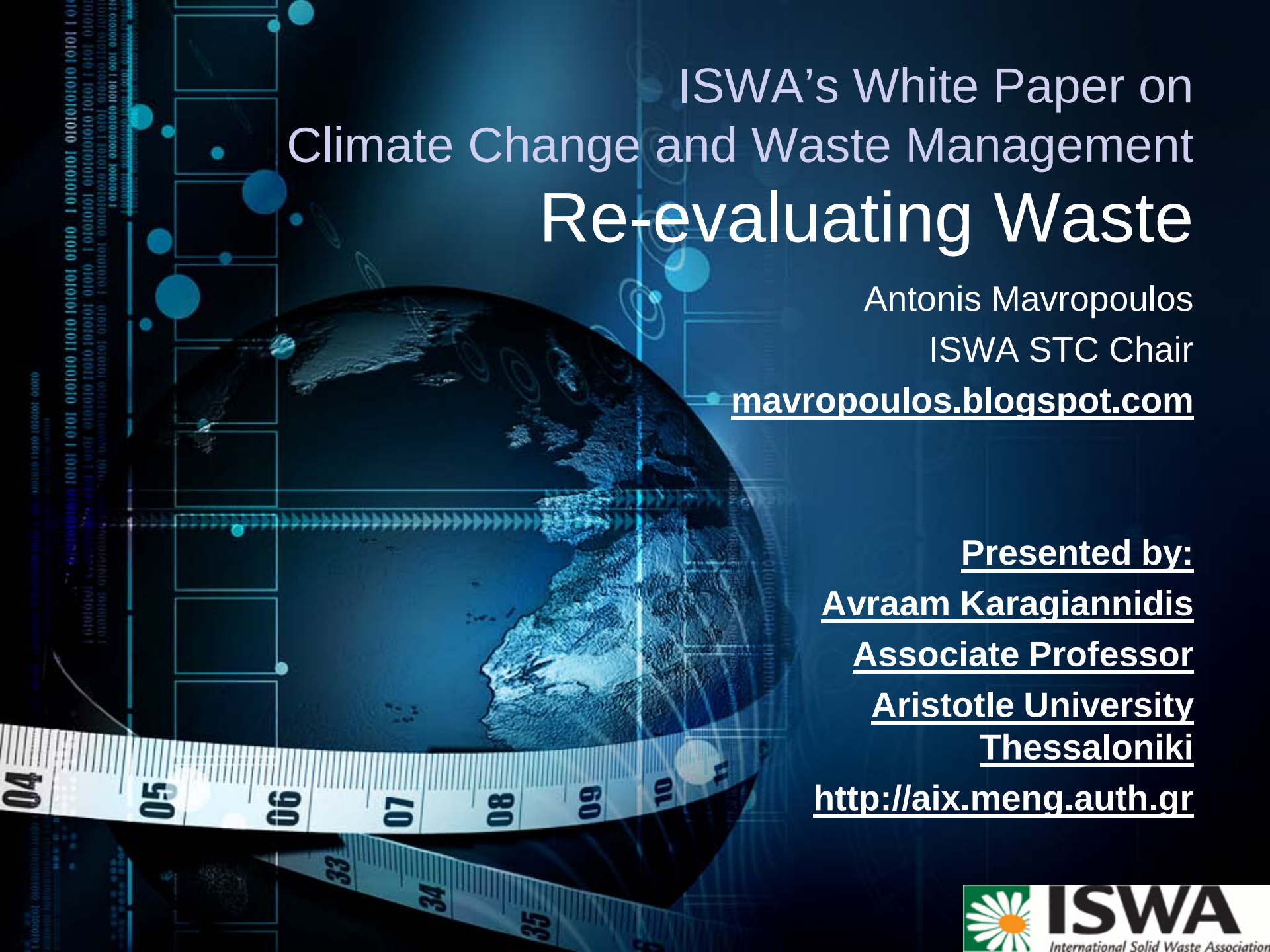

ISWA's White Paper on Climate Change and Waste Management

Re-evaluating Waste

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ISWA's Task Force and White Paper

- 2008, ISWA's TF on GHGs & SWM
- Established to:
  - –Increase awareness of the GHGs – SWM
  - –Promote actions to reduce GHGs from SWM emissions.
  - –Act as an information exchange office
- 4 Workshops with 72 papers and 220 participants
- Participation to 2009 UN (COP 15) meeting.
- A dedicated conference before COP, over 200 participants.

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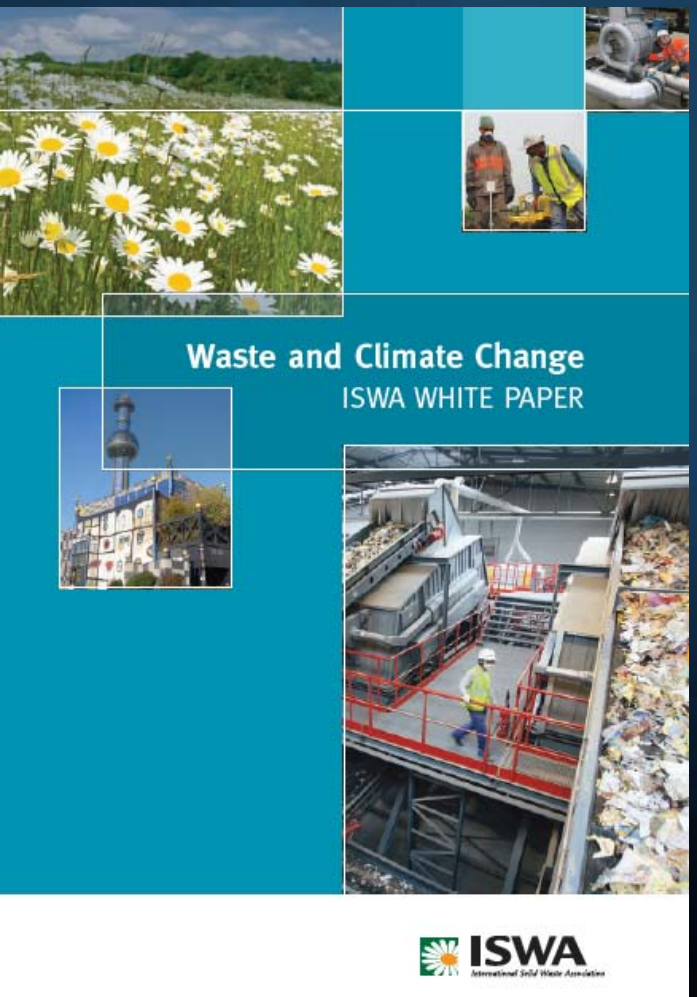
www.iswa.org



- Introduction
- Industry's position and role
- Portfolio of technologies
- Waste prevention & Recycling
- Biowaste
- Energy from waste
- CDMs
- Policies & Regulations
- Quantification issues
- Conclusions

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What’s different?

- Global view
- Holistic view
- Independency of the usual lobbies
- Framework for upgrading SWM activities within GHGs global discussion and action plans
- A product suitable for both developed and developing countries

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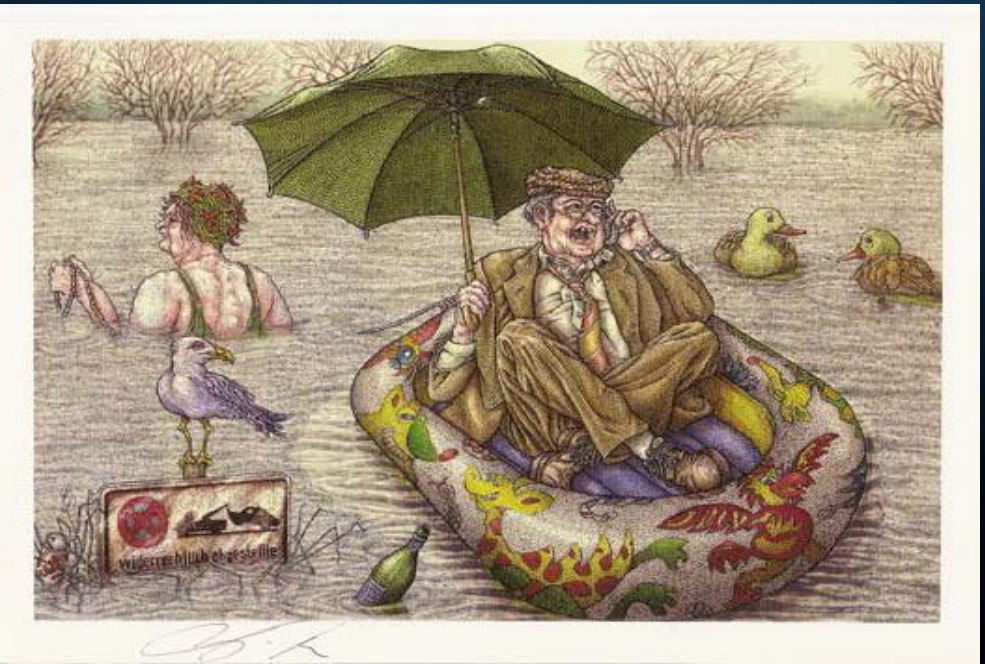
- Stop increasing CO_2 emissions is not enough
- Rapid reduction is a necessity
- Even so, it will take time to reduce the level of the threats evolved
- Humanity still lacks the required political tools and systems for a global response



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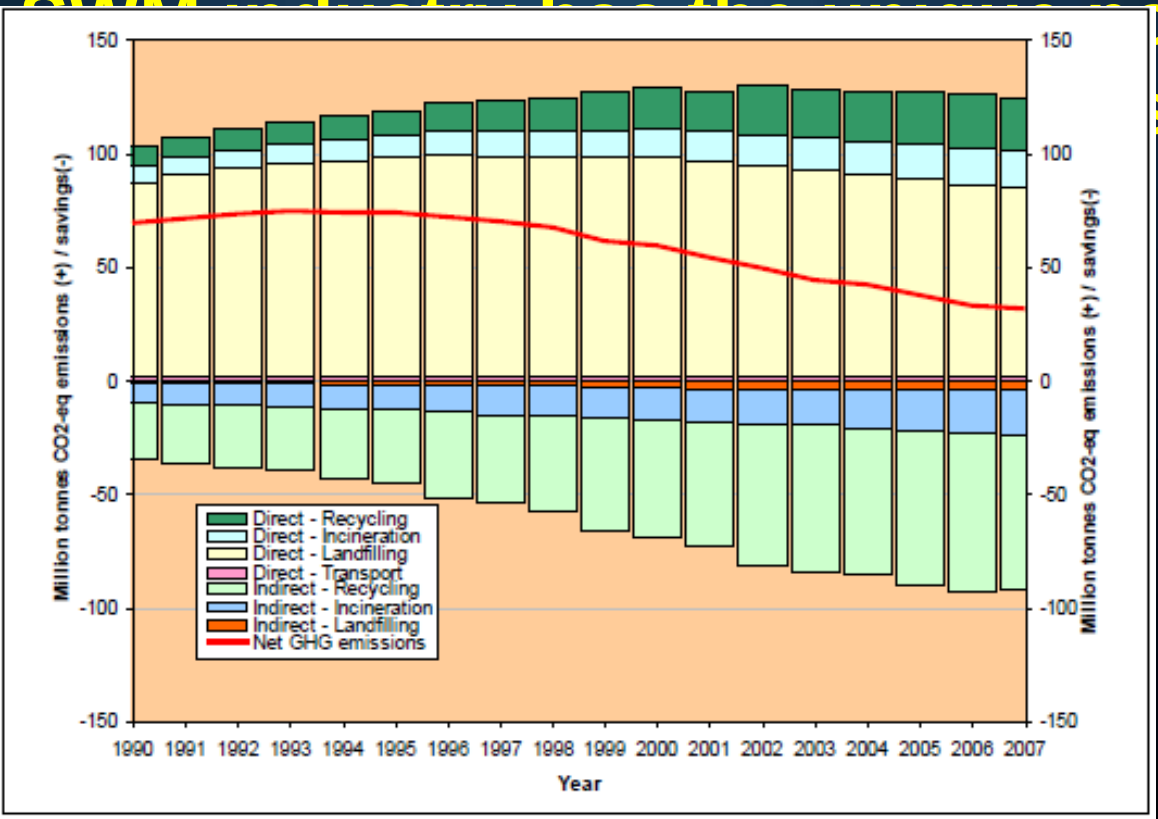
Industry's role and position

Max 3% of the problem worldwide

20% of the reduction in EU 2020

SWM industry has the unique potential to become a sions



	1990	2007	2012-2020 (projected)
European waste sector annual GHG emissions	69 million tonnes CO_2	32 million tonnes CO_2	Net reducer

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A key-area for CO_2 reduction investments

- Huge global unrealized potential of reduction of GHGs from SWM activities from both developing and industrialized countries
- There are obvious improvements in any country that can be directly applied in order to have measurable results in short-term horizon

A real possibility for short term reduction of emissions

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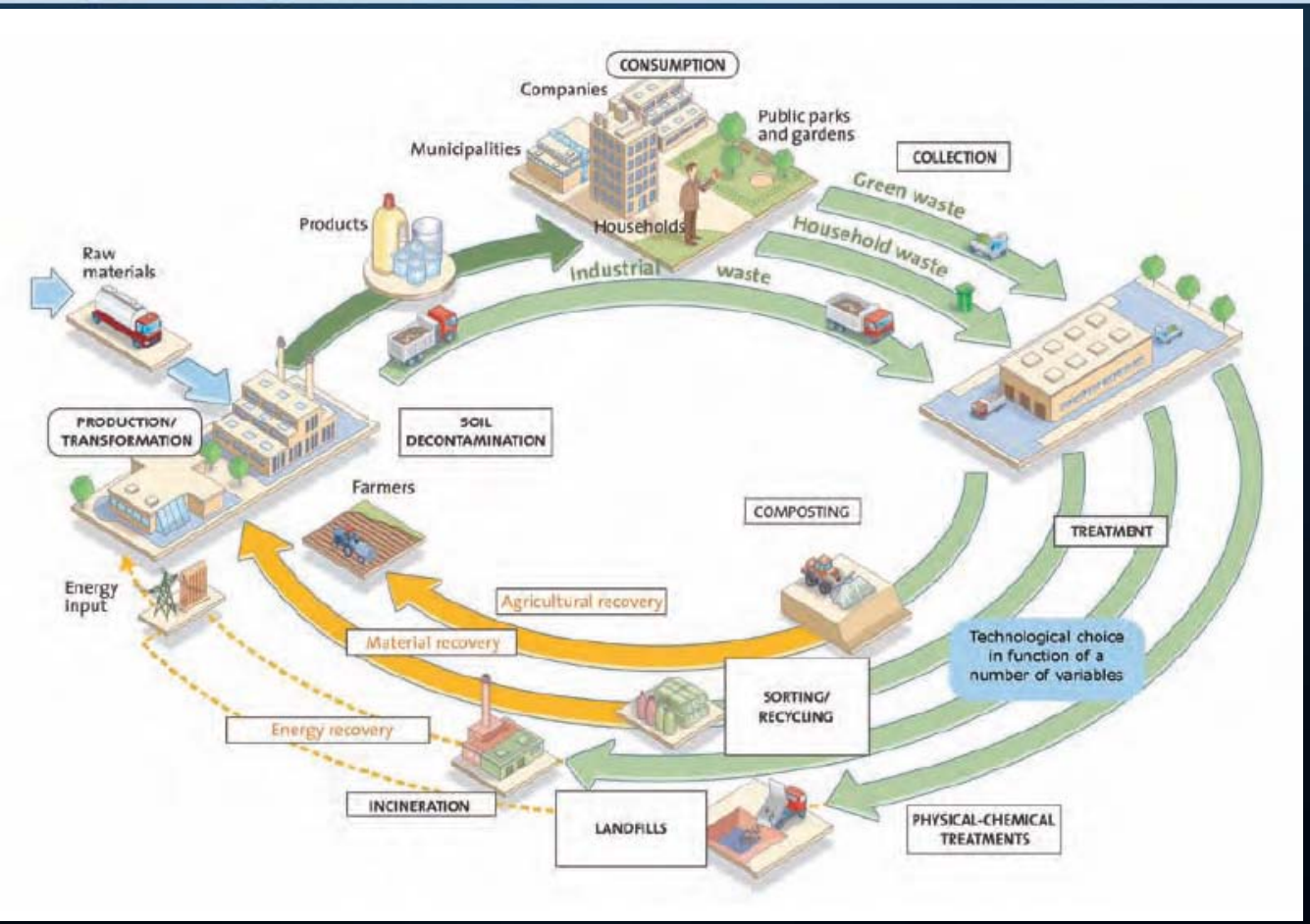
Technologies are already here



- Proven
- Commercial
- Continuously Improved
- Decades of expertise
- Tailor made solutions

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But we know that SWM systems are social outputs

The real expertise lies in applying decades of experience and advanced technology to establish integrated systems rather than copying single solutions from one region to another

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We need a more conscious WM industry

- GHGs as a global footprint of SWM activities
  - Global impacts of local actions
  - Necessity of global coordination for SWM infrastructure

- GHGs and the temporal scale
  - Previous and current practices create long-term results
  - Importance of long-term thinking and planning

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GHGs as an innovation driver

- Energy efficiency in collection - transportation and WtE
- Biowaste management
- Reduction of emissions –CCS
- Increase production and use of alternative fuels
- New production and consumption patterns of products

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Waste Prevention and Recycling

- Potential savings by extended RRR applications could greatly exceed savings achieved by technologies that treat post consumer waste

Material	Kg recyclables per 1000 kg MSW	Kg recovered per 1000 kg MSW	Kg CO_2-eq. saved per 1000 kg Material	Kg CO_2-eq. saved per 1000 kg MSW
Paper	200	140	2,500-600	350-85
Aluminium	10	6	10,000	60
Steel	25	15	2,000	30
Glass	50	30	500	15
Plastic	80	50	1,000-0	50-0
Total	365	241		505-190

Table 4.1 Recyclables as present in typical Northern European MSW, and approximate CO_2- eq saved when recycling the listed materials as opposed to use of virgin raw materials for production of the same amount of recycled material. Energy saving is by substituting energy from coal fired power plants.

Biowaste management

Soil Protection

Organic matter

Water retention

Workability

Climate Change

C sequestration

Reduction of Ps – Fs

Waste Management

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Savings up to 60 kg CO_2 / tone of biowaste

- The binding of carbon in the soil (sequestration)
- The reduced production and importation of mineral fertilizers
- The substitution of peat in the production of growth media.

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Energy from waste

Waste advantages over many biomass resources:

- Regularly collected at public expenses in any case
- Transport and logistics are already established
- Proven energy conversion technologies are already there for many decades

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Table 1: *Greenhouse gas emissions and remaining reduction options in the scenario period up to 2020, figures in million t CO_2 equivalent*

Disposal path	Emissions 1990	Emissions 2005	Emissions 2020-optimised	Reduction potential from 2005 to "2020-optimised"
Waste incineration	-1.00	-2.47	**-5.42**	**-2.95**
Co-incineration	-0.05	-2.16	**-3.55**	**-1.39**
Biowaste	0.10	0.19	-0.06	-0.25
Lightweight packaging	0	-0.54	-0.63	-0.09
Waste paper	-0.31	-1.71	**-1.65**	0.06
Waste glass	-0.39	-0.61	-0.61	0
Bulky waste/waste wood	-0.005	-0.27	-0.3	-0.03
Metals	-0.28	-0.78	**-1.55**	**-0.77**
Collection	0.48	0.36	0.36	0
MBT	0	0.21	0.19	-0.02
Landfill	39.23	0.09	0.02	-0.07

Emissions preceded by a minus sign mean that the CO_2 emissions for this disposal path (debit) are smaller than the credit for the processes replaced

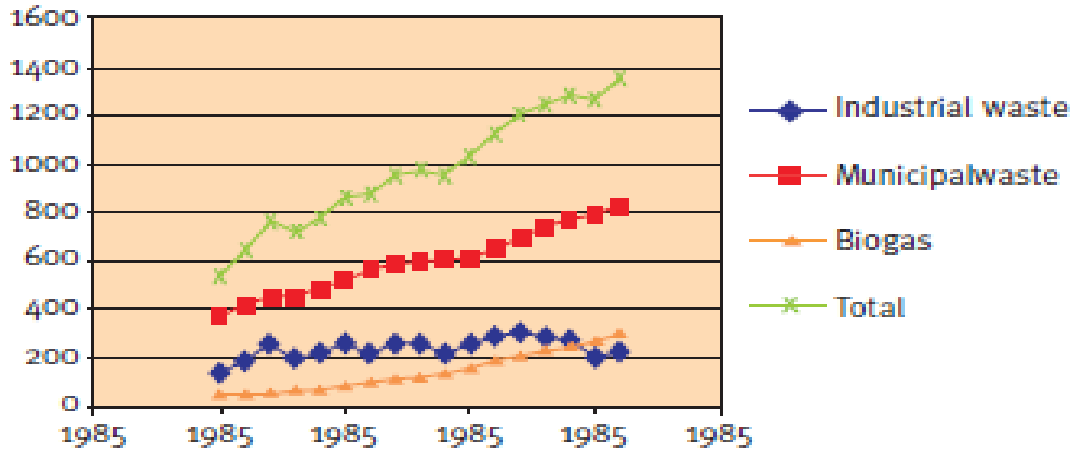

Figure 1. Global energy (Petajoules. PJ) from waste 1990-2006 (IEA, 2009). Biogas includes landfill gas and anaerobic digester biogas. Based on national data reported to IEA from OECD and non-OECD countries. Note: incomplete data from non-OECD countries; thus these are minimum values.

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Incentives and ISWA's suggestions

- Waste-to-energy should continue to be included among government and private sector incentives and targets as a cost-effective way to increase the role of renewable within the mix of local energy systems.
- ISWA supports the use of technologies to recover energy and materials from waste should be further exploited, including direct use (incineration; landfill gas recovery and utilization and use of digester gas) and indirect avoidance of fossil fuels and virgin materials (recycling, re-use, waste minimization).
- • Additional policies and measures should be encouraged to increase the role of waste sources in the global energy mix, including renewable energy mandates, taxes, and economic incentives.

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CDMs

Key programs under the Kyoto Protocol

- CDM - 18% of the 1,834 CDM projects were waste related (10/09)
- 209 millions tones of CO2 credits by the end of 2012
- JI – 19 of 73 projects are solid waste

Lots of potential for additional projects

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Challenges:

1) Technology diversification

2) Geographical distribution

3) Approval process

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Policy and regulations

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

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GHGs accounting

- **Critical to set and monitor realistic GHG emissions reduction targets**

- **Current methodologies form a valuable database for assessment of GHG emissions from waste activities, however, improvements are required to adequately represent the full life cycle of materials and energy.**

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Reporting Methods	Reporting Level	Purpose	Examples
Mandatory national reporting of GHG emissions	National	National GHG reporting for the Nations who signed the UNFCCC	IPCC (Intergovernmental Panel on Climate Change) Methodologies
Mandatory/Regulatory annual reporting for regulated facilities covering numerous parameters including GHGs	Installation	Regulations for integrated pollution prevention and control. These reporting requirements help to improve public access to information on the environment.	Pollutant Release and Transfer Register (PRTRS) - (Europe)
		Reporting specific to GHG emissions in the framework of cap and trade systems.	ETS directive (guidelines for monitoring and reporting GHG emissions from covered installations)
Annual Reporting Protocols to prepare GHG inventory for companies, local governments, or facilities (often on a voluntary basis)	Company/ local government organisation	Regular GHG reporting on the organisational level.	GHG Protocol (WRI / WBCSD) EpE Waste Sector Protocol (2007) ISO 14064
Life Cycle Analysis used in decision making or planning support	Various (National, regional, local)	LCA modelling of waste management systems is carried out in order to form a technical and environmental platform for decision making.	ISO 14048
Carbon Trading Project Mechanisms	Project	Different project-based flexible mechanisms are operational. The estimation of their emission reductions is obtained through a "baseline versus project" approach	CDM approved methodologies Voluntary project standards Offset protocols (CCX, RGGI...) CCAR landfill protocol... GHG Protocol for Project Accounting

An opportunity for SWM industry to…

- Increase the importance of SWM in the political agenda
- Globalize the current scientific and technical knowledge and localize their shape and forms
- Set up new standards for waste management
- Introduce innovation to the whole life- cycle of waste management

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ISWA's commitments

- Networking for capacity building, disseminating knowledge and experience at all levels
- Initiating and supporting research and education on GHGs & SWM
- Selecting cities – models and deliver case studies and actions to reduce GHGs through better SWM
- Assessing experience from different countries and regions on policies, strategies and regulations
- Participating actively in global events and negotiations

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Instead of conclusions

- GHGs context provides a window of opportunity for SWM activities
- There are mature technologies and approaches that can be easily applied and deliver substantial CO_2 emission reduction
- The main problem is their worldwide adoption in a timely manner
- The central challenge is to create global incentives for firms and households to adopt state of the art ways of waste management

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- Market forces can not face the problem themselves because market prices do not reflect environmental harm or benefits – markets must be part of the solution
- National and Local Governments can not resolve the problem by themselves – we can not afford a more intensive and more dangerous waste trafficking

A Global Convention for waste is

- Absolutely required
- Certainly achievable and …
- Waiting for your personal support

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PICK BATTLES BIG ENOUGH TO MATTER, SMALL ENOUGH TO WIN.

JONATHON KOZOL

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Book in preparation: 'Waste-to-Energy in Developing Countries and Transitional Economies'

- *The book aims to provide an overview on the state-of-the-art of **Waste-to-Energy (WtE)** in all its contemporary forms accompanied by **case studies** and **related analyses** focusing on developing countries and transitional economies, the common denominator being the incorporation of WtE in developing, not yet stabilized solid waste management systems, not exclusively in developing countries.*
- ***Chapter contributions are welcome**!*
- ***Publication scheduled within 2011.***
- *To indicate your interest to contribute, please contact until October 15, 2010, the editor, Prof. Avraam Karagiannidis (Aristotle University Thessaloniki, Greece) at: akarag@auth.gr*

Will be published by: Springer

We would be happy to share ideas…

Thank you for coming and listening!

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