

Better waste management to reduce greenhouse gas emissions

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European Topic Centre on
Resource and Waste Management



Under contract with
the European
Environment Agency

Resíduos e Carbono
– Novos Mecanismos de Gestão
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 - Waste generation
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1. Introduction to the ETC/RWM

What is a Topic centre?

- Consortia of national institutions
- Work under contract to the European Environment Agency (EEA)
- ETC/RWM
 - lead organisation: Danish EPA
 - 6 national institutions
 - 10 fulltime and 10 part-time staff

What is the aim of the EEA?

- To provide timely, targeted, relevant and reliable information on Europe's environment to policy-makers and the public
- Established a network (EIONET)
 - National Focal Points and National Experts
 - Five Topic Centres (ETCs)

Key clients

- European Environment Agency (EEA)
- DG Environment
- EU Member States / EEA member countries
- Professionals
- NGOs
- The public at large

2. Greenhouse gases from municipal waste

- Waste generation
- Waste management
- GHG emissions
- Objectives in the European Union
- Findings

Findings

Outlook for the EU, 2005-2020:

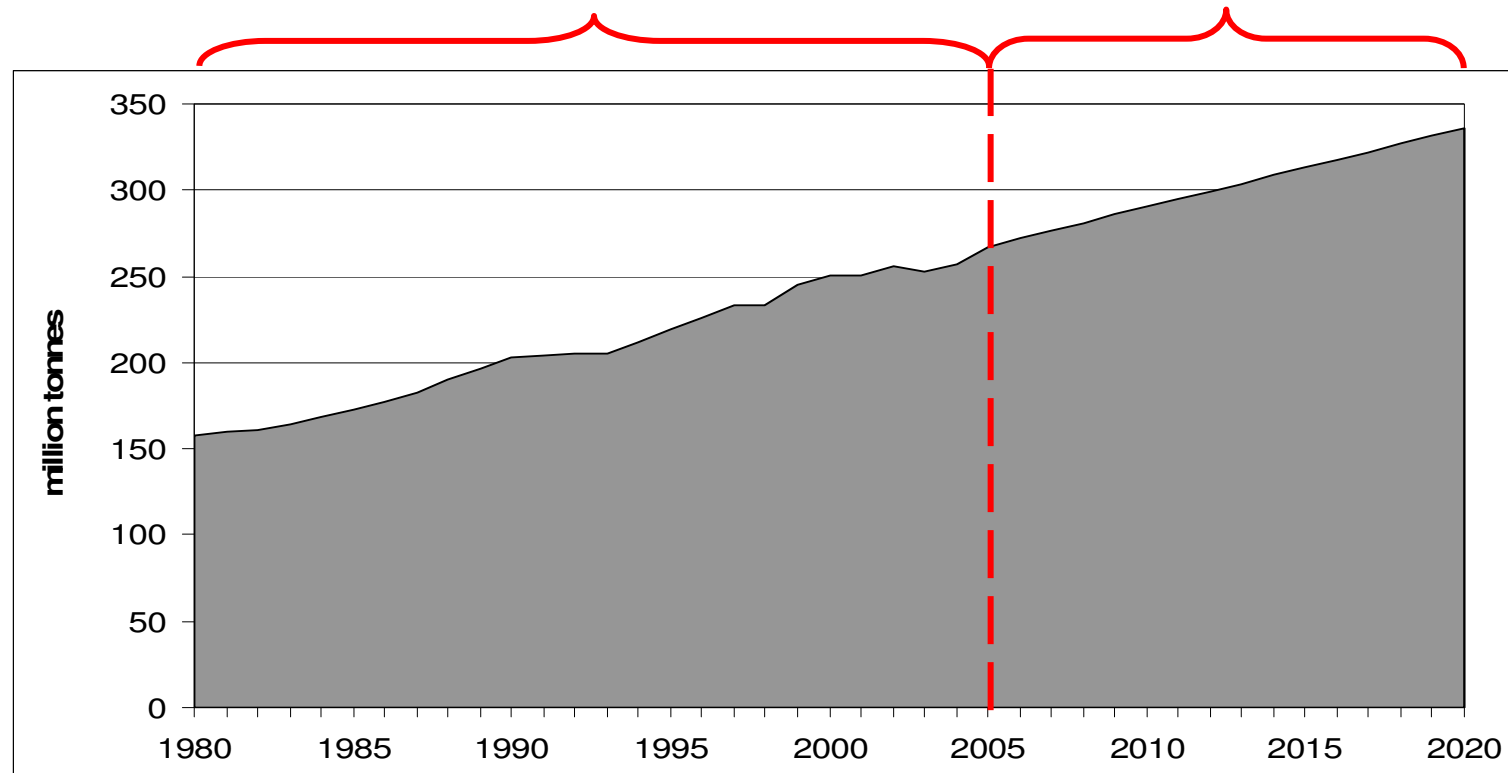
- Municipal waste growth: 25%
- Increased recovery of waste
- Reduction in net greenhouse gas emissions
- Further effort on waste prevention if further reduction of greenhouse gas emissions

Projection of municipal waste

Key explanatory variables:

- Private final consumption
- No of households/population

Projection of explanatory variables based on scenario for the European Commission



Key assumptions for the projection

Average, annual growth rates, 2005-2020

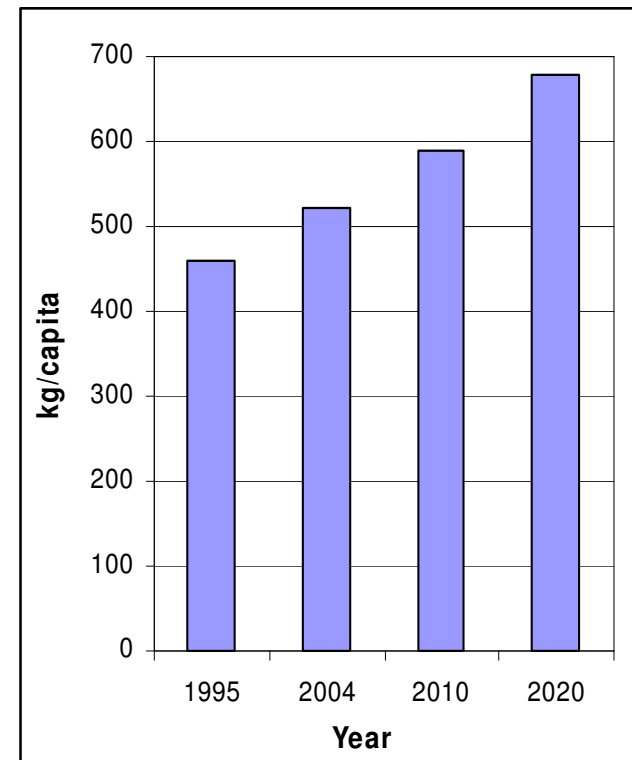
	EU-15	New EU-12
Private household consumption	2.0 % p.a.	4.1 % p.a.
Population	0.1% p.a.	-0.2% p.a.
Avg. household size, persons	2.1	2.4

Municipal waste generation

EU in 2020:

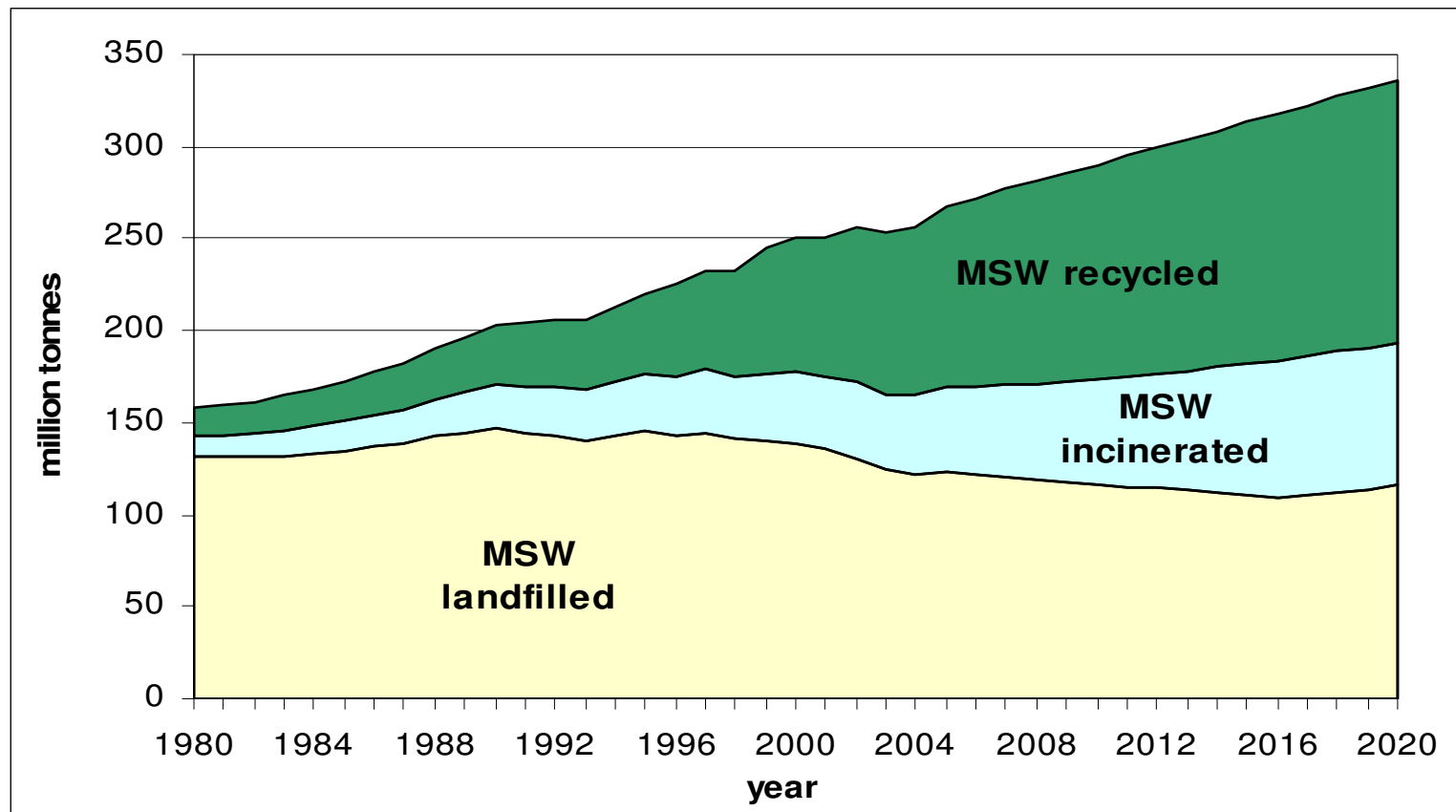
- Around 335 million tonnes
- 680 kg/capita
- 25% growth

Differences between
Member States



Management of municipal waste

In 2020: landfilling 34%, incineration 23%



Estimation of GHG emissions

Direct emissions:

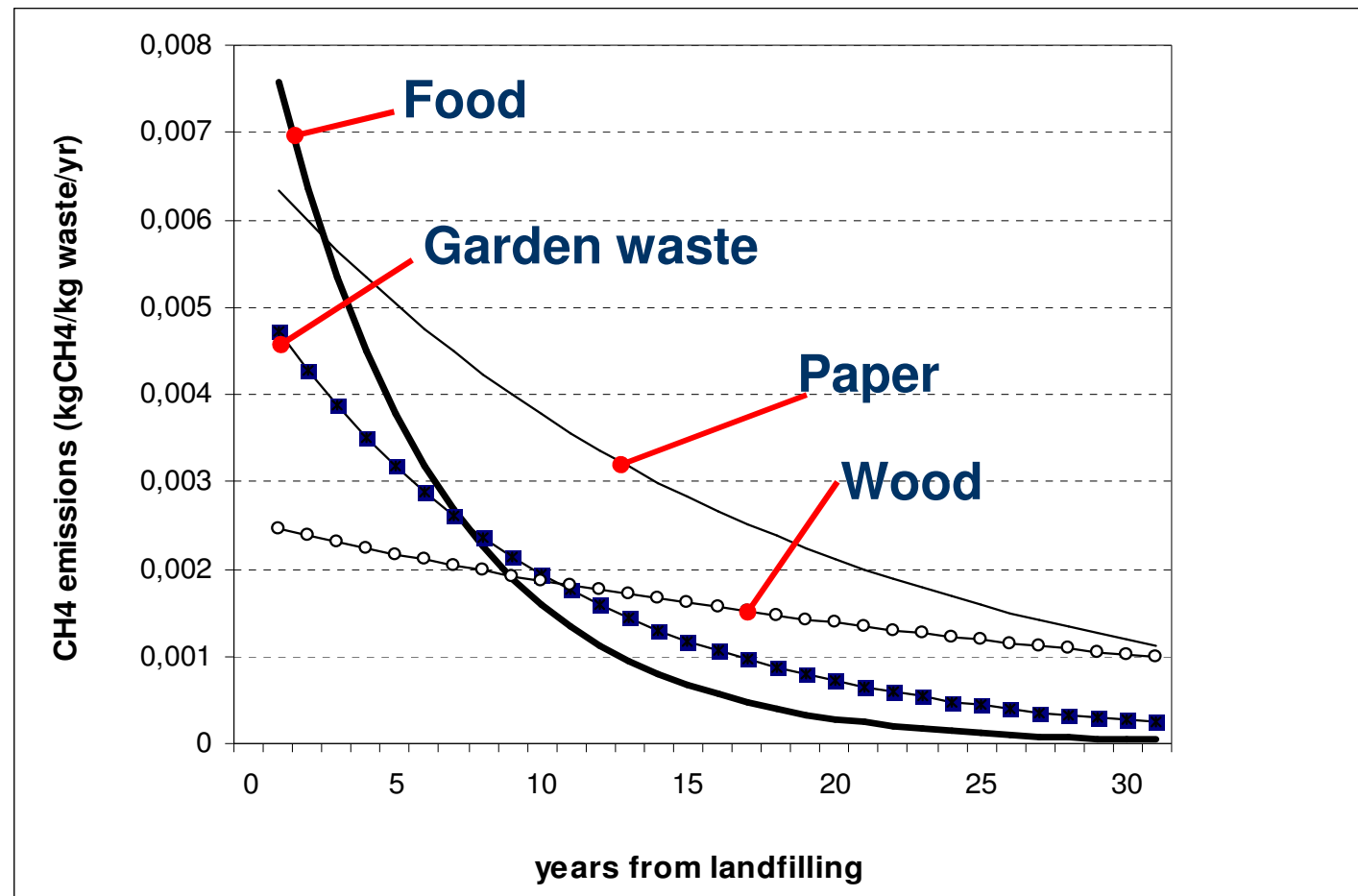
- Landfill – IPCC
- Incineration – IPCC, carbon mass balance
- Recycling – LCA data

Indirect emissions: LCA data

Modeling GHG emissions from landfill

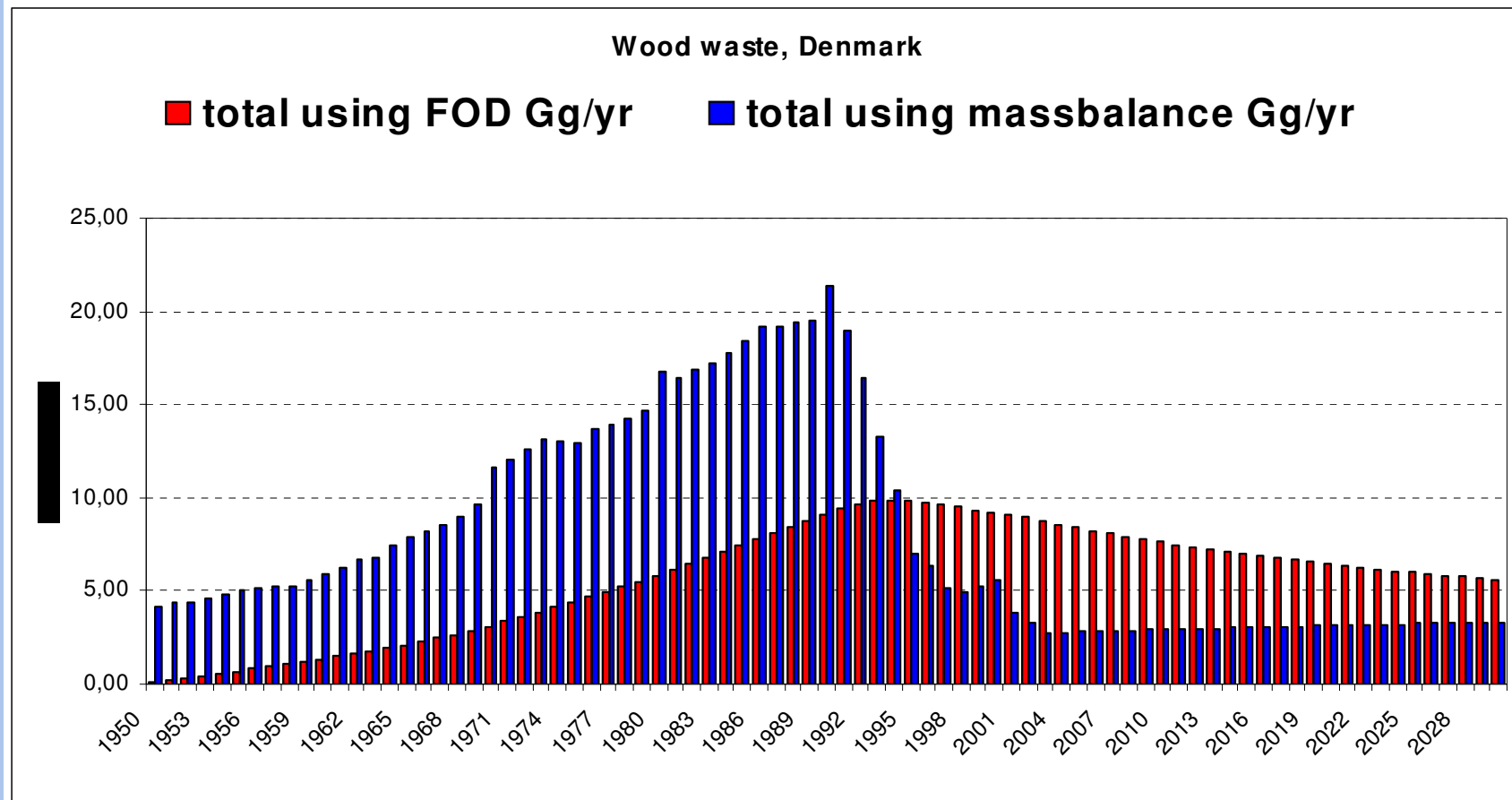
First Order Decay model - recommended by the IPCC

1 kg
municipal
waste



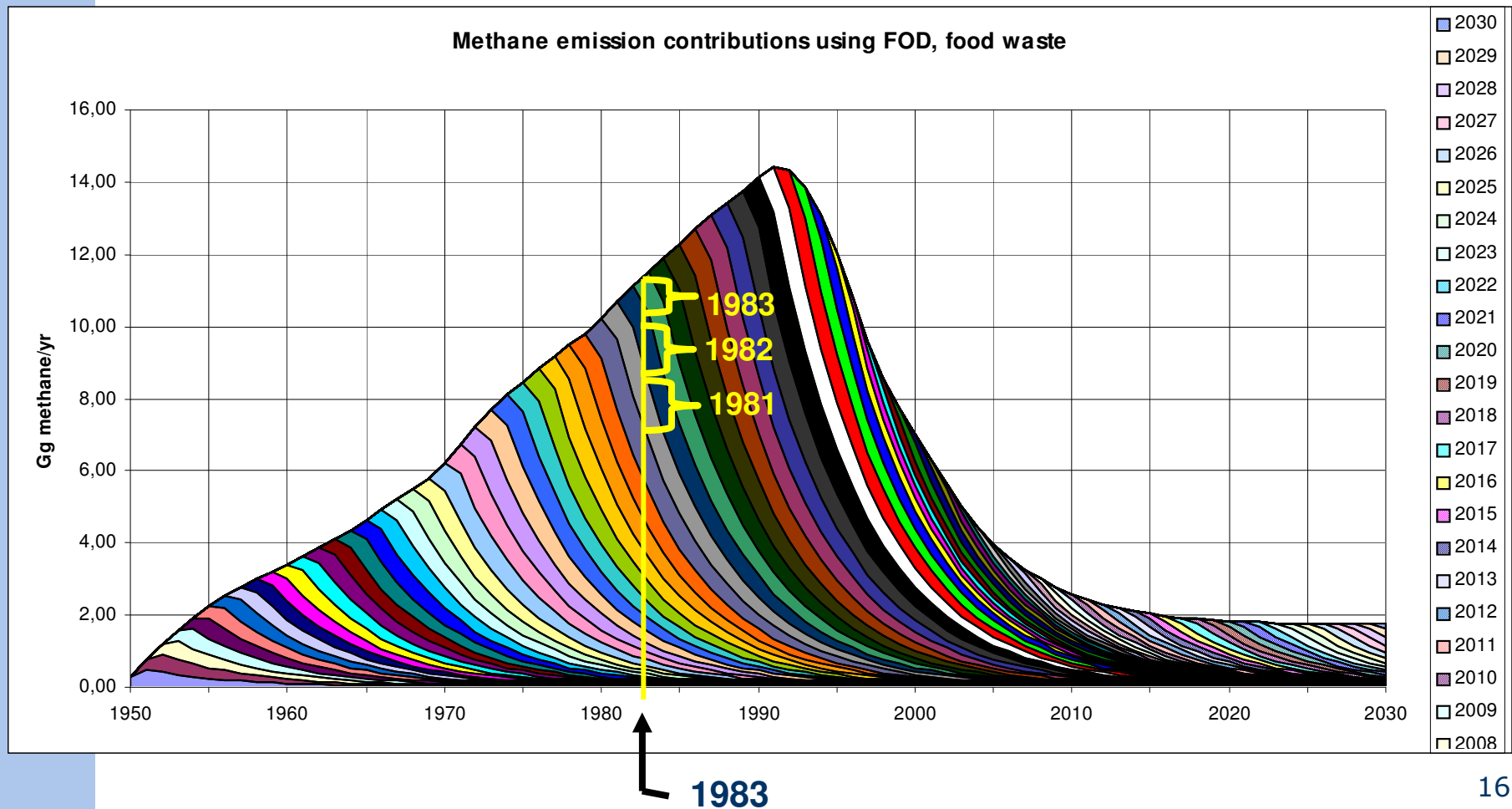
Background for the landfill projection

FOD vs. immediate release - wood waste



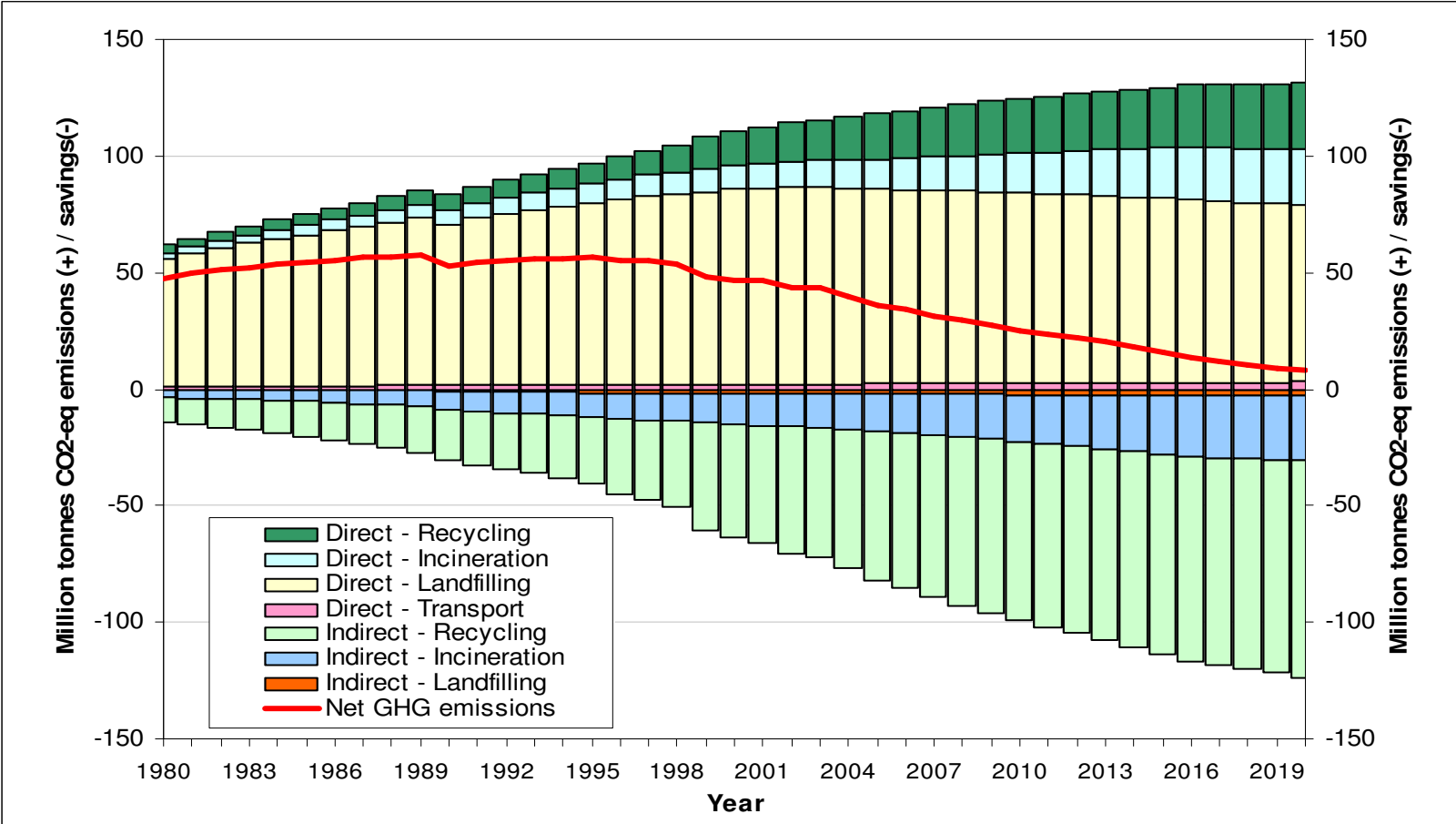
Background for the landfill projection

FOD example: Denmark, food waste

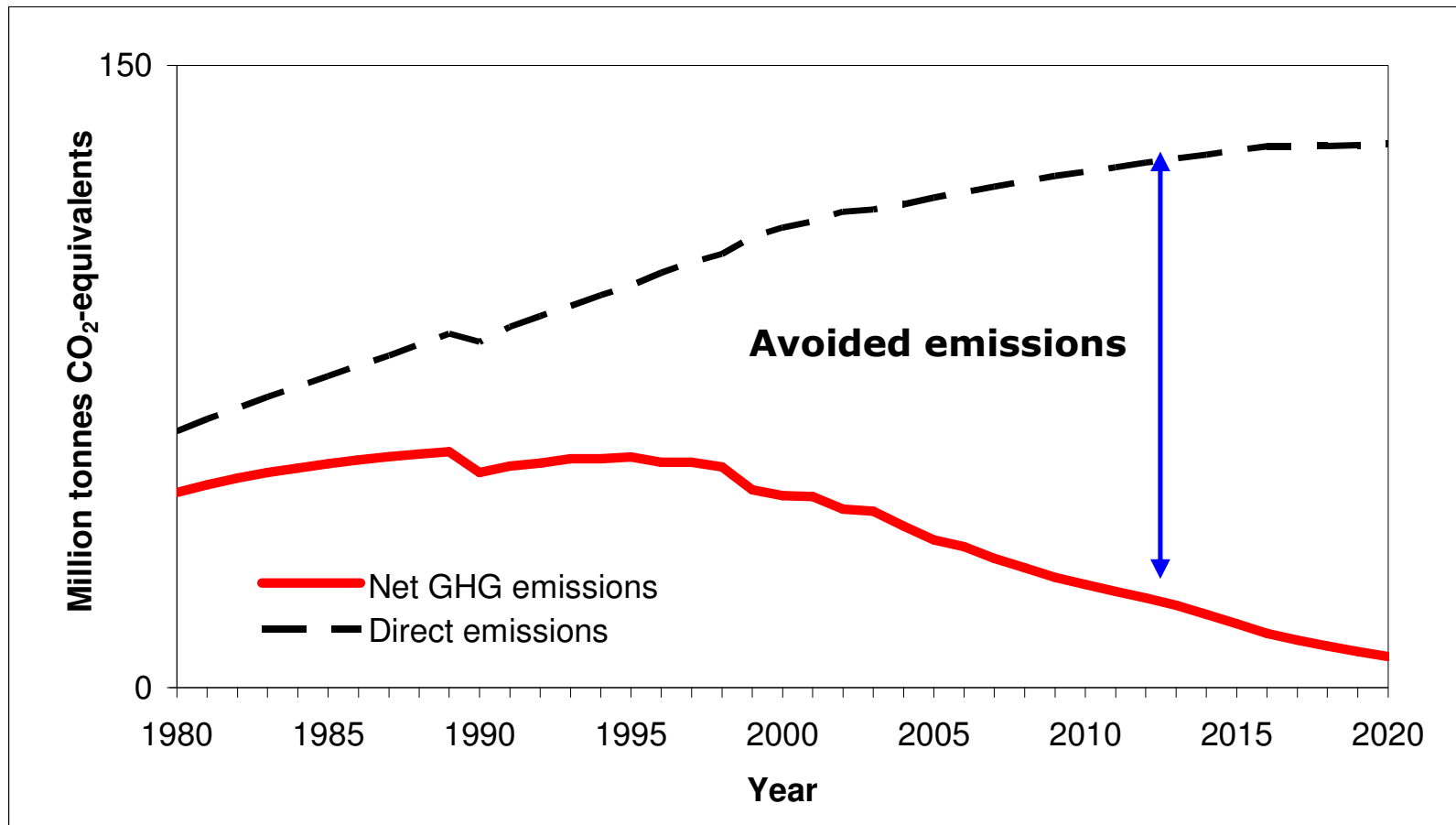


Net GHG emissions, EU-27

Max 20% methane recovery

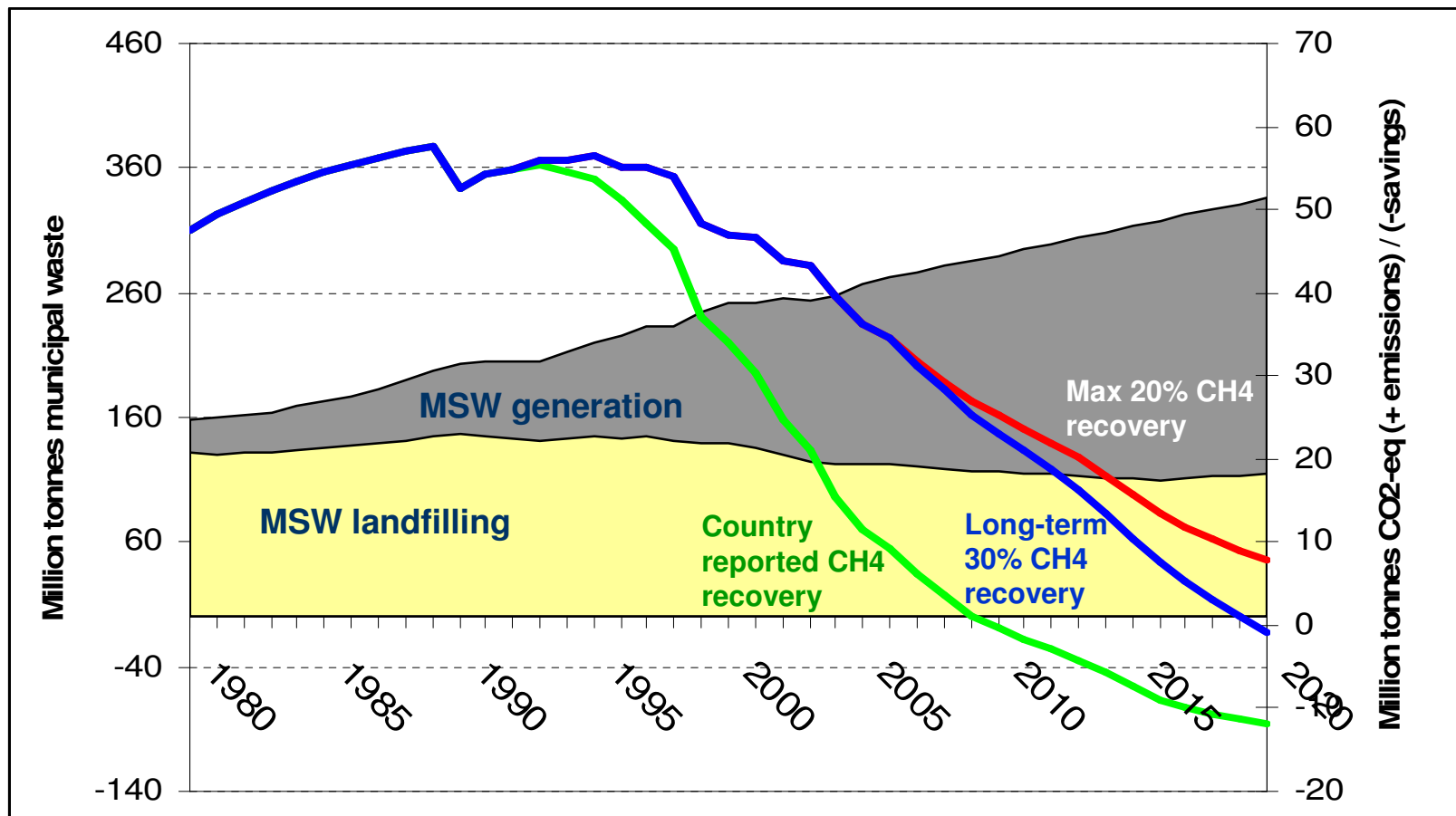


GHG emissions, EU-27



Net GHG emissions from management of municipal waste, EU-27

Uncertain range of methane recovery



Objectives in the European Union

6th Environment Action Programme:

- Significant reduction in
 - waste volumes generated
 - quantity of waste going to disposal
- Decoupling of waste generation from economic growth (environmental pressures)

Can we expect this to happen in the EU-27 in the next 15 years?

Findings

Outlook for the EU, 2005-2020:

- 25% growth in municipal waste - striking differences between Member States
- Increased recovery of waste - EU policies play a key role
- Considerable reduction in net greenhouse gas emissions from municipal waste management by 2020 - *if* a life-cycle perspective is taken
- Further effort on waste prevention would reduce greenhouse gas emissions

Further information

- EEA Briefing 2008/1: Better management of municipal waste will reduce greenhouse gas emissions
- Supporting document
- ETC/RWM Working Paper
- Web:
 - <http://www.eea.europa.eu/>
 - <http://waste.eionet.europa.eu/>

**2008
EEA Briefing 01**

Better management of municipal waste will reduce greenhouse gas emissions

- The amount of municipal waste is expected to grow by 25% from 2000 to 2020.
- Increased numbers of roads, and diverting waste away from landfill play a key role in halting the environmental impacts of increasing waste volumes.
- As recycling and incineration with energy recovery increasingly used, net greenhouse gas emissions from municipal waste management are expected to drop considerably by 2020.
- Limiting or avoiding growth in waste volumes would further reduce greenhouse gas emissions from the waste sector and deliver other benefits to society and the environment.

Key messages include:

Greenhouse gas emissions
On average, each European citizen generates 0.45 tonnes of municipal waste in 2000. This amount reaches 0.55 tonnes per person in 2020, and a further increase to 0.65 by 2030. In total, this corresponds to an increase of almost 10% in 30 years. This potential continuing increase in waste volumes is possible because an assumed constant growth in population and consumption (i.e. an average growth of 0.4% and 0.4% per year by 2020 (EU, 2006)) and a continuation of current trends in consumption patterns.

Waste management
In 2000, 16 million tonnes of municipal waste were generated in the EU-25. By 2020, this amount is expected to grow by 25% to 20 million tonnes. If measures simply to prevent all EU municipal waste management in 2020 (i.e., avoid landfills and incineration with energy recovery) are taken, the

of greenhouse gas emissions will be reduced by 10%.

These results indicate that actions to improve the management of waste should be specifically considered, if the aim of the EU's commitment under the agreement of a significant reduction in volume of waste is to be achieved.

Improving recovery and diversion of municipal waste

Interventions, driven by landfill tax, have been the primary policy instruments used for municipal waste, but over the last few decades considerable reductions in landfill have reduced EU municipal waste sent to landfill.

EU Action Plan (2005), ETC/RWM Working Paper (2005), EEA Briefing 2005/10, EEA Briefing 2006/10, EEA Briefing 2007/10, EEA Briefing 2008/10, EEA Briefing 2008/11, EEA Briefing 2008/12, EEA Briefing 2008/13, EEA Briefing 2008/14, EEA Briefing 2008/15, EEA Briefing 2008/16, EEA Briefing 2008/17, EEA Briefing 2008/18, EEA Briefing 2008/19, EEA Briefing 2008/20, EEA Briefing 2008/21, EEA Briefing 2008/22, EEA Briefing 2008/23, EEA Briefing 2008/24, EEA Briefing 2008/25, EEA Briefing 2008/26, EEA Briefing 2008/27, EEA Briefing 2008/28, EEA Briefing 2008/29, EEA Briefing 2008/30, EEA Briefing 2008/31, EEA Briefing 2008/32, EEA Briefing 2008/33, EEA Briefing 2008/34, EEA Briefing 2008/35, EEA Briefing 2008/36, EEA Briefing 2008/37, EEA Briefing 2008/38, EEA Briefing 2008/39, EEA Briefing 2008/40, EEA Briefing 2008/41, EEA Briefing 2008/42, EEA Briefing 2008/43, EEA Briefing 2008/44, EEA Briefing 2008/45, EEA Briefing 2008/46, EEA Briefing 2008/47, EEA Briefing 2008/48, EEA Briefing 2008/49, EEA Briefing 2008/50, EEA Briefing 2008/51, EEA Briefing 2008/52, EEA Briefing 2008/53, EEA Briefing 2008/54, EEA Briefing 2008/55, EEA Briefing 2008/56, EEA Briefing 2008/57, EEA Briefing 2008/58, EEA Briefing 2008/59, EEA Briefing 2008/60, EEA Briefing 2008/61, EEA Briefing 2008/62, EEA Briefing 2008/63, EEA Briefing 2008/64, EEA Briefing 2008/65, EEA Briefing 2008/66, EEA Briefing 2008/67, EEA Briefing 2008/68, EEA Briefing 2008/69, EEA Briefing 2008/70, EEA Briefing 2008/71, EEA Briefing 2008/72, EEA Briefing 2008/73, EEA Briefing 2008/74, EEA Briefing 2008/75, EEA Briefing 2008/76, EEA Briefing 2008/77, EEA Briefing 2008/78, EEA Briefing 2008/79, EEA Briefing 2008/80, EEA Briefing 2008/81, EEA Briefing 2008/82, EEA Briefing 2008/83, EEA Briefing 2008/84, EEA Briefing 2008/85, EEA Briefing 2008/86, EEA Briefing 2008/87, EEA Briefing 2008/88, EEA Briefing 2008/89, EEA Briefing 2008/90, EEA Briefing 2008/91, EEA Briefing 2008/92, EEA Briefing 2008/93, EEA Briefing 2008/94, EEA Briefing 2008/95, EEA Briefing 2008/96, EEA Briefing 2008/97, EEA Briefing 2008/98, EEA Briefing 2008/99, EEA Briefing 2008/100.

European Environment Agency

3. Evaluation of waste policies related to the Landfill Directive

Objectives

- Analyse the effectiveness of policies to divert waste from landfill:
 - MSW and BMW - in context of the Landfill Directive
 - why particular measures were chosen
 - did they work well and why
 - was the Landfill Directive a driver for implementing policies
- Better understanding of policy measures
- Share the lessons learnt

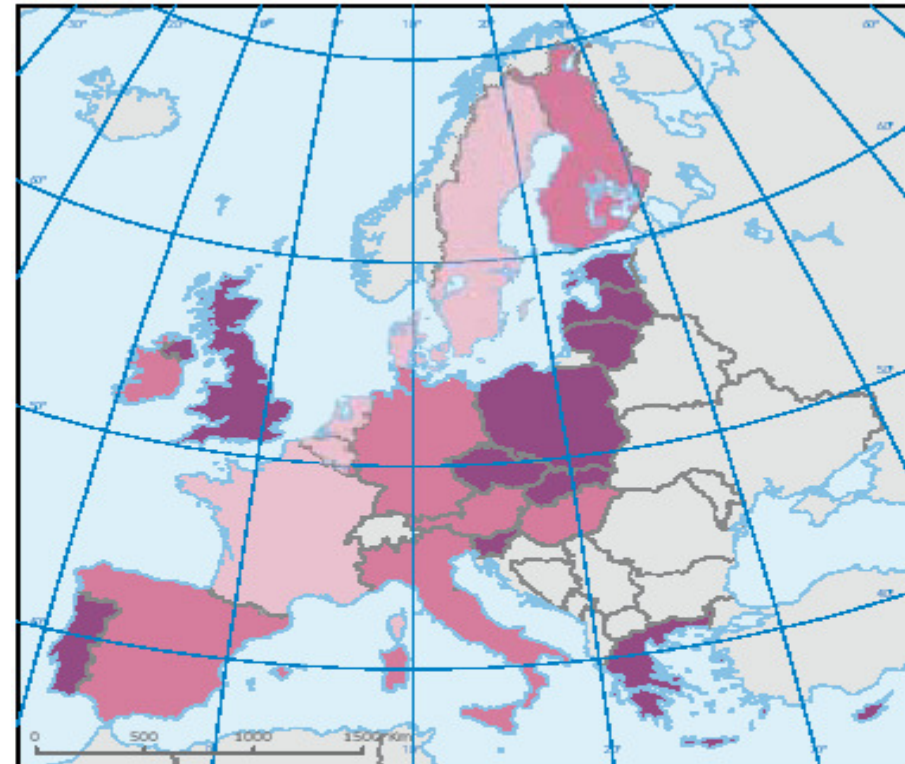
5 countries and one region

**Group 1: Germany,
Flemish region**

**Group 2: Italy and
Finland**

**Group 3: Hungary
and Estonia**

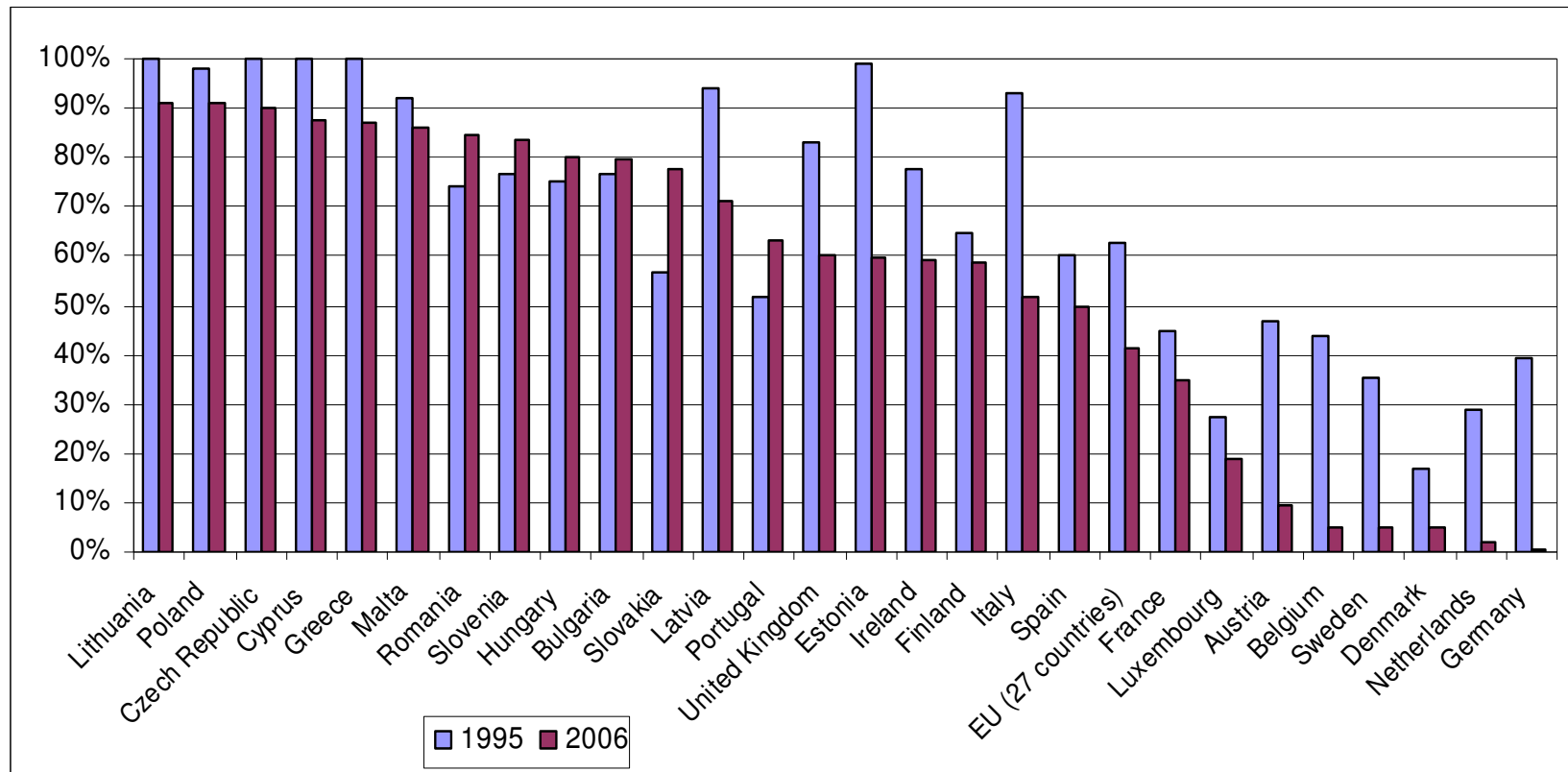
Source: The road from landfilling to recycling: common destination, different routes, EEA (2007)



Three country groupings defined by diversion strategy

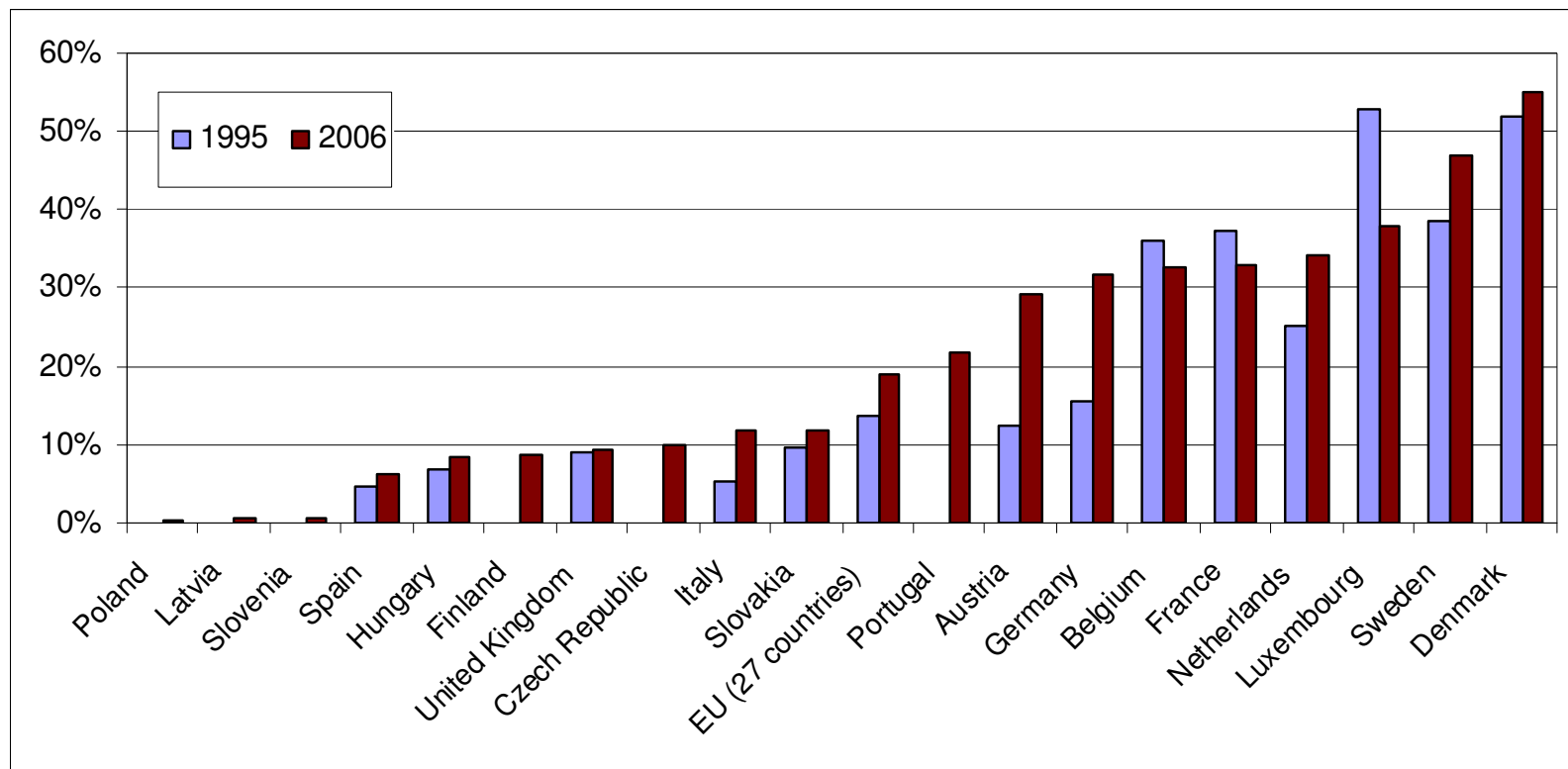
- 1: incineration > 25 % and material recovery > 25 %
- 2: incineration < 25 % and material recovery > 25 %
- 3: incineration < 25 % and material recovery < 25 %
- Outside data coverage

Landfill of municipal waste



Calculated, based on Eurostat Structural Indicators

Incineration of municipal waste



Calculated, based on Eurostat Structural Indicators

Preliminary findings

- Landfill Directive a driver for diverting waste from landfill (IT, FI, EE and HU)
- But not for preventing waste generation
- Packaging Directive may have been more important in terms of awareness raising and introduction of separate collection schemes
 - one of the first directives to introduce separate collection schemes
 - visible waste stream for households

Preliminary findings

- Increase in alternative treatment capacity (composting, MBT, incineration)
- Increase in gate fees
- Market for compost: exist only if compost is of good quality – need for standards/labels?
- Public acceptance to:
 - using waste as a product
 - incineration (high technical standards)

Lessons learnt

- A long-term target and intermediate targets (Landfill Directive design)
- Authorities to define clear targets and responsible institutions for meeting these targets
- Regional cooperation to establish 'critical mass'
- More instruments are often necessary
- Communication is important to keep households aware and active
- A combination of recycling and incineration often necessary to meet targets

For more information: <http://waste.eionet.europa.eu/>

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European Topic Centre on Resource and Waste Management

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News from the Topic Centre

03 Mar 2008 [Transboundary shipments of waste in the EU](#)
A new study from the ETC/RWM shows that transboundary shipment of waste has increased significantly during the last decade. This increase is not only for shipments of hazardous, problematic and non-hazardous wastes but also illegal shipments. In 2003 about 8,6 million tonnes of hazardous and problematic waste were shipped across European boundaries. Over 90% of this waste was shipped to other EU countries. About 80% were for recovery and 20% were for disposal. ([more...](#))

27 Feb 2008 [Projected increase in end-of-life vehicles](#)
A new working paper from the Topic Centre shows that the number of end-of-life vehicles for 25 EU Member States is likely to increase by 20-25% between 2005 and 2015. This corresponds to an increase from around 11 million to around 13.5 million vehicles. As, the average weight of cars is increasing, about 14 million tonnes of waste may be generated, if the average weight of an end-of-life vehicle increases to 1025 kg in 2015. ([more...](#))

26 Feb 2008 [Not all EU countries outsource pressure-intensive production](#)
Taking account of hidden emissions embodied in trade is a hot subject right now. A new Topic Centre article argues that not all EU countries are reducing environmental pressures by outsourcing their 'dirty' industries to other countries; some are actually specialising in emission-intensive industries for the export market. Such specialisation can give global environmental benefits but makes a country look worse than its neighbours under traditional emissions monitoring ([more...](#))

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The European Topic Centre on Resource and Waste Management (ETC/RWM), established in 1997, is one of five Topic Centres under the European Environment Agency. The mission of the Topic Centre is to provide reliable and comparable data and information on resource and waste management in Europe to decision-makers and the public.