The importance of Waste Management from Climate Perspective

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ISWA Mission

- ISWA is the leading International Association representing all aspects and partners within the waste industry. It collaborates with National and International Organizations in research, studies and proposals to fulfil its declared mission:

  “To Promote Sustainable Waste Management Worldwide “

- With more than 1,000 Members in more than 70 Countries ISWA has a unique worldwide network in waste management matters.

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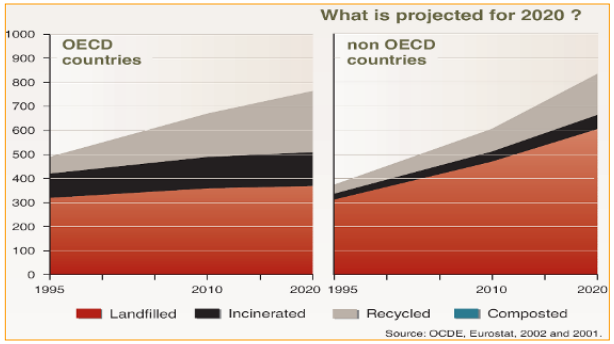
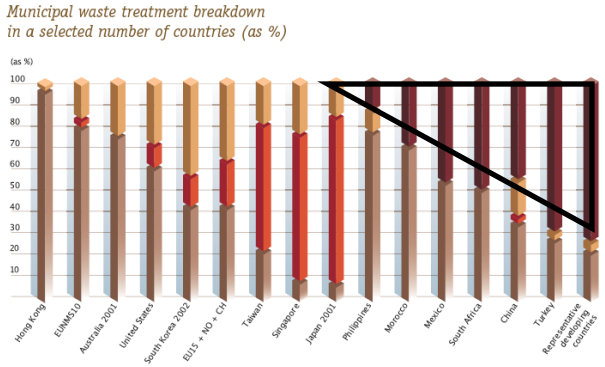
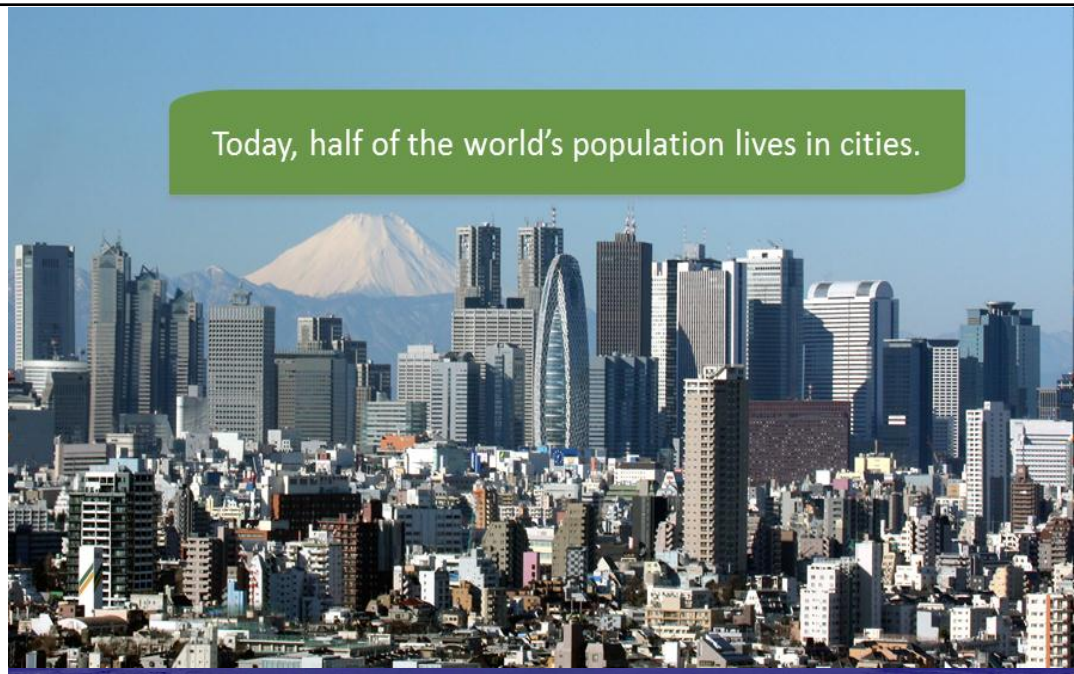
The issue: waste volumes are growing…



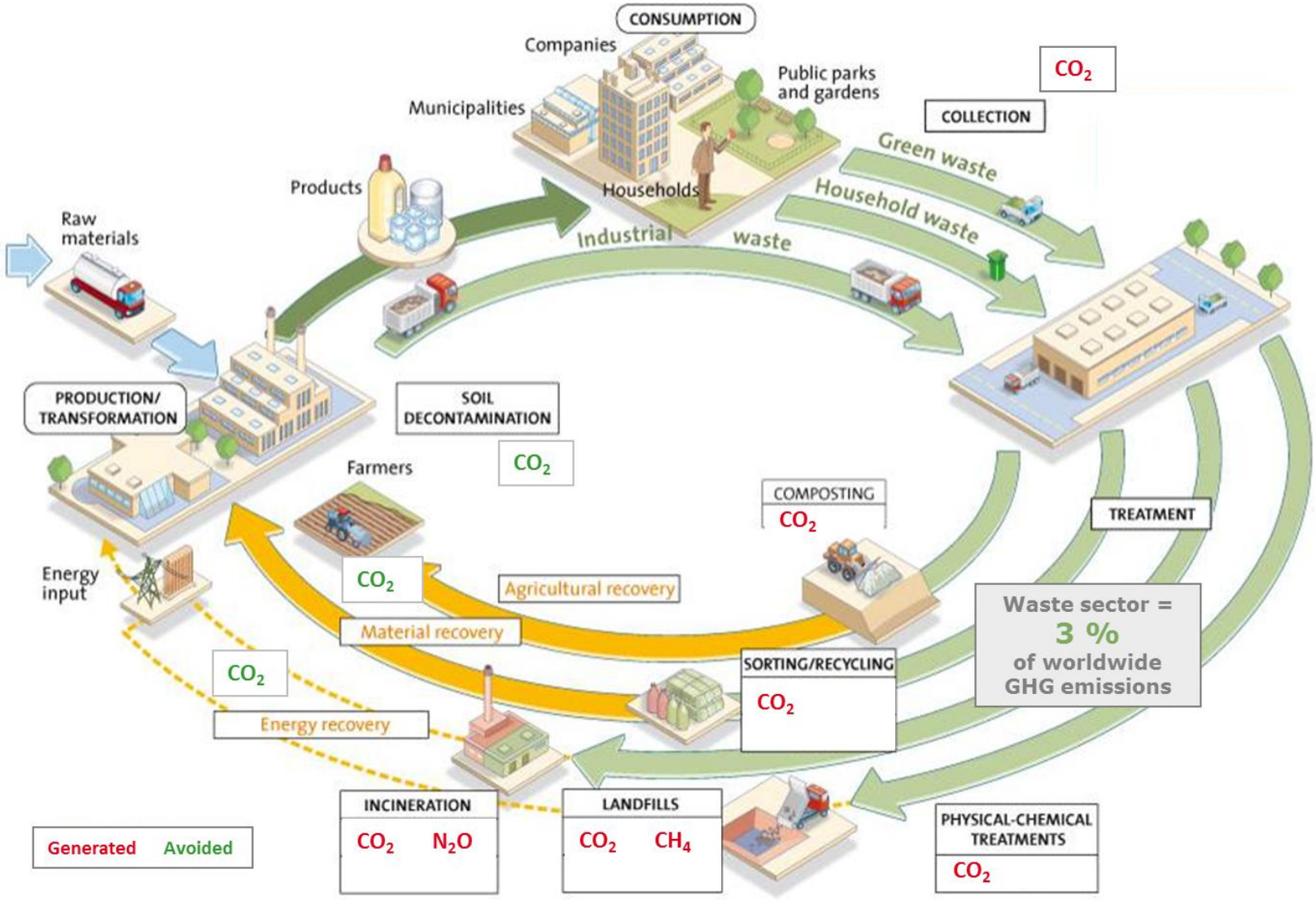
Rapid increases in population & urbanization: increased waste generation in developing countries.



(Uncontrolled) landfilling is still common practice



Waste Resource Management as a Catalyst for the Circular Economy



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Waste Sector actions to reduce GHG emissions

Collection and transportation

- *Rationalization of collection operations and improvement of fuel efficiency.*
- *Use of alternative fuels (biodiesel, bioethanol...)*
- *Development of alternative means of transportation (rail and waterway transport...)*
- *Implementation of driver training programs*

Recycling

- *Increase of the material recovery rate to save energy.*
- *Recovery of substitute fuels (waste oil, refuse derived fuels...)*

Waste to energy

- *Substitution of energy produced from fossil fuels by thermal energy and electricity from waste combustion.*
- *Recovery of metals and bottom ashes from incineration.*

Biological treatment

- *Increase the compost production, low emitting treatment solution.*
- *Recovery of the methane from anaerobic digestion processes*

Landfill

- *Installation of active landfill gas collection and treatment systems*
- *Use of landfill gas as a fuel to produce electricity or thermal energy*

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Waste Sector actions to reduce Black Carbon emissions

Collection and transportation

- *Rationalization of collection operations and improvement of fuel efficiency.*
- *Use of cleaner fuels and modern technologies*
- *Implementation of driver training programs*

Waste Handling Equipment

- *Using cleaner fuels and modern technologies.*
- *Employing operator best practices*

Flare, boilers, and other combustion sources

- *Maintain high combustion temperatures and clean combustion chambers*
- *Ensure best operating practices at plants*

Open fires

- *Banning deliberate open burning*
- *Increasing security around waste areas to prevent incidental fires.*
- *Improving waste collection services to reduce household burning of waste*
- *Improving landfill management practices to prevent spontaneous fires*

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Sustainable development co-benefits

- **Environmental benefits**
  - ✓Reduced GHG emissions generation
  - ✓Reduced environmental degradation from uncontrolled waste disposal
  - ✓Material recovery enables natural resource and energy conservation
  - ✓Energy recovery helps to reduce demand on limited natural resources

- **Economical benefits**
  - ✓Access to international financing
  - ✓Revenues from the sale of emission credits, recovered energy and materials
  - ✓Foreign expertise and training received to facilitate smooth technology transfer

- **Social benefits**
  - ✓Improved sanitary and health conditions
  - ✓New facilities / projects create local job opportunities
  - ✓Staff training to improve skills of locals.

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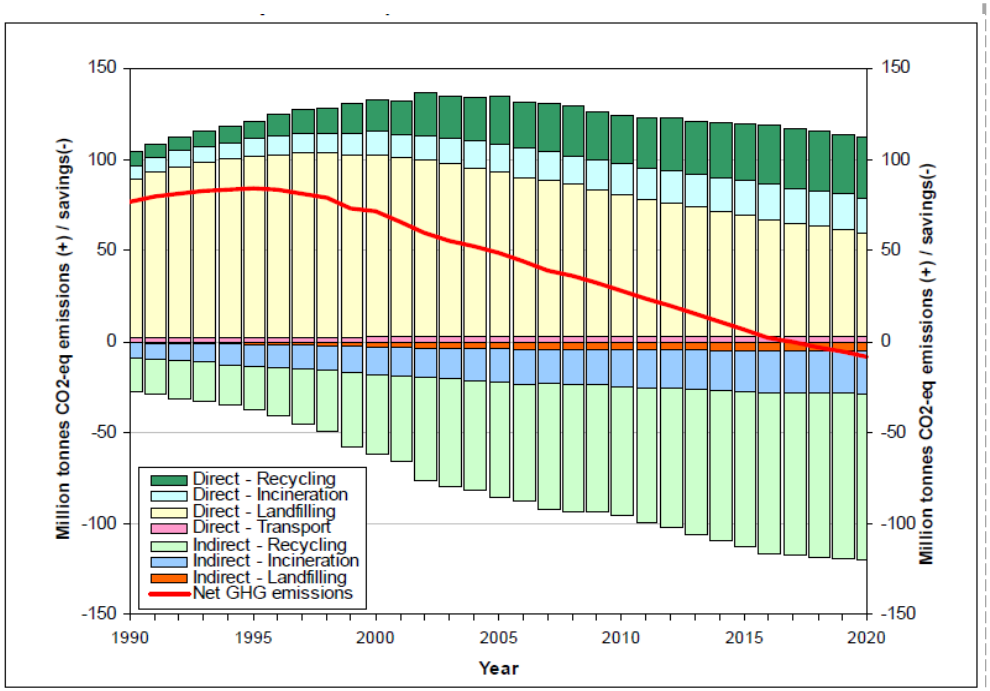
The magnitude of GHG reduction by waste management

The example of **Europe**

- What the EU has done
  - Regulation and investment in waste management
  - Prevention, minimization, reuse, recycling and energetic valorization activities and gradual reduction of landfilling
  - will make the municipal waste sector a net GHG reducer in 2012-2020.
- The mitigation is very success
  - Improved municipal solid waste management in these countries has already cut annual net greenhouse gas (GHG) emissions by 48 million tonnes CO_2-equivalent between 1995 and 2008;
  - if all countries fully meet the Landfill Directive's waste diversion targets, potential GHG emissions from municipal waste management in 2020 could be cut by a further 62 million tonnes



"Harvesting the GHG mitigation potential of better municipal waste management can make an important contribution to combating climate change." *(EEA, 2011)*

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Policies and regulations can be strong national drivers and enablers to reduce GHG emissions.

Actions related to	Examples of policy and regulation instruments
Waste generation and collection	Producer responsibility "Full cost" collection tariffs Separate collection schemes for specific waste types
Material recycling sector	Strategies and precise targets for recycling of specific waste streams Producer responsibility Landfill tax Tax exemptions for recyclable materials Green Public Procurement to stimulate demand for recycled products
Incineration and anaerobic digestion sector	Co-ordination with energy planning Subsidies for construction Landfill ban of biodegradable waste Secure sufficient waste to the plants Tax exemptions for energy generated Emissions limitations
Landfill sector	Strategies for phasing out old landfills Landfill ban on biodegradable waste or untreated waste High technical standards in general and especially for performance to reduce GHG emissions by capture and utilisation of the energy Landfill tax

+ Resource Efficiency

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Landfill gas capture and recovery for essential quick wins

- **Landfills are major contributors to climate change through CH4 emissions**
  - Priority: reduce direct emissions and increase avoided emissions.

- **How to reduce emissions?**
  - Ban or reduction biodegradable waste in landfills
  - Install active gas collection and treatment systems
  - Use gas as a fuel to produce electricity / energy

Effect on GHG emissions

- Europe's CH4 emissions from landfills -35% between 1990 and 2010. (EEA)
- Australia's CH4 emissions from landfills -17.8% reduction between 1990 and 2010. (Australian Dept. Of Climate Change & Energy Efficiency)
- From 1990 to 2011, CH4 emissions from landfills decreased by 30.3 % (USEPA)

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Organic Recovery: low threshold for improvement

- **Organic waste is a major component of MSW**
  - Responsible for CH4 emissions in landfills
  - Organic waste can be recovered even at small scale at local level

- **How to reduce emissions?**
  - Separate collection and increase of compost production
  - Use of compost as a soil amendment
  - From composting to Anaerobic Digestion
    - Recover methane to produce energy
    - The digestate is a good quality compost

- **Effect on GHG Emissions**
  - In top performing countries composting has a positive Climate contribution
  - Anaerobic Digestion allows for the recovery of renewable energy from organic waste.

Referenced values for AD in study:
- Compost Production : 295 kg/t waste
- Energy Consumption : 50 kWh/t waste
- Energy Production : 160 kWh/t waste

Source: Ecofys' study "*Sectoral Emission Reduction Potentials and Economic Costs for Climate Change (SERPEC-CC)*" – Chapter « Waste » - October 2009



Composting in Dhaka Bangladesh

World's 1st Compost Plant registered as a CDM project!

Objective: develop sustainable model for solid waste treatment based on recycling /agricultural recovery
- recovery of organic wastes from households and vegetable markets in Dhaka
- reduce volume of uncontrolled landfilling
- To create job opportunities for the urban poor, especially women and waste pickers
- Economics: substitute chemical fertilizer by locally produced compost

Basic information:
- 700 tons waste/day;
- Certified compost = 50 ktonnes/year
- Reduction of GHG = 89 ktonness of CO2e/year
- Employment creation: 800 persons
- Project Cost = 12 million Euro

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Mechanical Biological Treatment (MBT) technologies

London, Southwark, UK

Process: MBT and Biodrying
Capacity: 87,500 tonnes/yr
Input: MSW
Recovery: SRF (44,000 tonnes/yr)

Rostock, Germany

Process: MBT and Dry AD
Capacity: MBT (195,000 tonnes/yr) and AD (40,000 tonnes/yr)
Input: MSW
Recovery: SRF (71,000 tonnes/yr); **Electricity** (5,900 MWh/year) and **Biogas** (11,200 MWh/year)

Graincourt, France
Artois Methanisation
Process: Wet AD
Capacity: 50,000 tonnes/yr
Input: Organic waste (90% industrial and 10% urban)
Recovery: Electricity (8,000 MWh/year) and Heat (8,000 MWh/year)

AD = Anaerobic Digestion / MSW = Municipal Solid Waste / SRF = Solid Recovered Fuel

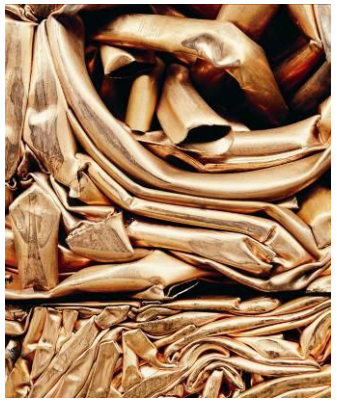
Turning waste into a resource

- Recycling, re-use, and waste minimisation represent an important and growing opportunity for indirect reduction of GHG emissions through:
  - the conservation of raw materials
  - improved energy efficiency and
  - fossil fuel avoidance.









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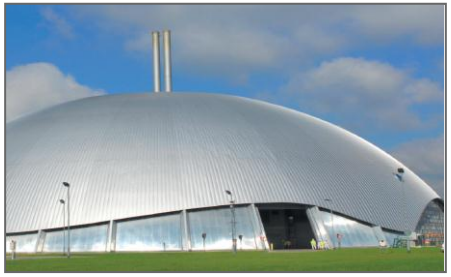
Closing the loop
Examples of Resource Efficiency in Practice



Integrated waste management contracts based on material and energy recovery

State of the Art Sorting Center

Bottle-to Bottle Recycling

From used cooking oil recovery to biodiesel

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Transferring technology and financing through the CDM

- **The Clean Development Mechanism**
  - Introduced under the Kyoto Protocol
  - Transfer of sustainable technology
  - Reduce GHG in developing countries
- **Advancement**
  - CDM: **7392** projects registered / **1,406,452,436** CERs issued
  - Established significant regulatory capacity (methodologies, tools, Governance Structure, …)
  - Improved operational processes (registration and issuance)
- **Waste Management is relevant**
  - **11.1%** of registered projects are waste sector projects
  - Landfill gas and methane avoidance projects were expected to deliver **262 million** carbon credits by end of 2012
  - Confirmed significant potential of waste GHG mitigation projects in developing countries
  - Demonstrated that Private investments can dwarf public sector contributions

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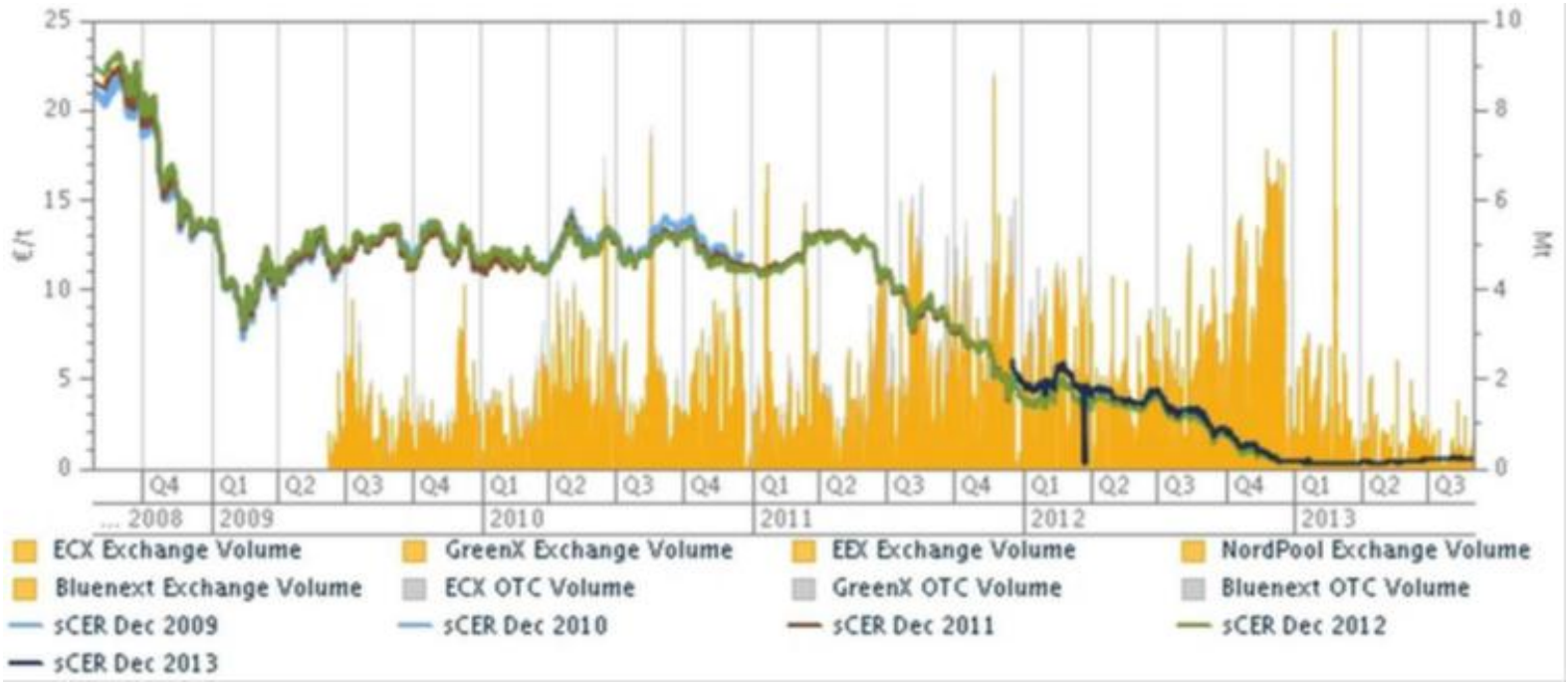
The value of carbon offsets slumped significantly

- Economic slowdown in Europe resulted in lower emissions and demand for offsets.
- Increased demand resulting from renewed targets for the 2nd Commitment Period of the Kyoto Protocol did not materialise.
- The CER price has significantly fallen with a corresponding drop in CER issuance.



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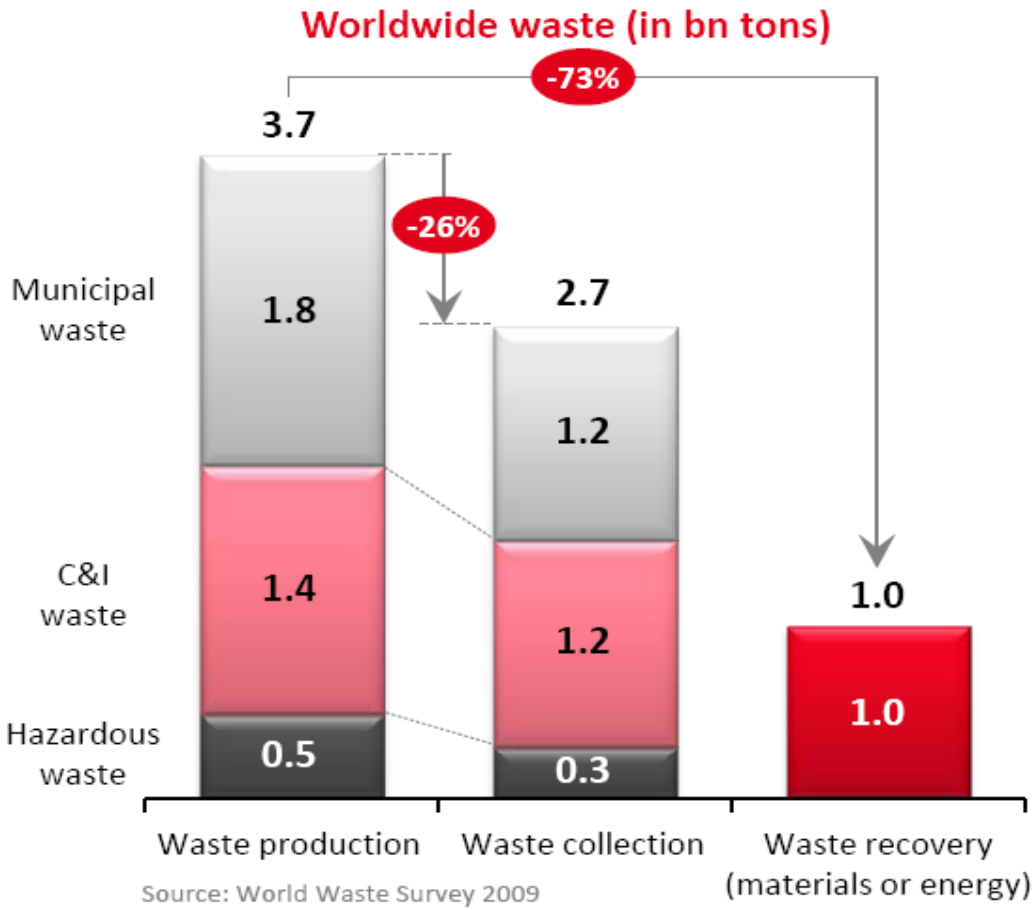
Financing Mitigation Actions

- Investing in a greener waste sector requires substantial financial resources for both capital expenditures and operation.
- The funding for NAMAs may come from the following sources:
  - COP mandated public funds – Green Climate Fund (GCF)
  - Non-COP mandated public funds – multilateral, bilateral national budgets
  - Private funds – private sector investments and potentially the carbon market
- Public-Private Partnerships (PPPs), can be an efficient funding mechanism, delivering improved services while reducing the fiscal pressure on government budgets.

> *"**Globally, solid waste management costs will increase from today's annual $205.4 billion to about $375.5 billion in 2025.** Cost increases will be most severe in low income countries (more than 5-fold increases) and lower-middle income countries (more than 4-fold increases).*
>
> *Source: World Bank Report "What a Waste"*

Significant potential to scale-up waste management & recycling solutions

- **Only 25% of worldwide waste is recovered** as materials or energy.
- Waste volumes are growing.
- It is essential that integrated waste management solutions are deployed to **achieve sustainability and environmental goals — including reductions in greenhouse gas emissions.**



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NAMAs including waste management & recycling

- The sector has proven experience and capabilities in the following areas:
  - ☑ Technology transfer
  - ☑ Policy examples
  - ☑ Sustainable development co-benefits
  - ☑ Capacity building
  - ☑ Monitoring, Reporting and Verification Methodologies
  - ☑ Financing of waste management projects
- These are considered to be amongst the key building blocks to be incorporated into Nationally Appropriate Mitigation Actions (NAMAs).

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Conclusion

- Waste Management and Recycling should be adequately recognized and promoted as one of the important areas for mitigation actions.
- There are proven and cost-effective waste management technologies and approaches that can be applied immediately and deliver substantial GHG / SLCP emission reductions and other sustainable development co-benefits.
- NAMAs can be used as a mechanism to scale-up the implementation of sustainable waste management & recycling.

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Thank you for your attention !

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