

## GMI MSW Subcommittee Meeting March 2013

# Better Waste Management Can Avoid GHG Emissions Significantly

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## Waste Technology Waste Technology Transfer

Focus on the linkage  
of waste management and  
greenhouse gas emissions



- **Share of GHG emissions from the waste sector**

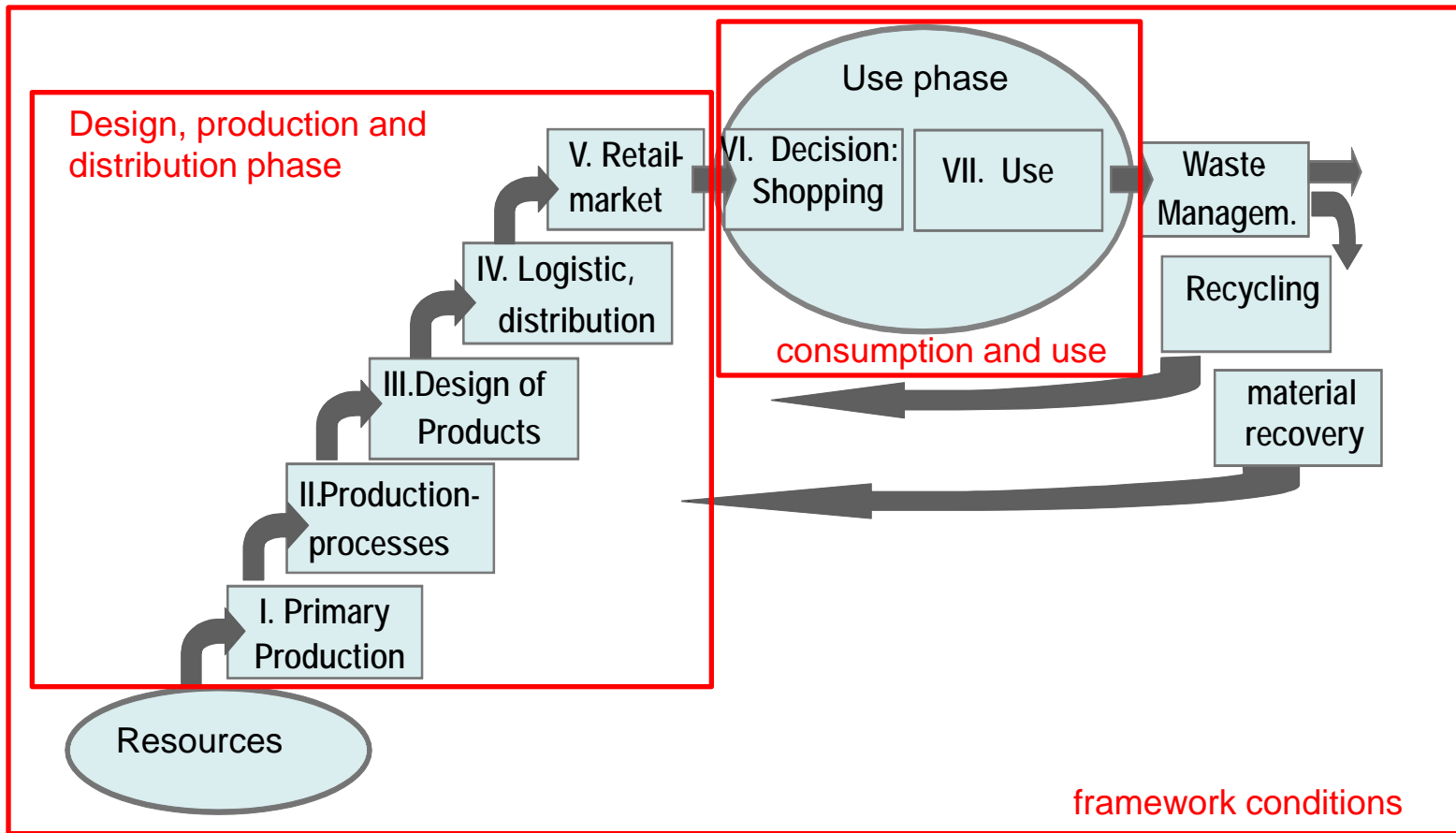
According to the Intergovernmental Panel on Climate Change (IPCC) about 2.8 % of all GHG emissions stem from the waste sector

but only methane emissions from landfills are reported and waste incineration without energy recovery plus direct emissions from composting and MBT plants

No avoided emissions from recycling (reported in Sector Industry) or energy recovery (reported in Sector Energy) are accounted for the waste sector

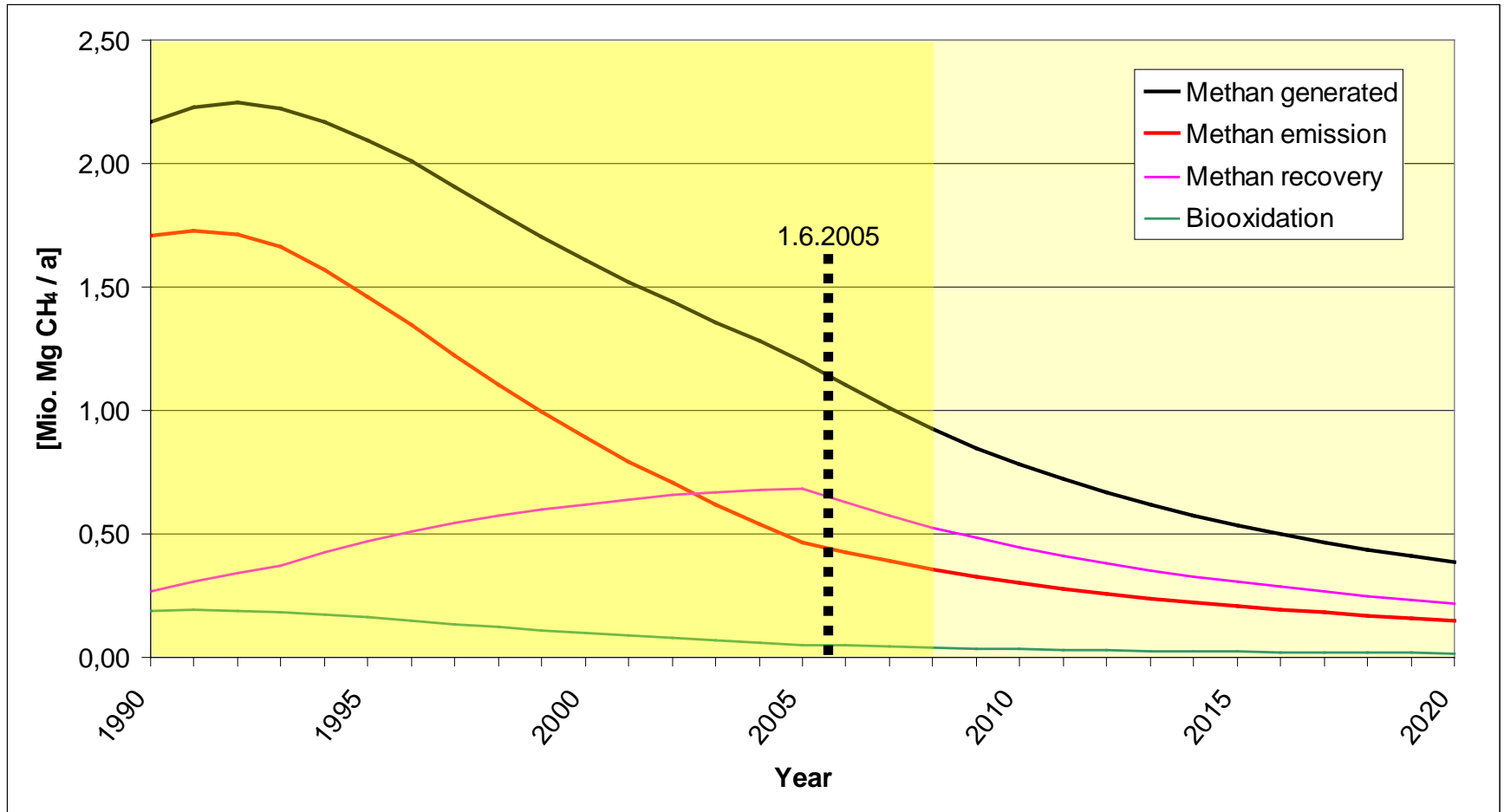
- Several surveys commissioned by the Environment Agency to describe the "Climate Protection Potential in the Waste Management Sector"
- Surveys by other institutions: e.g. European Topic Center on Sustainable Production and Consumption (EEA); OECD
- Overall result: the mitigation potential is much higher than the IPCC figures make you think (between 12 and 16 % of total GHG; up to 25 % acc. IGES)

## stages of the life cycle of products

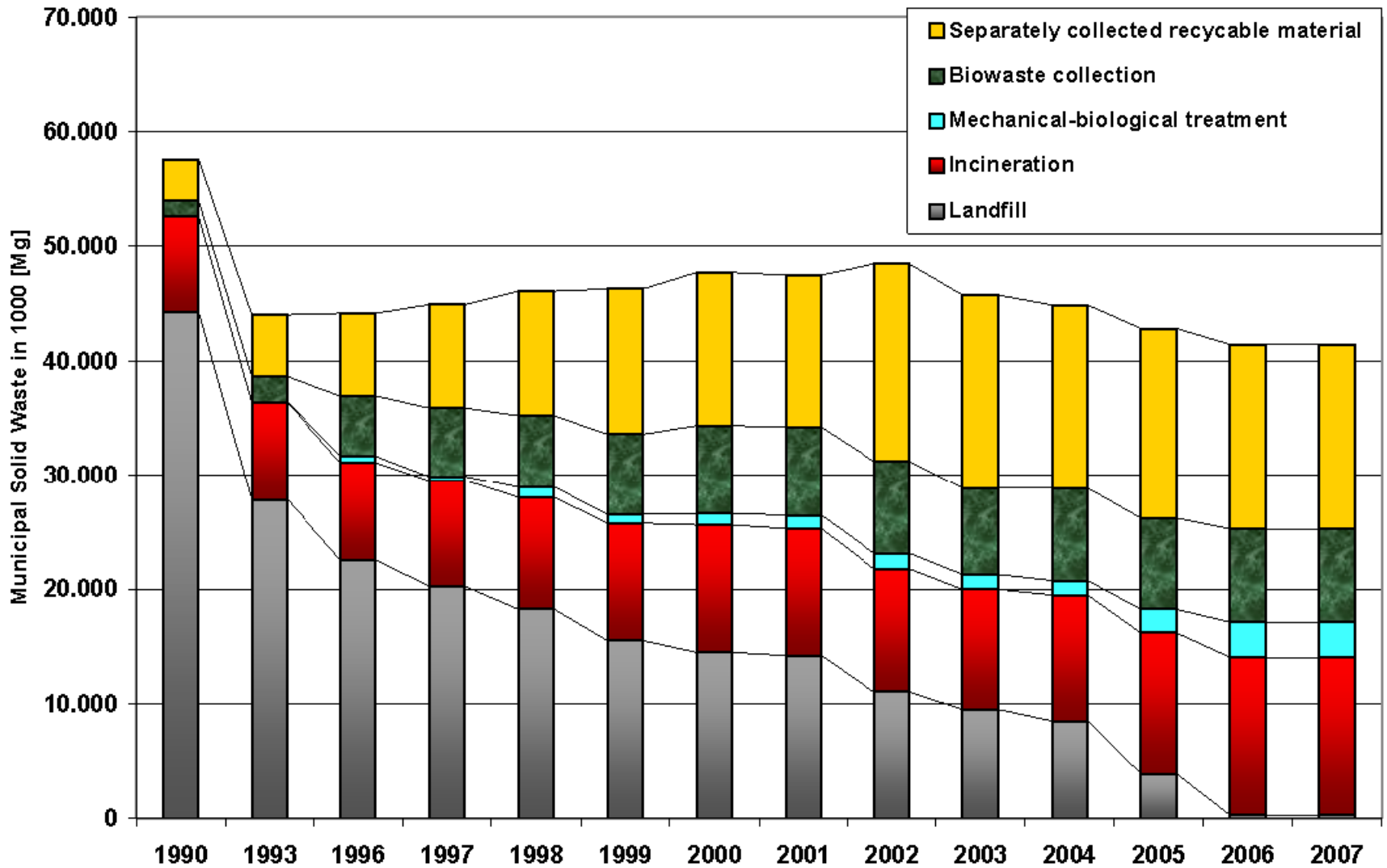


Source:  
G. Dehoust;  
Öko-Institut 2012

# Methan-Emission from German Landfills (IPCC - FOD - Method)



Changes in pathways for management of household waste



# GHG-balance for Germany

## Scenarios

### 2006 current situation

GHG impacts and credits for recycling, incineration and treatment of residual waste on the basis of current technology → recycling rate about: 62 %

### 2020 Technology

improvement in the technical standards with unchanged waste flows. It is assumed that net efficiencies of plants and the gas yields of anaerobic digestion plants increase and higher value secondary products are produced → recycling rate about: 62 %

### Scenario 2020 Abfall (waste)

change in the waste flows with increased collection and more recycling with unchanged technical standards. It is assumed that 50 % of the recyclable materials, still in the mixed residual waste in 2006, are additionally collected and utilised. → recycling rate about: 72 %

### Scenario 2020 AT

the combination of the scenarios 2020 T and A. → recycling rate about: 72 %

## GHG emissions from waste

Greenhouse gas emissions according to material flows

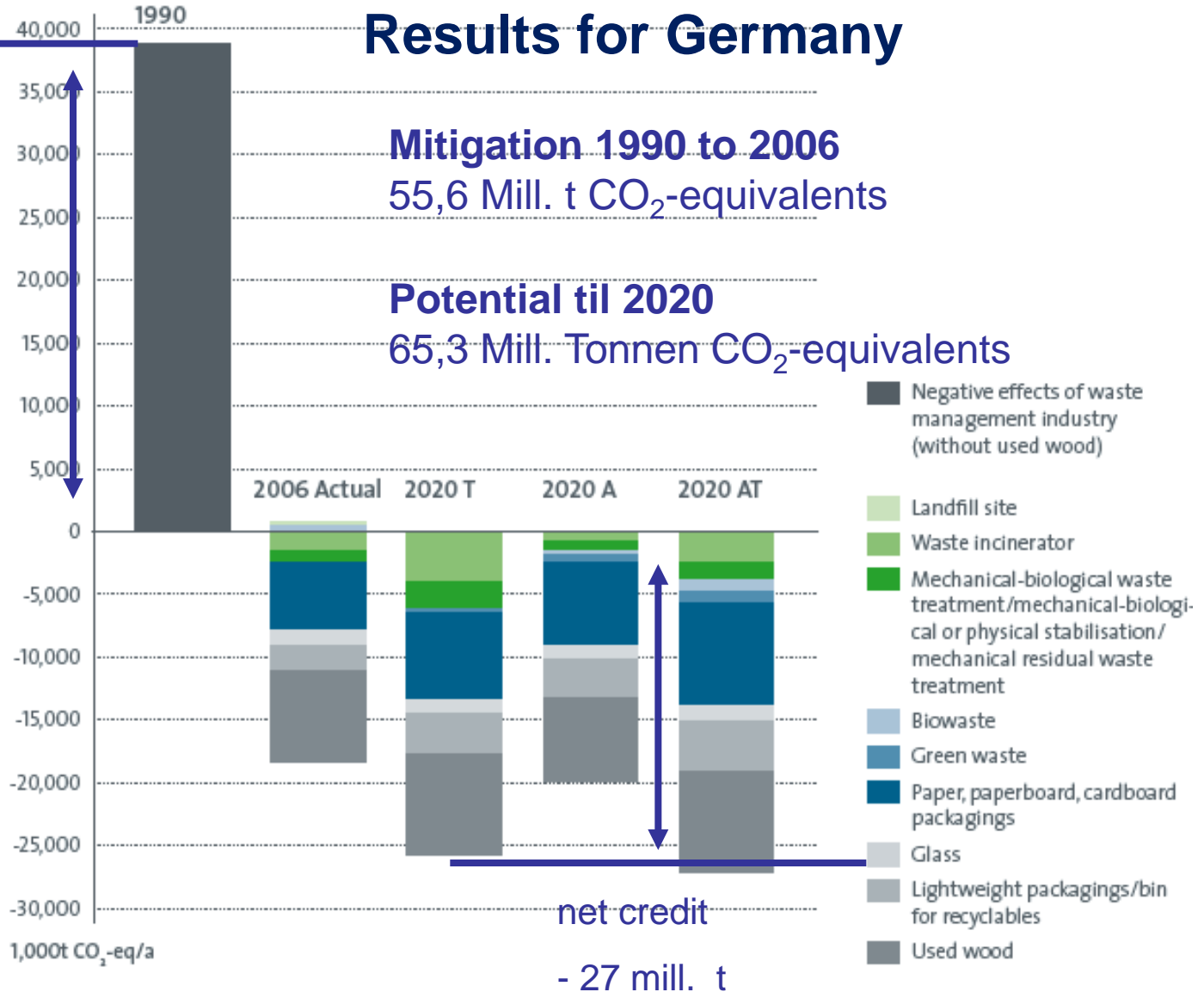
### Results for Germany

Mitigation 1990 to 2006  
55,6 Mill. t CO<sub>2</sub>-equivalents

Potential til 2020  
65,3 Mill. Tonnen CO<sub>2</sub>-equivalents

total  
saving  
65 mill. t

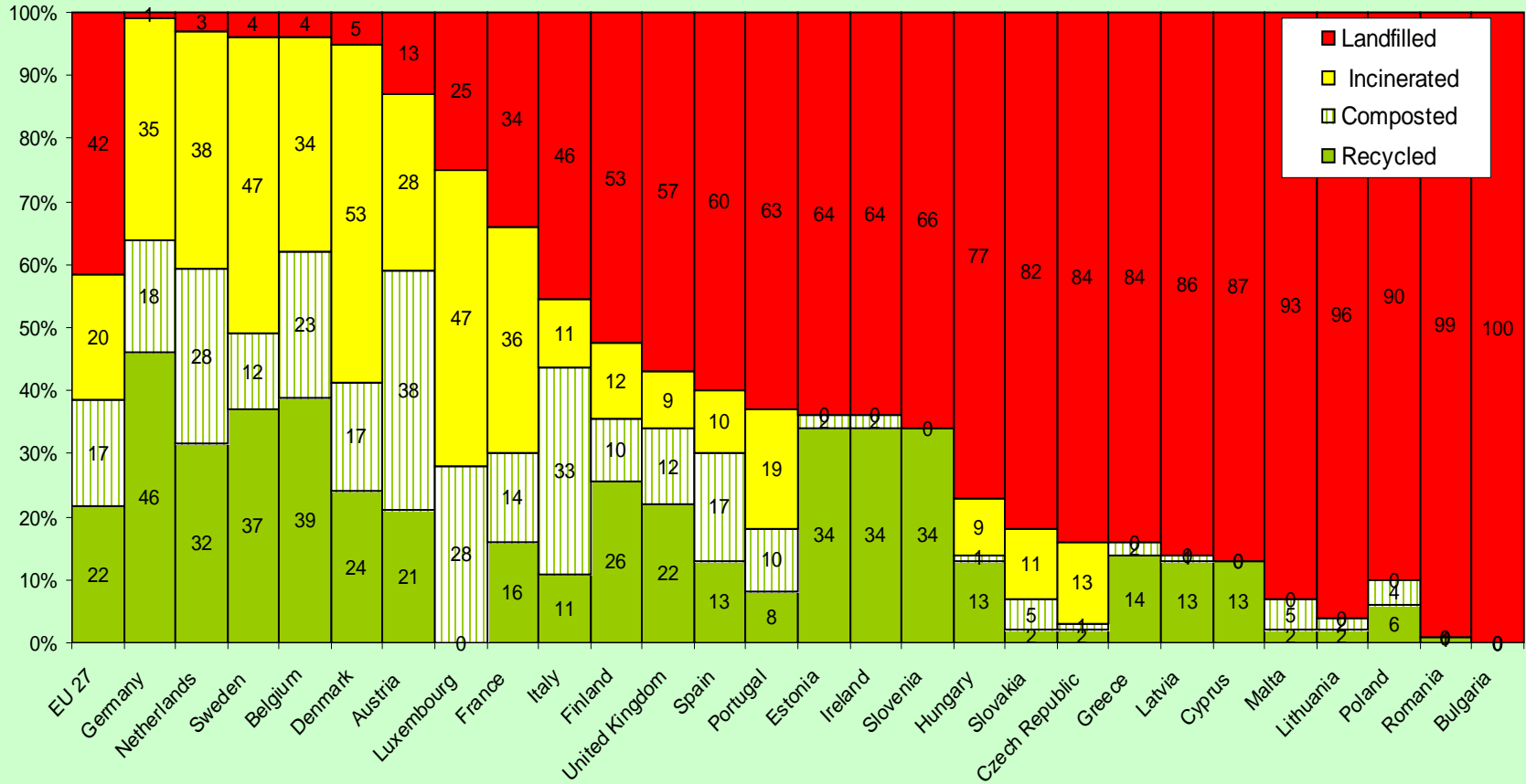
net  
emission  
38 mill. t





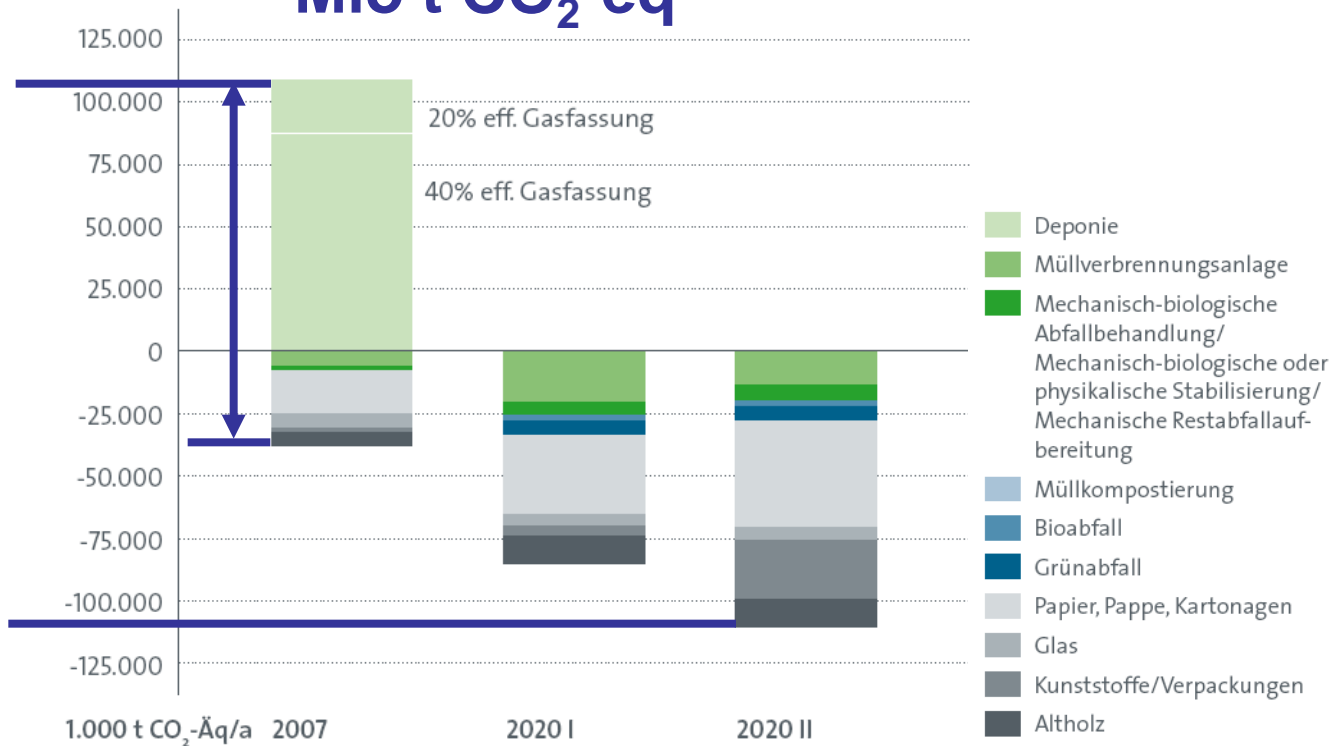
## GHG emissions from waste

EUROSTAT MSW, 2007



## Results EU27

- 2007 Burden from Landfilling up to 110 Mio t CO<sub>2</sub>-eq

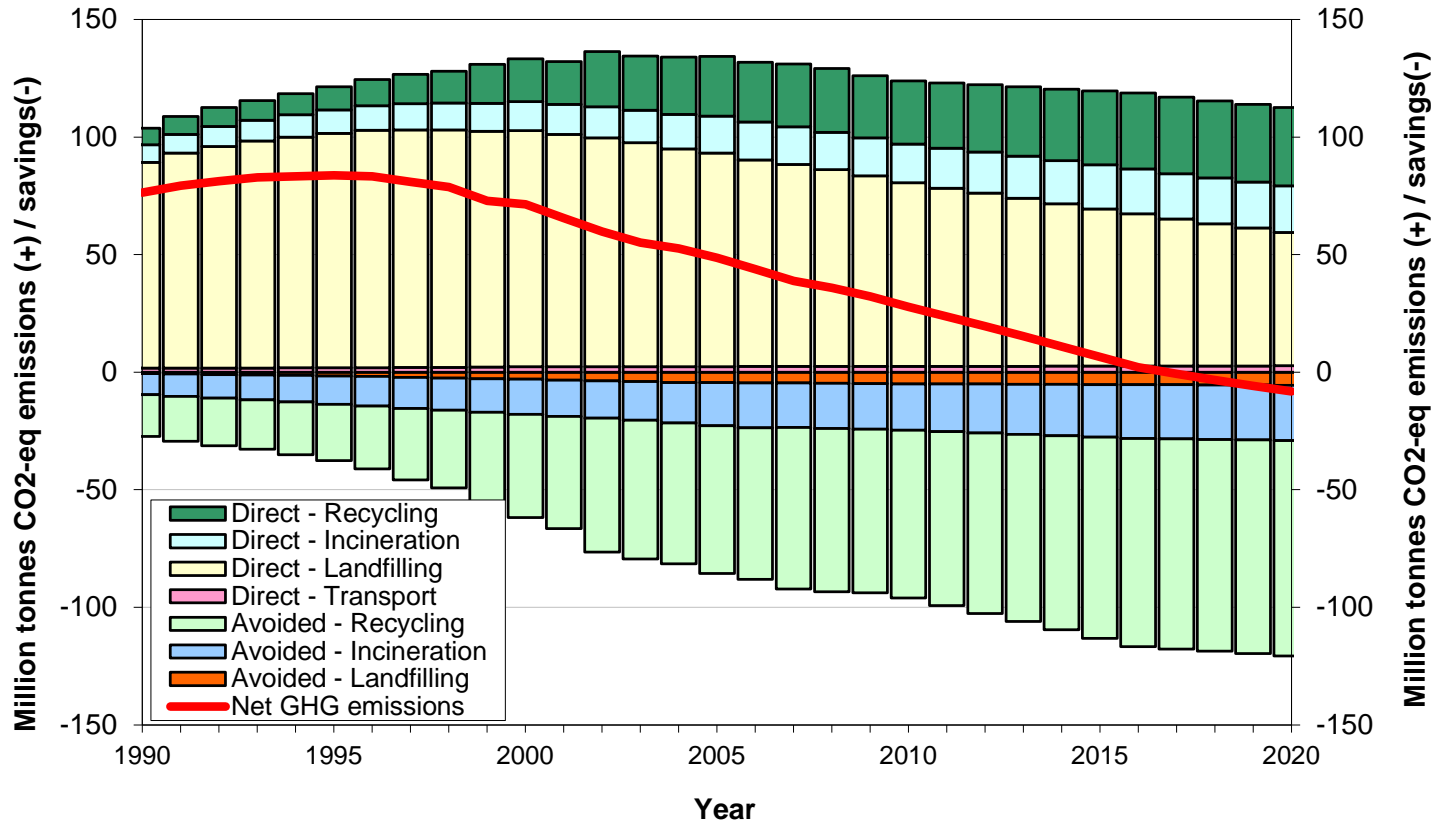


Potential 2020 up to 192 Mio t CO<sub>2</sub>-eq through increased recycling and technical improvements in treatment plants

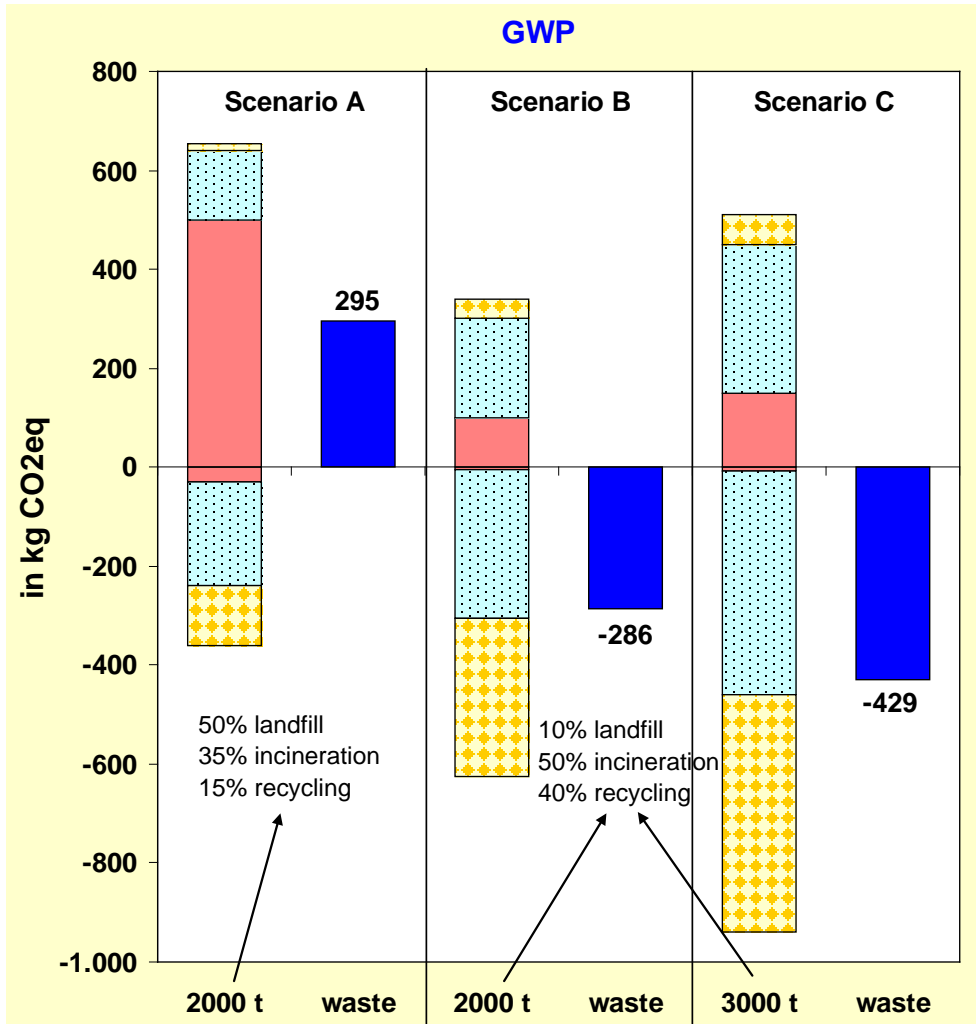
To exploit the Climate Protection Potential of an effective waste management in Europe we need

- a Europe wide landfill ban  
2007 GHG emissions by landfill in EU 27 caused up to **110 mill. tonnes** CO<sub>2</sub>-equivalents
- increasing the recycling rate and value  
Potential 2020 recycling credits are up to **114 mill. tonnes** CO<sub>2</sub>-equivalents
- waste-treatment with the best available technology to reduce GHG emissions

## GHG emissions from waste



Results and projections for EEA countries (Source: ETC /SCP)



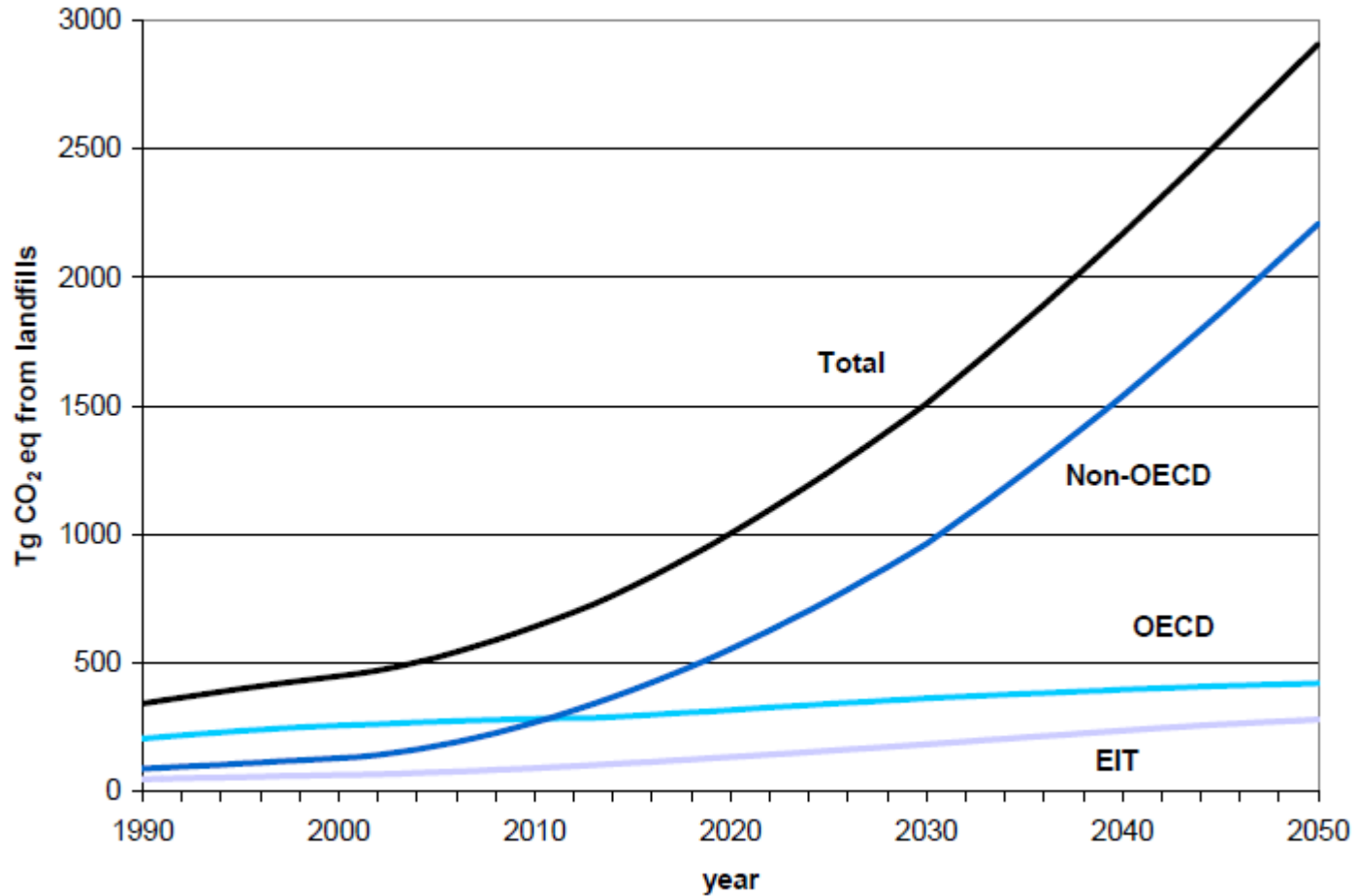
Same emission factors in A,B,C  
(=same avoided processes)

Waste volume A = B  
-> system comparison possible  
B in favor of A due to change in share  
of disposal options

Waste volume C > A,B  
-> no system comparison possible,

Can be used to describe  
development of total emissions

## GHG emissions from waste



Development of GHG emissions from landfills

Thank you  
for your attention!

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Further information:  
[www.umweltbundesamt.de](http://www.umweltbundesamt.de)

# Technology Transfer



Informationssammlung über Ansätze zur nachhaltigen Gestaltung der kommunalen Abfallbewirtschaftung und dafür geeignete deutsche Technologien und Ausrüstungen



Information pool on approaches towards a sustainable design of municipal waste management and supporting German technologies and equipment



Observatoire des solutions durables pour la maîtrise des déchets des communes, des technologies et des équipements allemands



Информационный сборник по подходам к устойчивой организации муниципального менеджмента отходов и подходящим немецким технологиям и оборудованию



Bewährte Verfahren zur kommunalen Abfallbewirtschaftung

## Best Practice Municipal Waste Management

Meilleures pratiques en maîtrise des déchets des communes

Испытанные методы муниципального менеджмента отходов



Gefördert durch  
Funded by



Erstellt durch  
Produced by





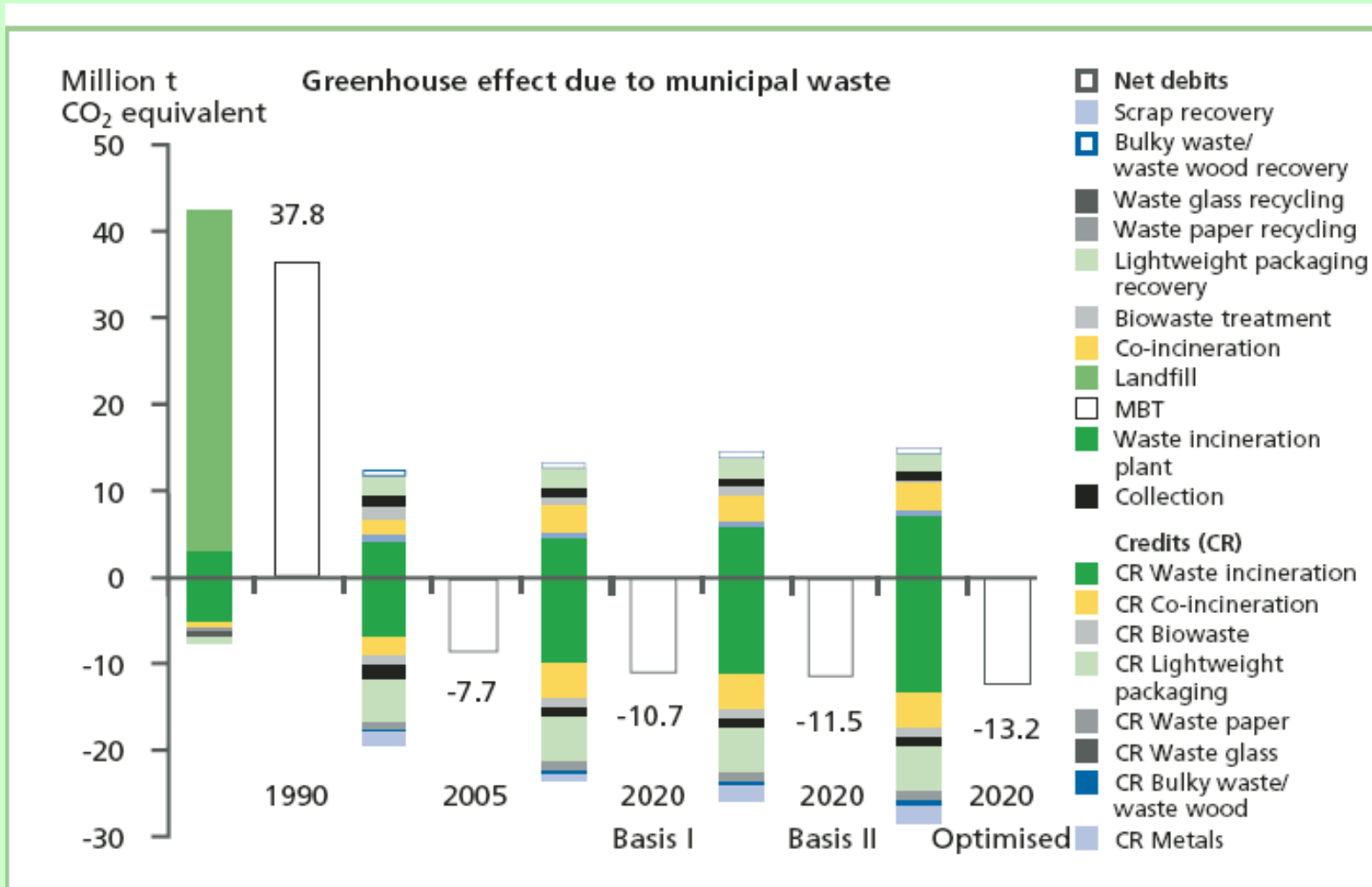
## Methodology

- GHG-balances following **Life Cycle Assessment** approach **LCA standard ISO 14040**
- **No waste reduction or increase** was assumed for the scenarios to show only the effects of the waste handling
- Calculations for **each** separated collected **waste type** and for **residual waste** to
  - incineration (MSWI plants) and
  - mechanical-biological treatment/stabilisation
- Assumption for potential scenarios: using existing technology of the current situation in Germany and Europe

Possible substitute processes, taking waste incineration plants as an example

Waste incineration plant without energy utilisation	Waste incineration plant plus power	Waste incineration plant plus power and heat
<p><b>Debit (plus):</b> CO<sub>2</sub> emissions from waste incineration plant due to combustion of fossil components in waste</p>	<p><b>Debit (plus):</b> CO<sub>2</sub> emissions from waste incineration plant due to combustion of fossil components in waste</p> <p><b>Credit (minus):</b> CO<sub>2</sub> emission savings due to avoidance of power generation in power plants</p>	<p><b>Debit (plus):</b> CO<sub>2</sub> emissions from waste incineration plant due to combustion of fossil components in waste</p> <p><b>Credit (minus):</b> CO<sub>2</sub> emission savings due to avoidance of power generation in power plants</p> <p>CO<sub>2</sub> emission savings due to avoidance of heat generation by a typical household heating system</p>

## GHG emissions from waste



## GHG Reduction Goals:

- Kyoto Protocol:
  - total cut of at least 5% by 2012 (baseline of 1990)
  - European Union: 8 %
  - Burdon Sharing; differentiated reduction goals
  - Germany: reduction goal by 21%
  
- Post-Kyoto-Process:  
further development by 2020
  
- European Union: 20 (30) % by 2020
  
- Germany: 30 (40) % by 2020

## The Climate Protection Potential of waste management in Europe

- Changing the net emissions 78 mill. tonnes CO<sub>2</sub>-equivalents in 2007 into a credit of up to 114 mio. tonnes CO<sub>2</sub>-equivalents until 2020

the total net saving is

**192 mio. tonnes CO<sub>2</sub>- equivalents**

**This corresponds to 32% of the 600 mio. tonnes CO<sub>2</sub>-equivalents that the EU27 still has to minimize according to the voluntary target for 2020!**

## Landfill-methane as a major climate problem

Methane has a 25 times higher Global Warming potential than CO<sub>2</sub>

Methane accounts for 16% of global greenhouse gas emissions from human activities

Landfills are the single largest anthropogenic source of methane (US EPA)

Landfills are a significant emitter of greenhouse gas emissions and a serious climate change problem (!)

Methane emissions from landfill sites in Germany in Gg (IPPC-FOD)

