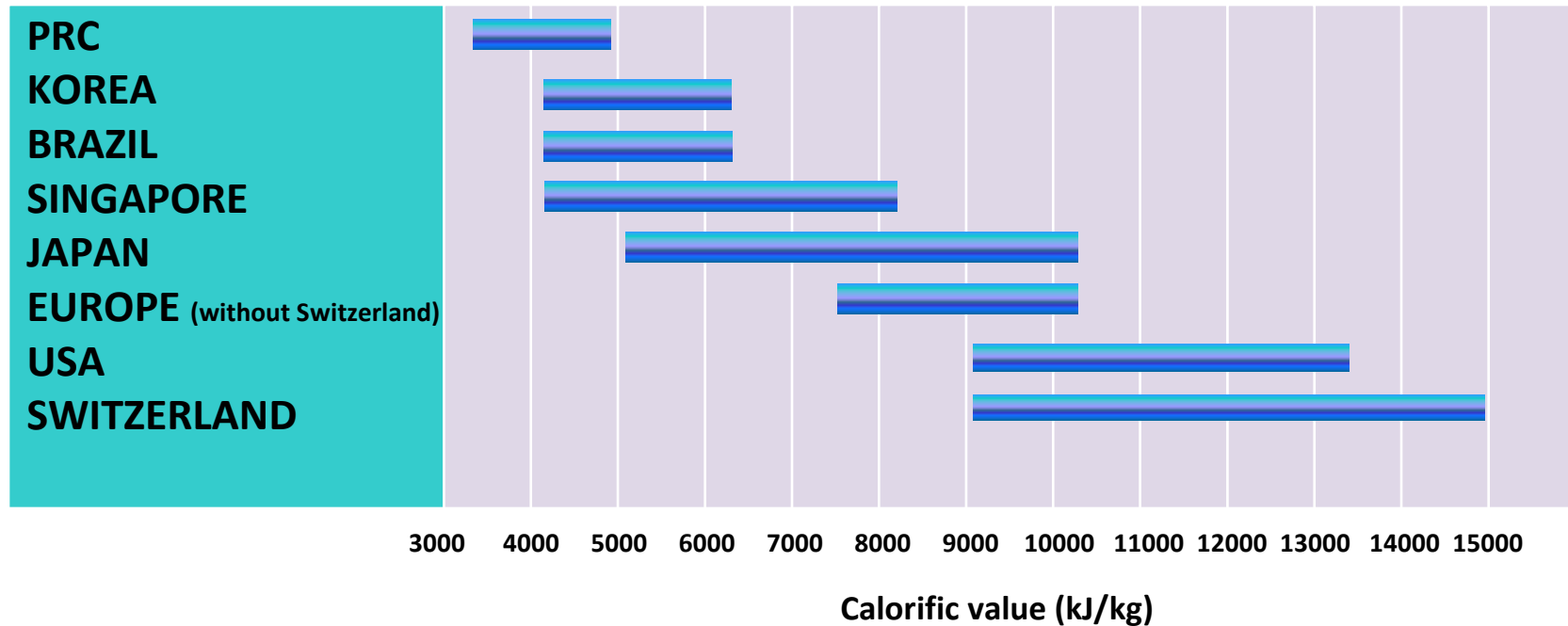


- Barriers due to Absence of Policy/Regulations and Lack of Technology Experience

Source: SECO and EMP (2003)

Success and failure of Technologies

Calorific Value of Waste from different countries



- Solutions need to be customized for differing waste situations and priorities

Success and failure of technologies

Success of Incineration in Japan

- Waste with high calorific value
- Space constraint

Incineration unpopular in UK

- Public acceptability issues
- Fears over the health effects of emissions from the plants

Success of biomethanation in Europe

- Efficient source segregation
- Affordability

Biomethanation not so successful in some cities of Asia

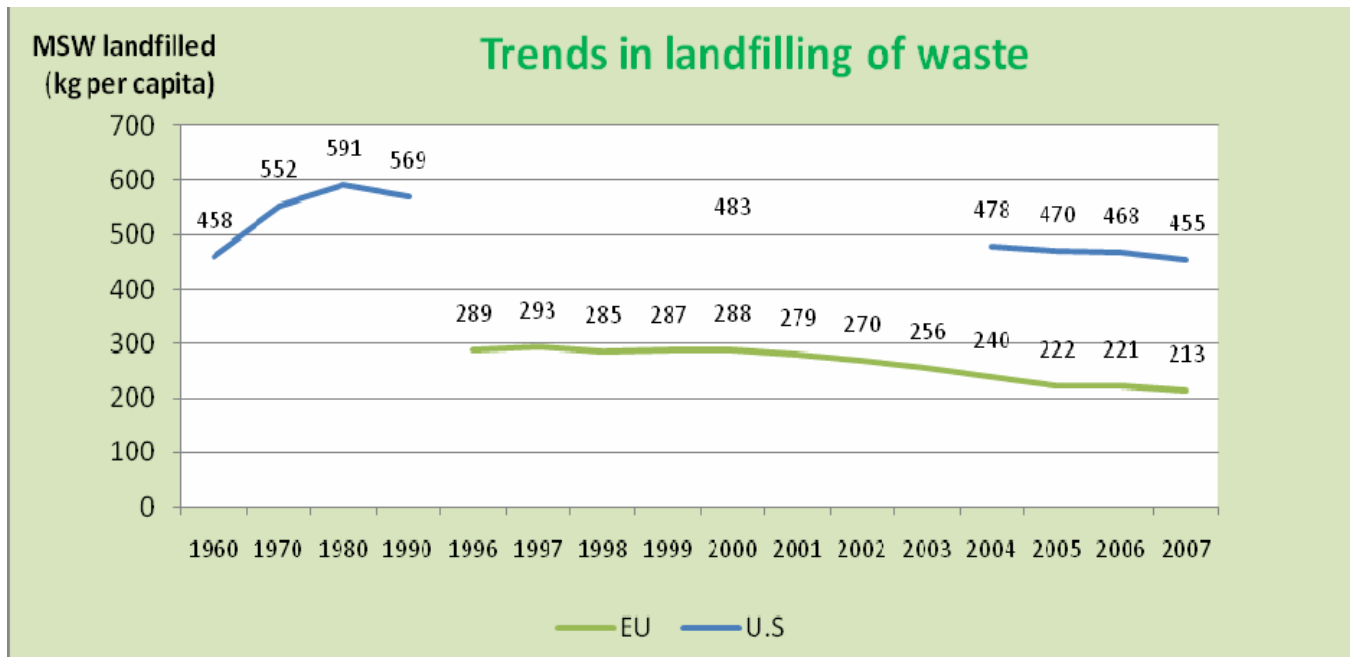
- Poor source segregation

Success and failure of technologies

- Lesser organics being landfilled
- Energy recovery and recycling increasingly considered for non-organics

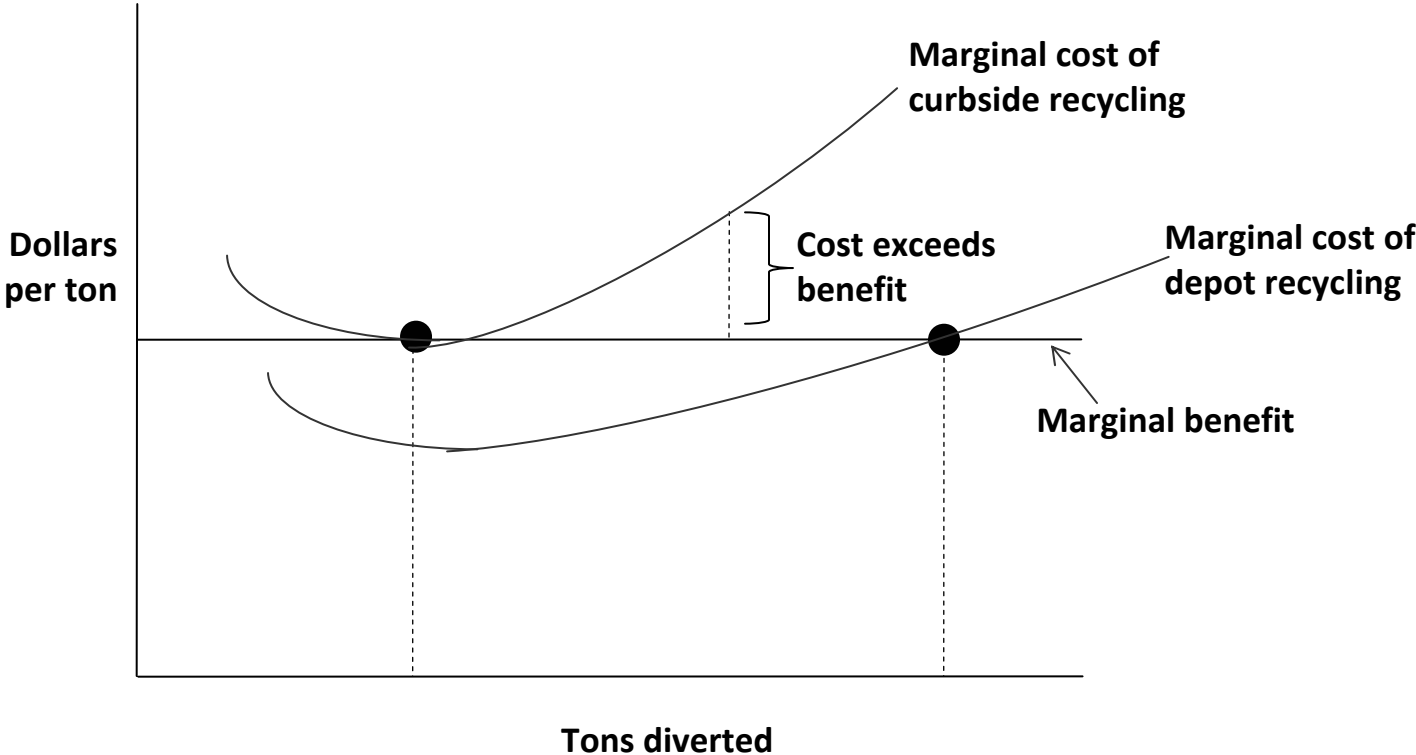
Obliges Member States to reduce the amount of biodegradable waste that they landfill to 35% of 1995 levels by 2016

**LANDFILL DIRECTIVE
1999/31/EC**



Success and failure of technologies

Why scale matters...



● Marginal cost = marginal benefit: The level of recycling that maximizes community benefits

Financial barriers

- 'Waste' receives lower priority and limited fund allocation from the public bodies
- No direct payment for waste thrown (user fee)
- Understanding of newer revenue streams like CDM still not very clear
- High cost of technology
 - Incineration is the most capital intensive technology
 - Cost of segregation ranges from 107 US\$ / ton for mixed collection to 1320 US\$/ ton for segregated collection in developed regions.

Cost aspect...

Technology	Capital cost (US\$/ metric tonne)
Energy from waste plant	330
Anaerobic digestion plant	206
MRF and transfer station	82
Transfer station & civic amenity site	41
Landfill	33



WM Option	Indicative Cost (in US\$/ metric tonne)		
	Low-income country	Middle-income country	High-income country
Collection	15 - 30	30 - 70	70 - 120
Public cleansing	30 - 60	60 - 140	140 - 240
Transfer	3 - 5	5 - 15	15 - 20
Disposal	1 - 3	3 - 10	15 - 50
Recycling	Highly influenced by market demand		

Need for Institutional capacity building

- Absence of qualified staff
- Less in-house skills
- Lack of dedicated departments
- Poor information base – less use of modern tools
- Less clarity on target setting
- Barriers to innovation – new practices
- Misunderstanding PPP
- PPP engagement absent on programme or policy level
- Vendor influence
- Stakeholder consultation not followed or importance not understood

Addressing barriers

	Collection and Transport	Recycling	Treatment with Recovery
Technology	<ul style="list-style-type: none"> • Human-powered or semi-motorized carts • compaction trucks 	<ul style="list-style-type: none"> • Material Recycling Facilities 	<ul style="list-style-type: none"> • Waste to energy • Composting • Incineration with energy recovery
Financing/ Institutional Model	<ul style="list-style-type: none"> • Cooperatives, Micro enterprises in Africa, Asia and Latin America, • PPP 	<ul style="list-style-type: none"> • Private companies • Cooperatives and micro enterprises in Africa, Asia and Latin America • Waste Exchange Programs 	<ul style="list-style-type: none"> • PPP (DBO, BOO, BOOT) • CDM • MDB Support • NGO Support • Industry Support

Need to change attitude of communities

- Minimization of waste generation
- Making right product choices
- Packaging
- Using the products/services correctly
- Practicing segregation at source
- Encouraging 3Rs
- Paying for services
- Working in partnership
- Following decentralized solutions
- Mainstreaming IWM in education
- Support IWM related policies

THANK YOU