

*Waste opportunities: Past and Future Climate  
Benefits from Better Municipal Waste Management  
in Europe*

2011 GMI Partnership-Wide Meeting  
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# Contents

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- ❑ Objectives
- ❑ Project structure
- ❑ Waste projections
- ❑ Waste management
- ❑ GHG emissions
- ❑ Future scenarios
- ❑ Main messages



# Objective

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## 3 main questions

Are waste volumes decreasing?

Is waste management improving?

Is there GHG mitigation potential from better waste management?

→ Investigation of MSW



# Response

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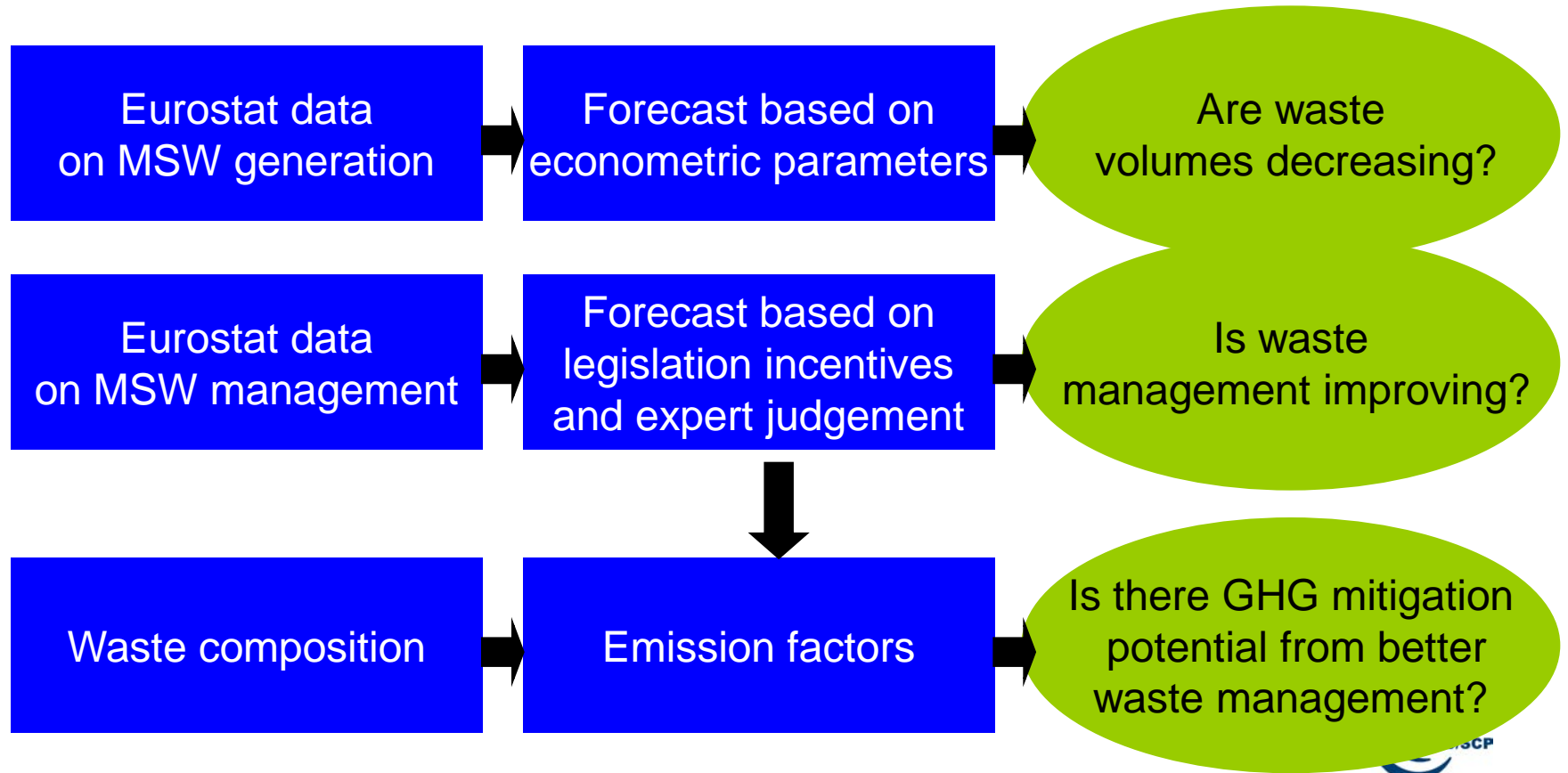
- Projections of MSW volumes
- Projections of MSW management
- Modelling of GHG emissions but...
- Use of Life Cycle Thinking



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- ❑ Objectives
  - ❑ **Project structure**
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  - ❑ Waste management
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# Structure



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- ❑ Objectives
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  - ❑ **Waste projections**
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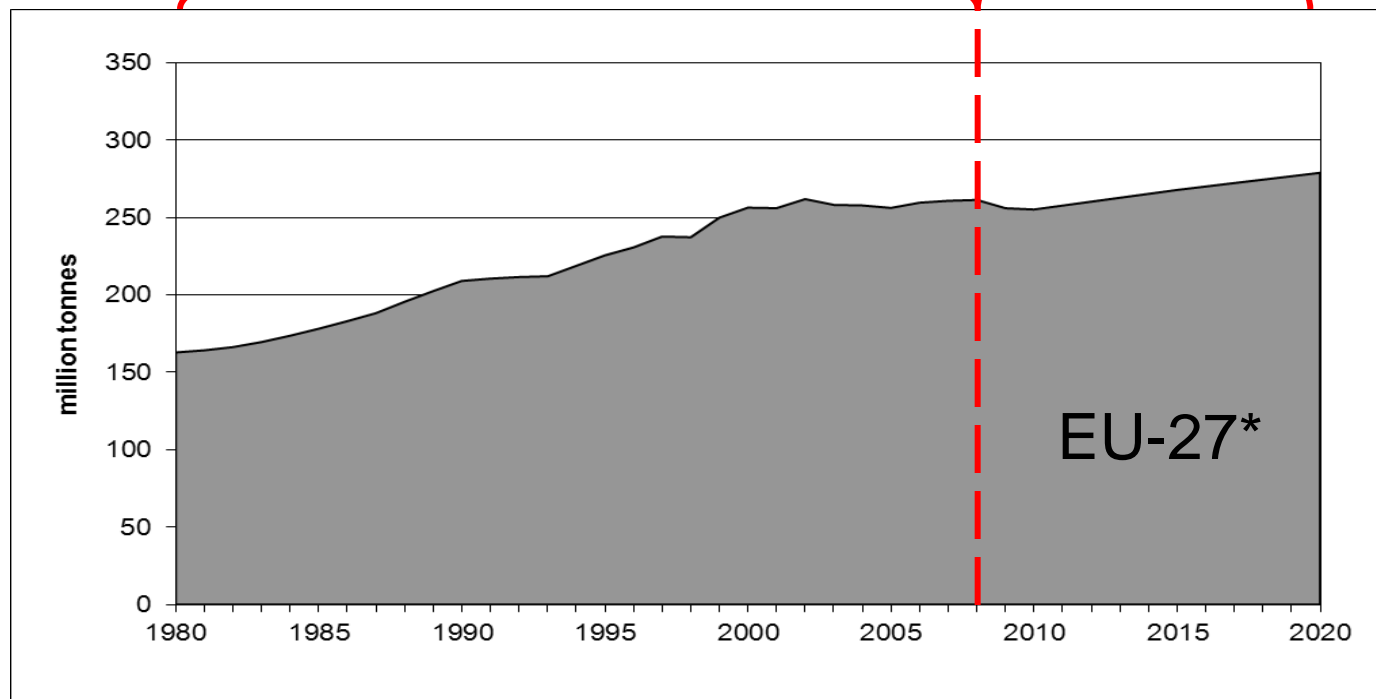


# Projections of municipal waste

Key explanatory variables:

- Private final consumption
- No of households/population

Projection of explanatory variables based on scenario for the European Commission



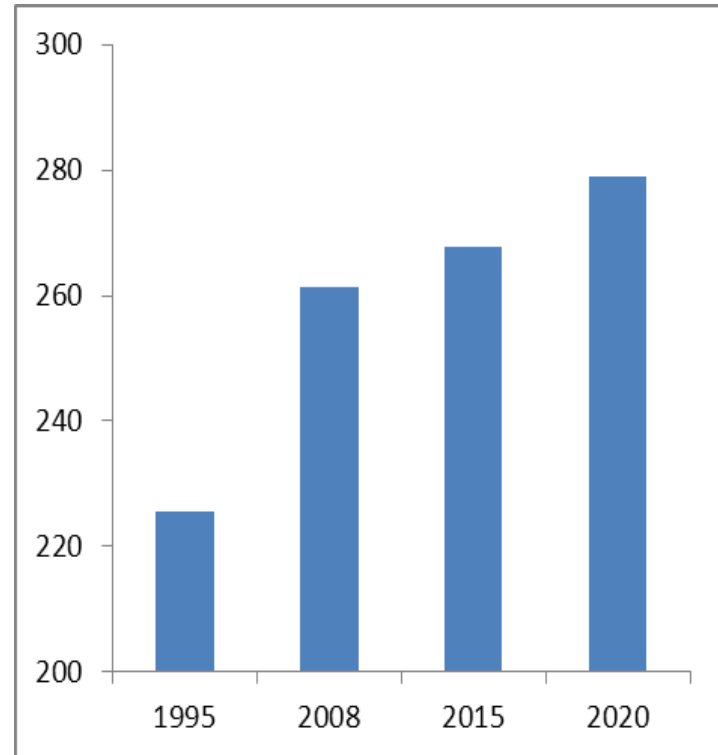


# Projections of municipal waste

## EU in 2020:

- Around 280 million tonnes
- 558 kg/cap
- 6.9 % growth 2008-2020

Differences among MS

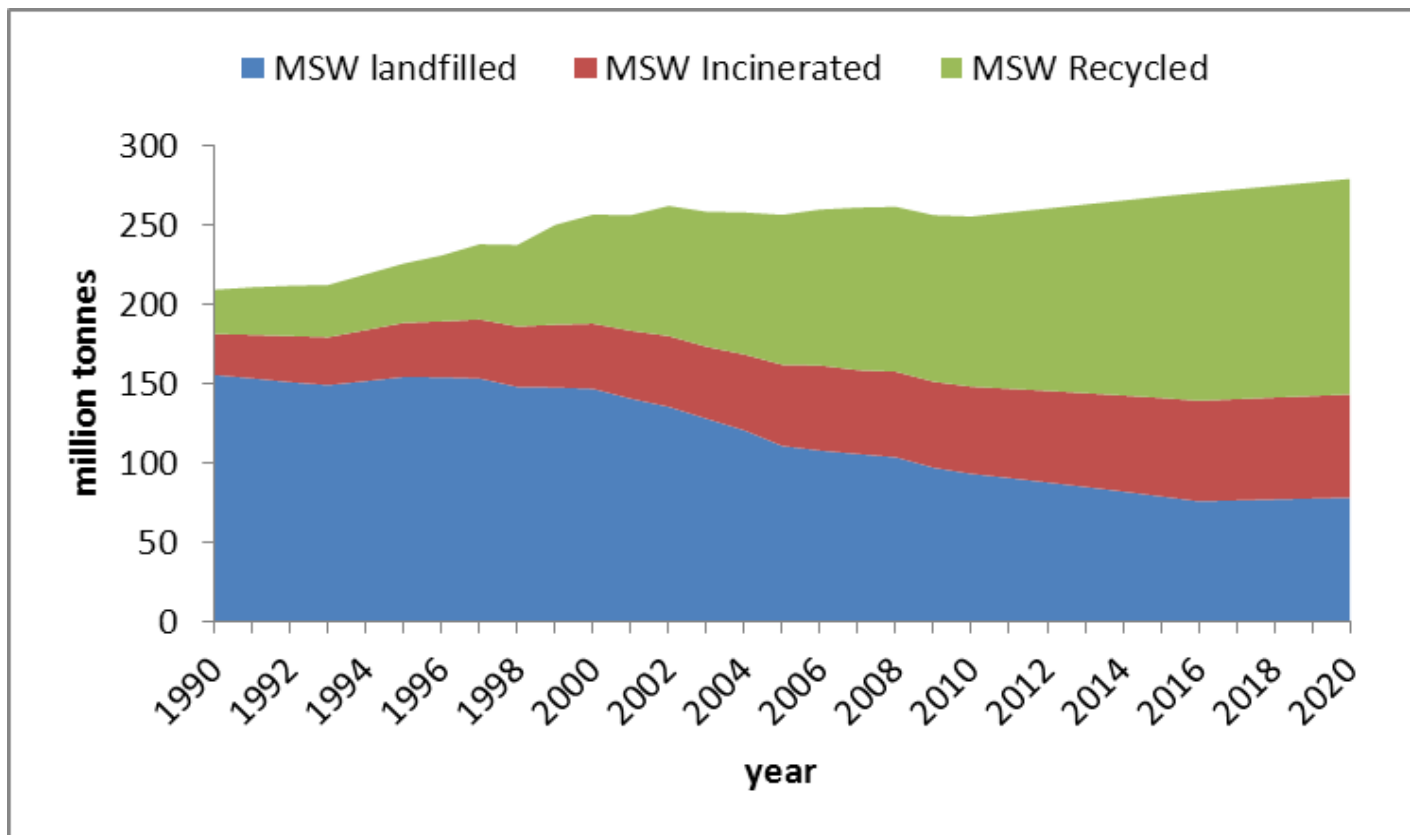


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- ❑ Objectives
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# Municipal waste management

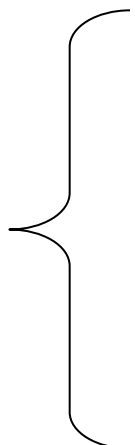
In 2020: Landfilling 28 % - Recycling 49 %



# MSW management projection assumptions

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- Existing data in Eurostat 1995-2008 (9)
- Backcasting based on expert judgement

- Forecasting 
  - Incentives from legislation
  - Expert judgement
  - Historical data



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# Estimating GHG emissions

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## Direct emissions

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

## Indirect emissions

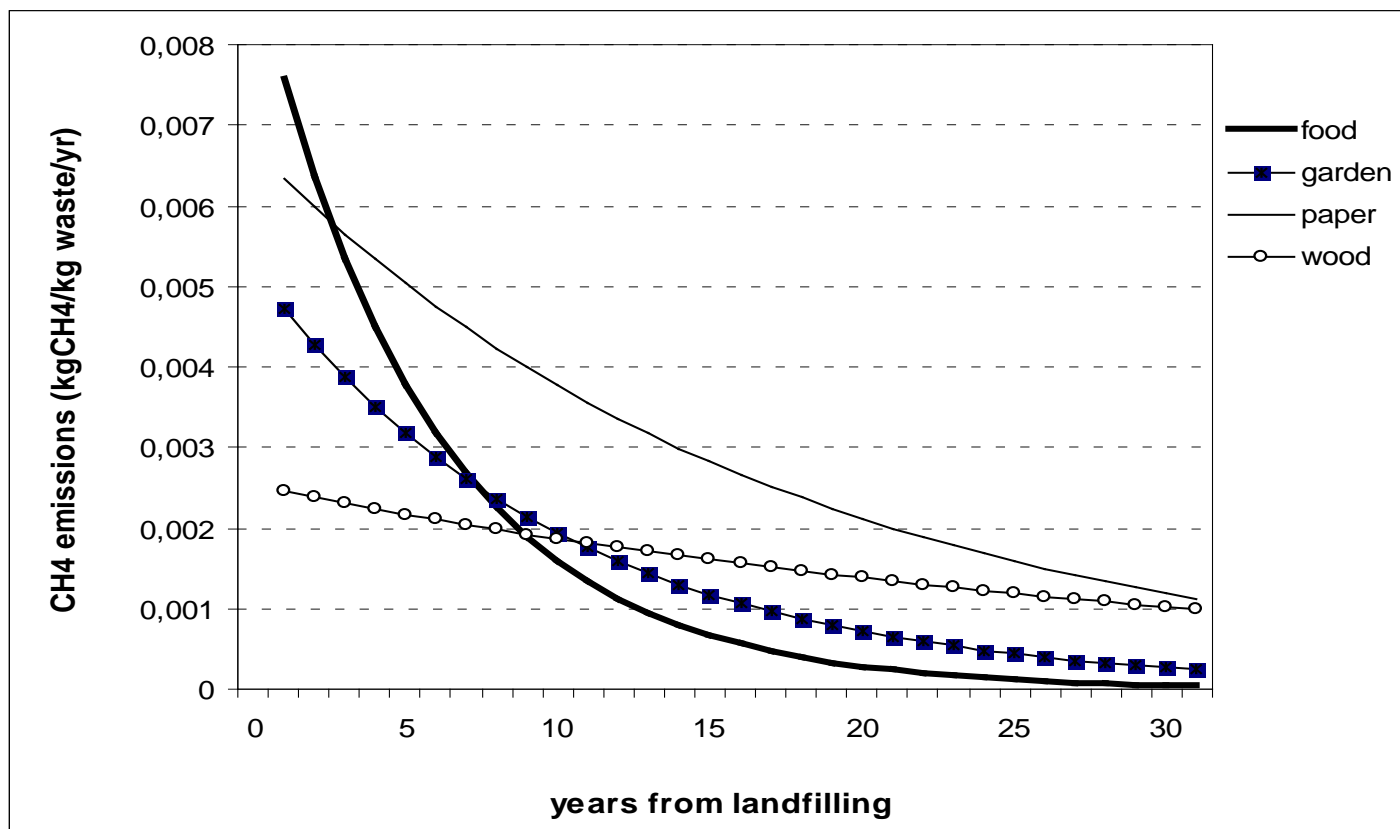
- All options: LCA data



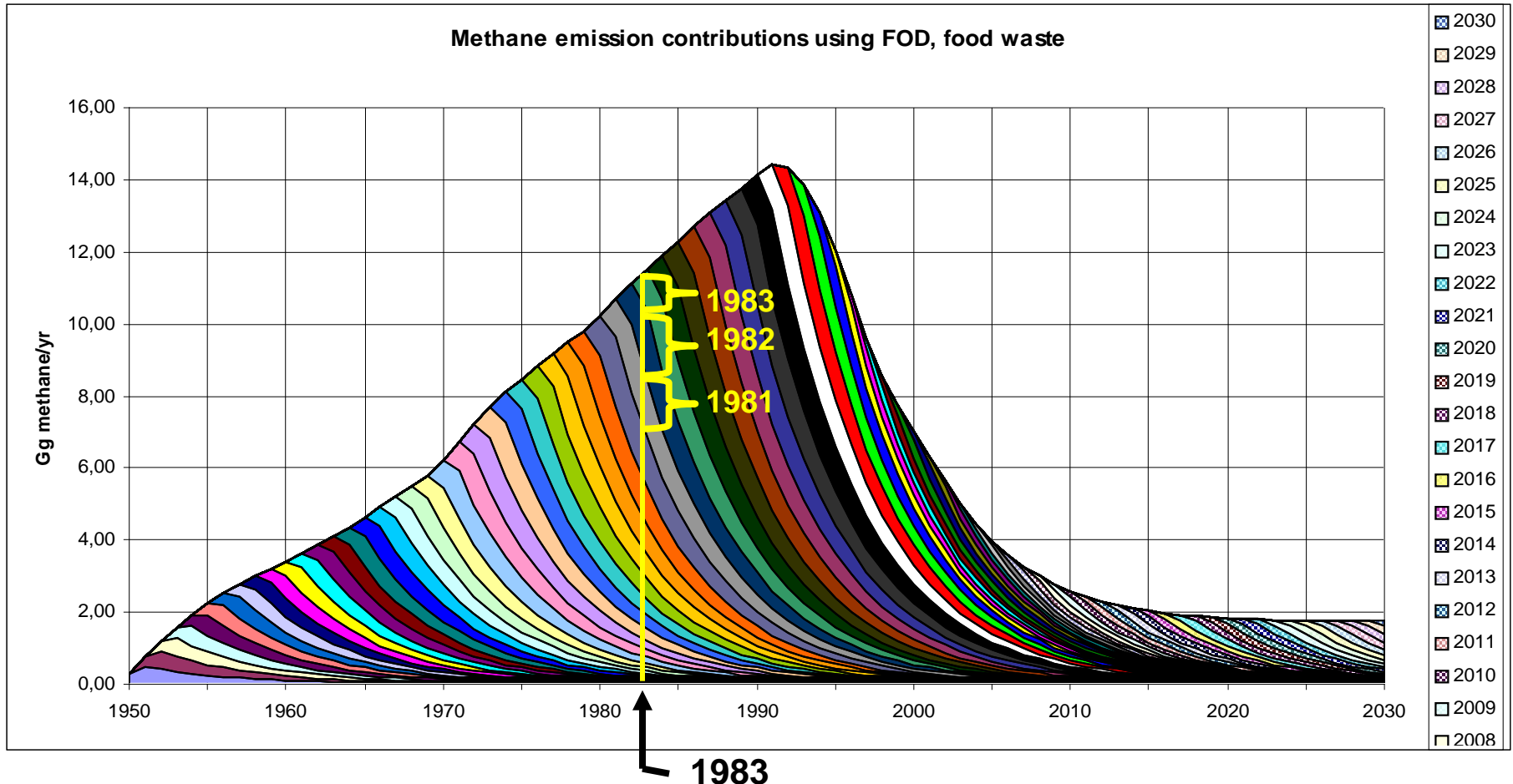
# Modelling GHG emissions from landfills

First order decay method – IPCC recommended

1 kg  
municipal  
waste



# Projection of methane emissions





# Methane capture

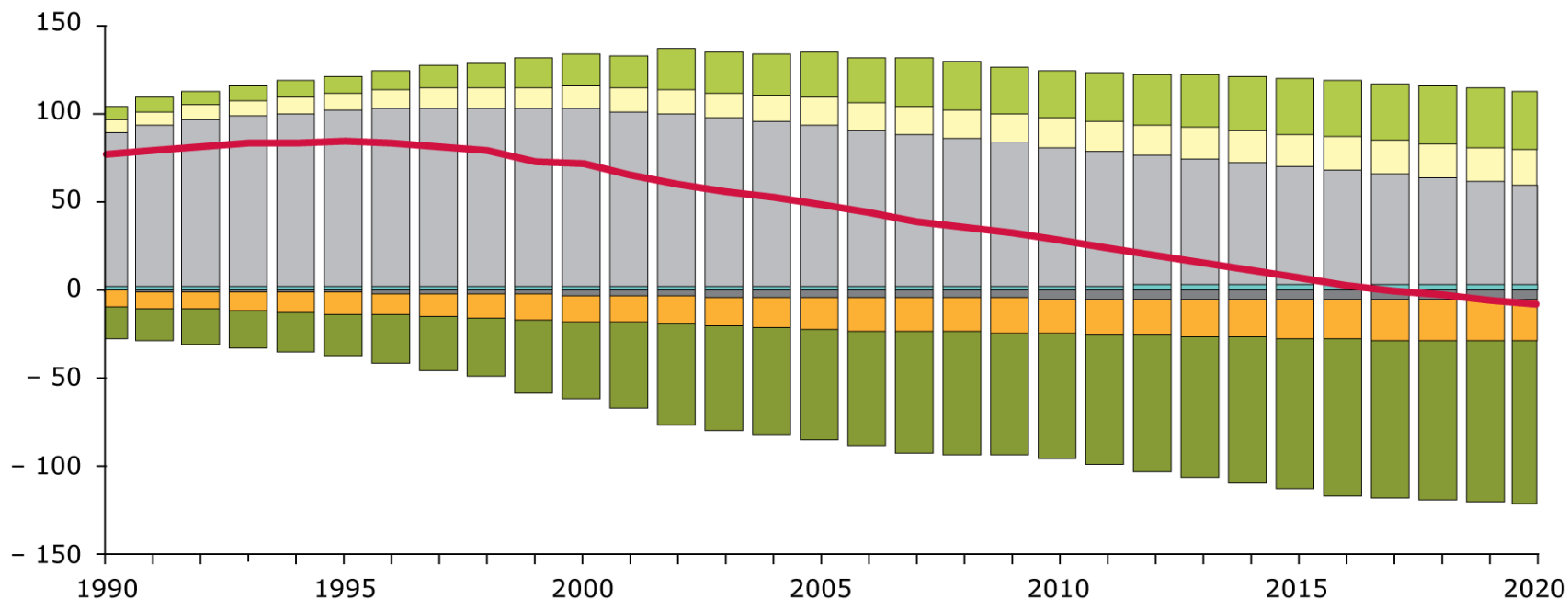
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- Most critical parameter for landfill emissions
- Countries report in UNFCCC
- Controversy over maximum value
- Hard to measure
- Our model < 50 %



# Net GHG emissions results (I)

Million tonnes CO<sub>2</sub>-equivalent emissions (+)/savings (-)



Direct emissions

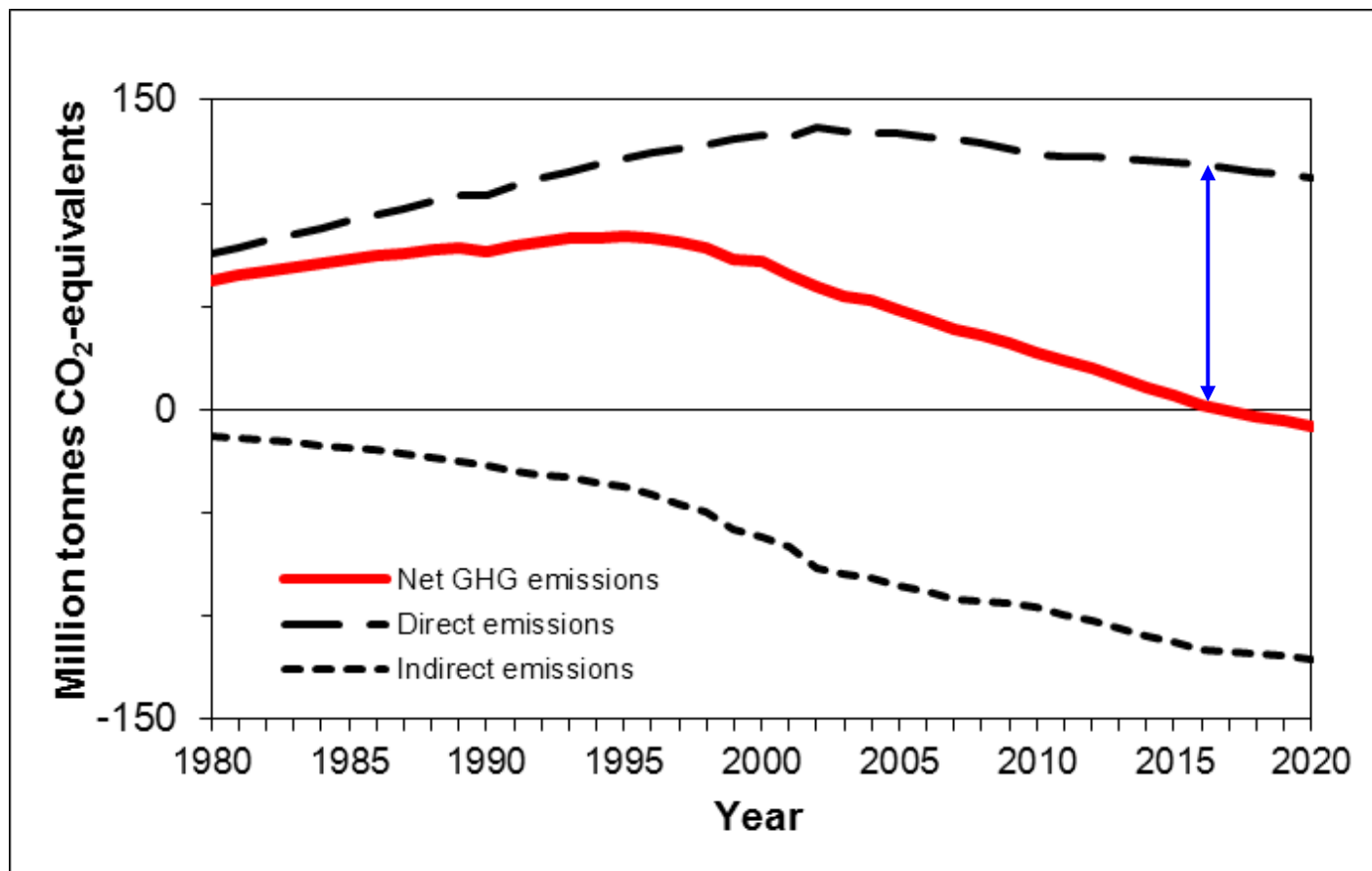
- Recycling
- Incineration
- Landfilling
- Transport

Avoided emissions

- Recycling
- Incineration
- Landfilling

Net GHG emissions

# Net GHG emissions results (II)



# Influencing factors for GHG estimation

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1. MSW composition from 6 countries
2. Methane recovery cap (50 %)
3. Average energy mix per country
4. Emission factors (LCA data)



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# Scenarios

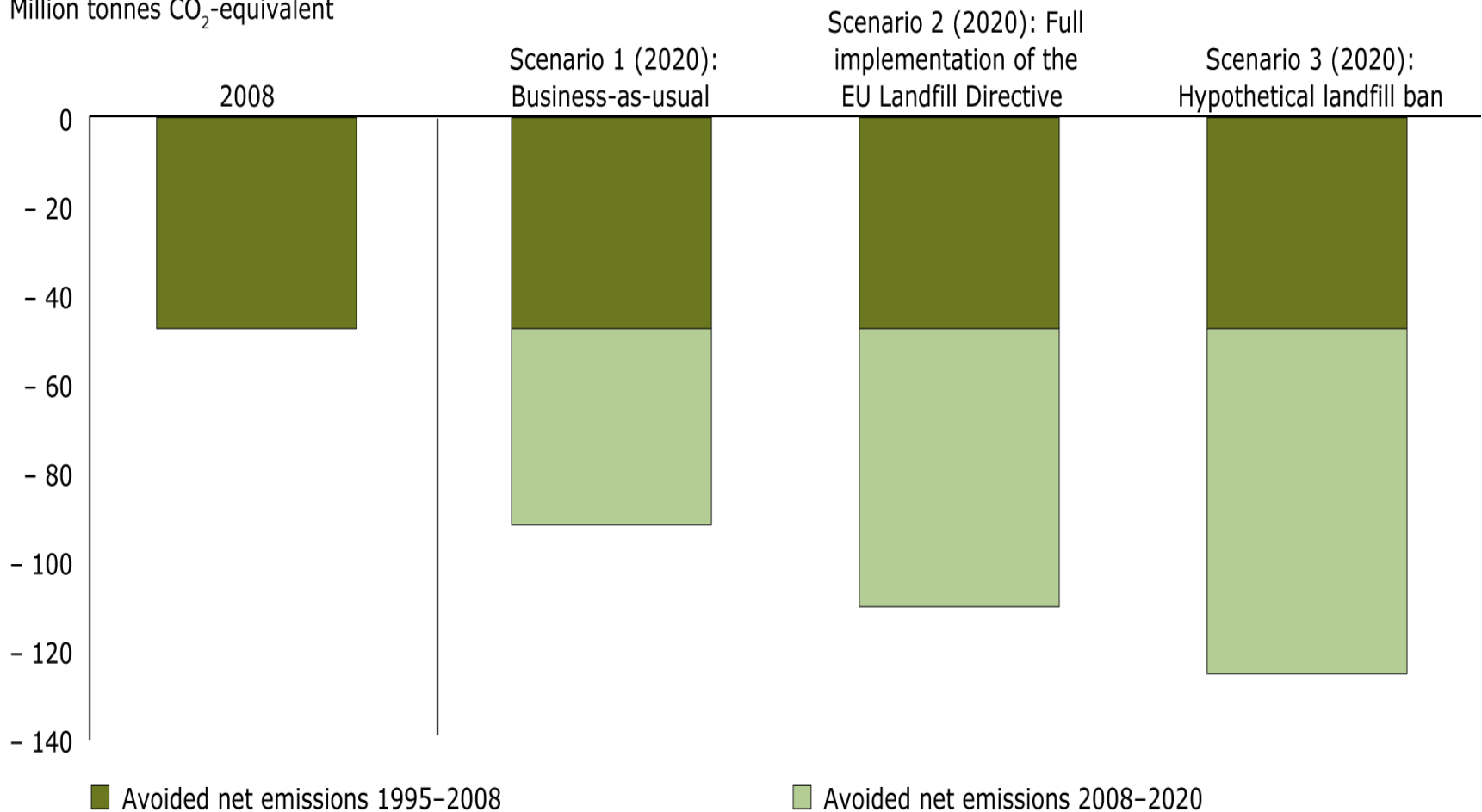
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1. Business-as-usual
2. Landfill Directive full compliance
3. Implementation of Landfill Ban across all countries



# Scenario results

Million tonnes CO<sub>2</sub>-equivalent



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# Main messages (I)

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- No decoupling of MSW generation from GDP growth
- MSW management expected to improve:  
Recycling ↑ Landfilling ↓
- EU legislation to stimulate management improvement
- EU legislation has “side-effects”



# Main messages (II)

- 48 mio tonnes CO<sub>2</sub>-eq reduction between 1995 and 2008
- Main factors:
  1. Reduced methane emissions
  2. Increased avoided emissions through recycling
- Significant contribution of MSW management to EU GHG targets
- Landfill Directive fulfillment: 62 mio tonnes reduction between 2008 and 2020: 42 % more than BAU scenario
- Landfill Ban: 78 mio tonnes reduction between 2008 and 2020: 76 % more than BAU scenario



# Publications

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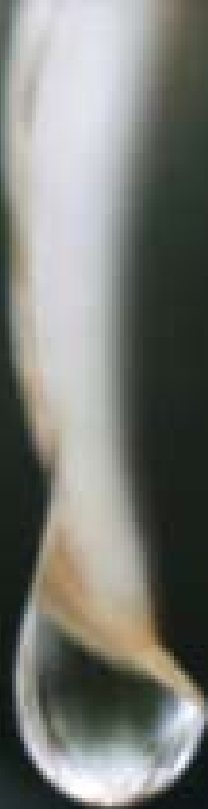
- EEA at

<http://www.eea.europa.eu/highlights/big-potential-of-cutting-greenhouse>

- ETC Working Paper at

<http://scp.eionet.europa.eu/publications/2011WP4>





**Thank you for your attention**

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