

The Waste Sector's Contribution to Reducing Greenhouse Gas Emissions

A successful Experience in Germany

A good Example for other Countries?

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Section

Waste technology
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

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"
- performance and potential in Germany and Europe with regard to climate change mitigation
lookout to three other countries: Mexico, Tunisia and Turkey
- Overall result: the mitigation potential is much higher than the reported figures to IPCC (can sum up to about 15 % of total GHG emissions)

Landfill-methane as a major climate problem

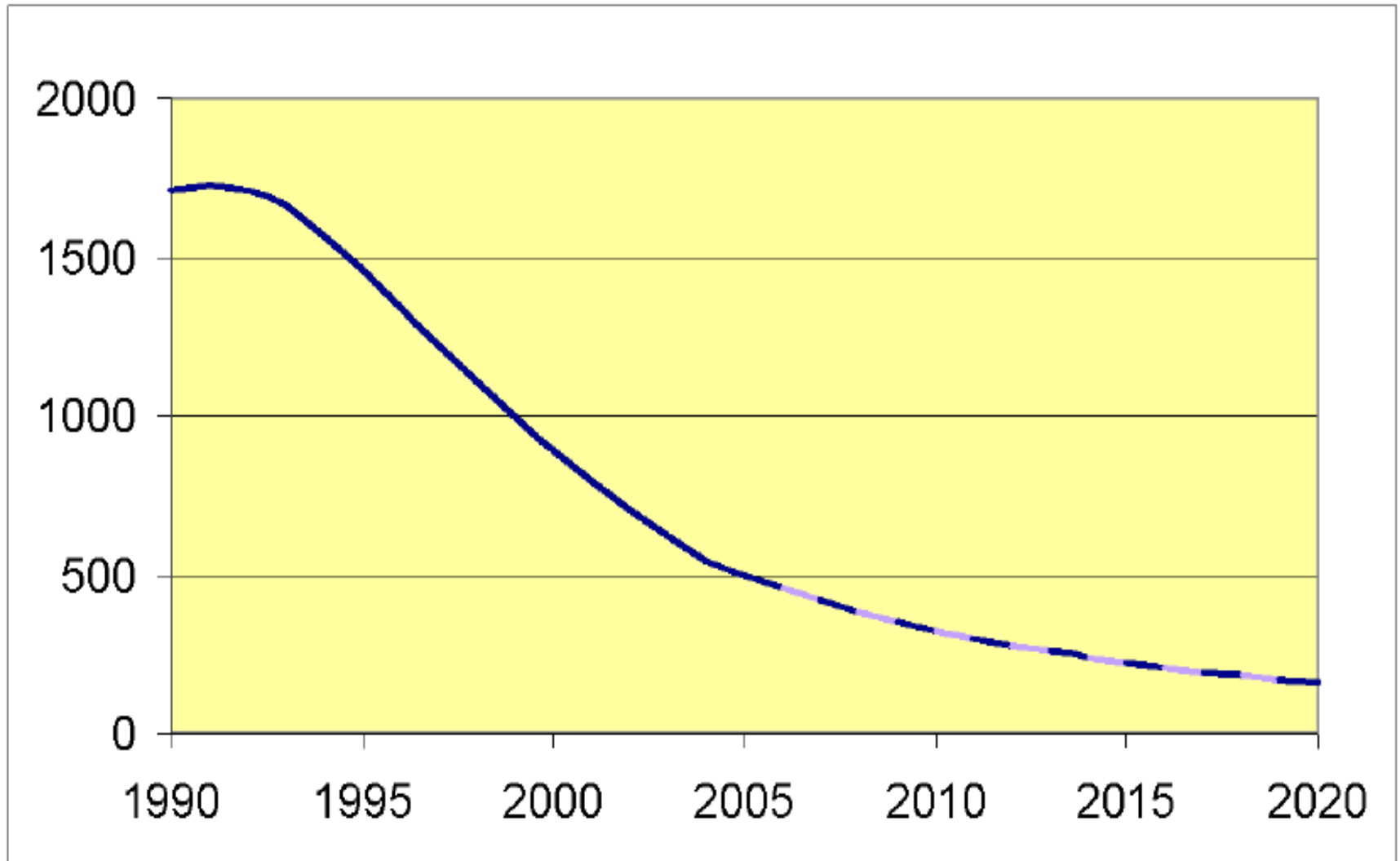
Methane has a 25 times higher Global Warming potential than CO₂

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

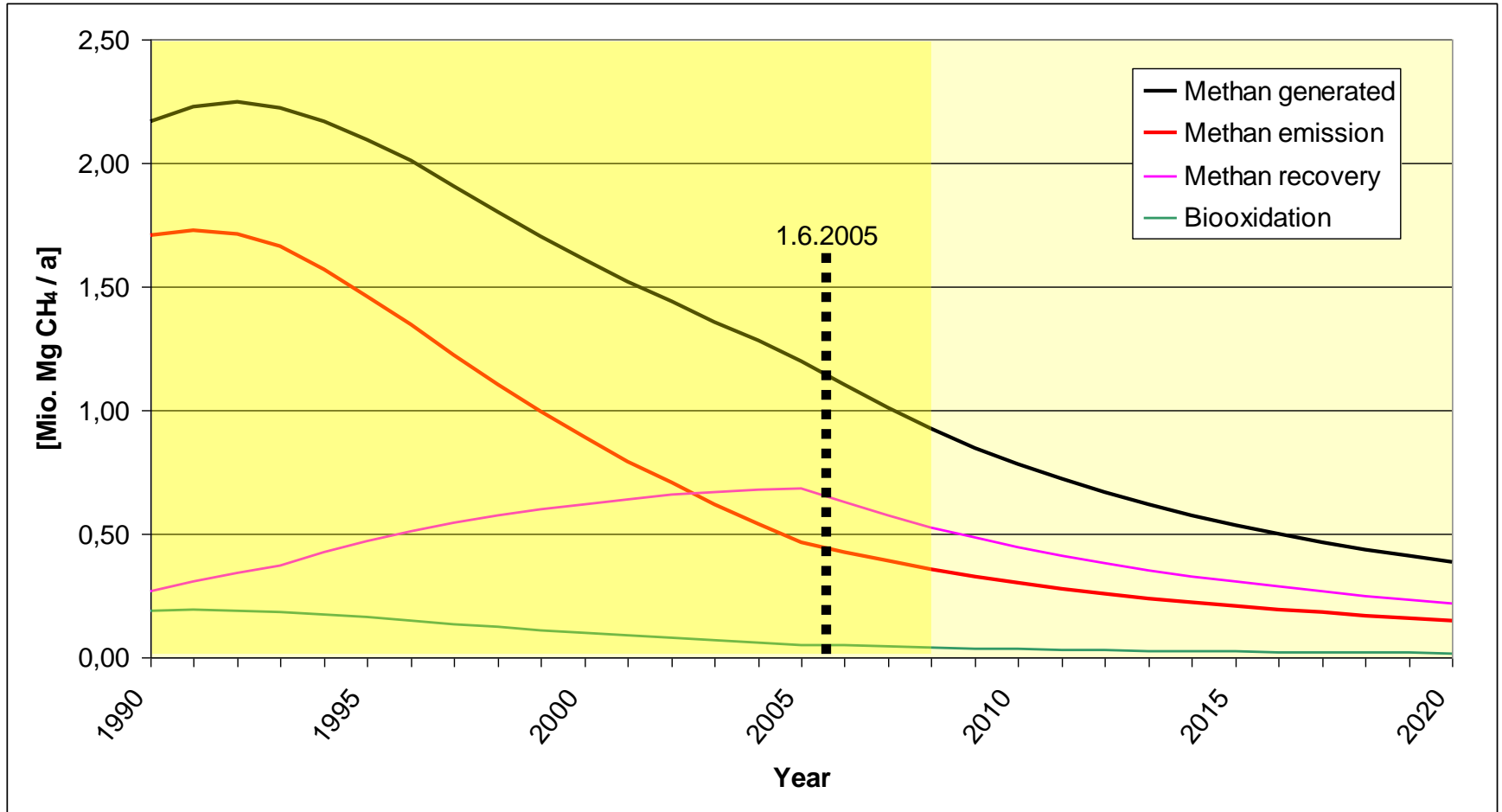
Landfills are the single largest anthropogenic source of methane (US EPA)

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

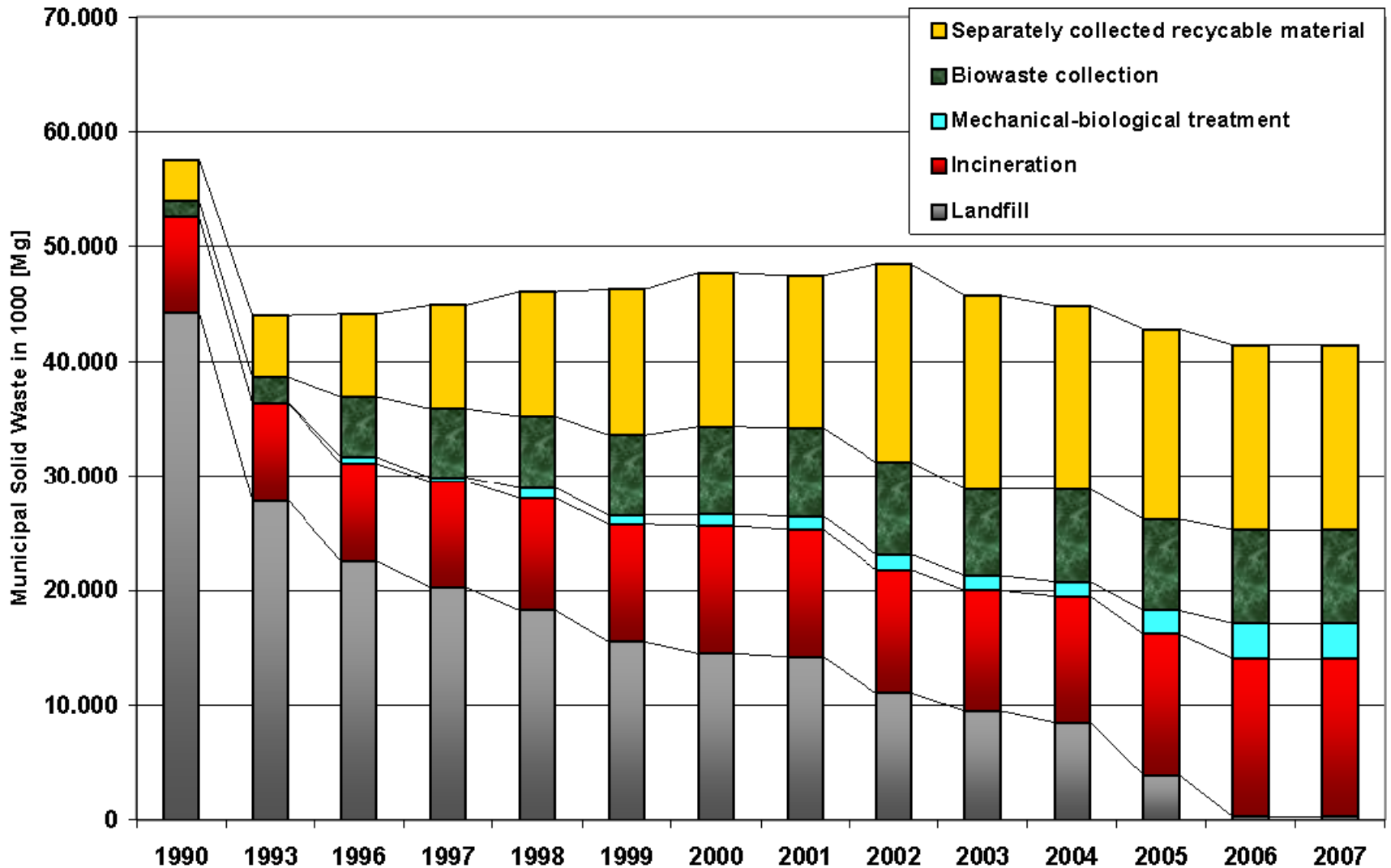
Methane emissions from landfill sites in Germany in Gg (IPPC-FOD)



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



Changes in pathways for management of household waste



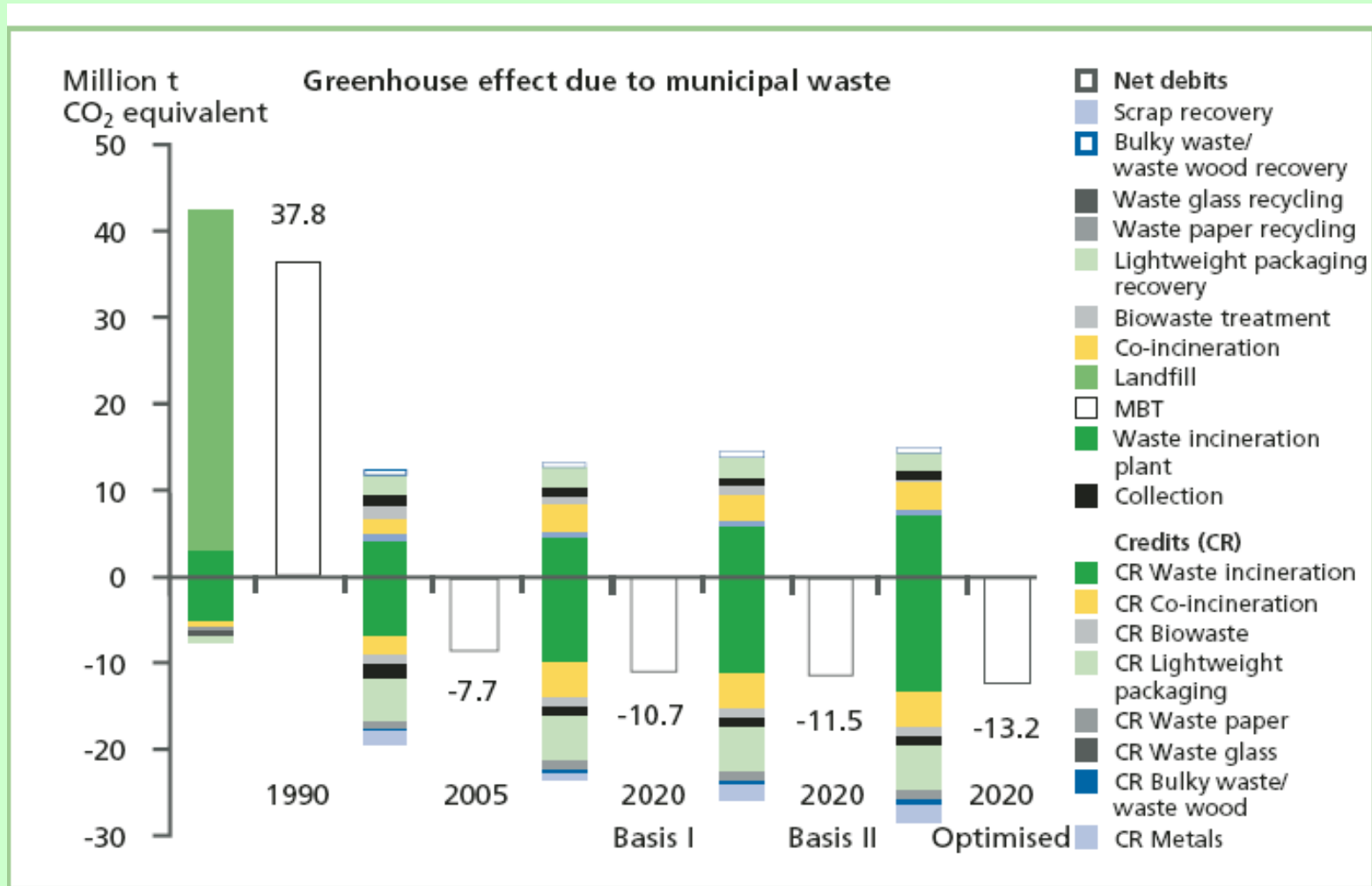
Methodology

- 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>Debit (plus): CO₂ emissions from waste incineration plant due to combustion of fossil components in waste</p>	<p>Debit (plus): CO₂ emissions from waste incineration plant due to combustion of fossil components in waste</p> <p>Credit (minus): CO₂ emission savings due to avoidance of power generation in power plants</p>	<p>Debit (plus): CO₂ emissions from waste incineration plant due to combustion of fossil components in waste</p> <p>Credit (minus): CO₂ emission savings due to avoidance of power generation in power plants</p> <p>CO₂ emission savings due to avoidance of heat generation by a typical household heating system</p>

GHG emissions from 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 highvalue 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

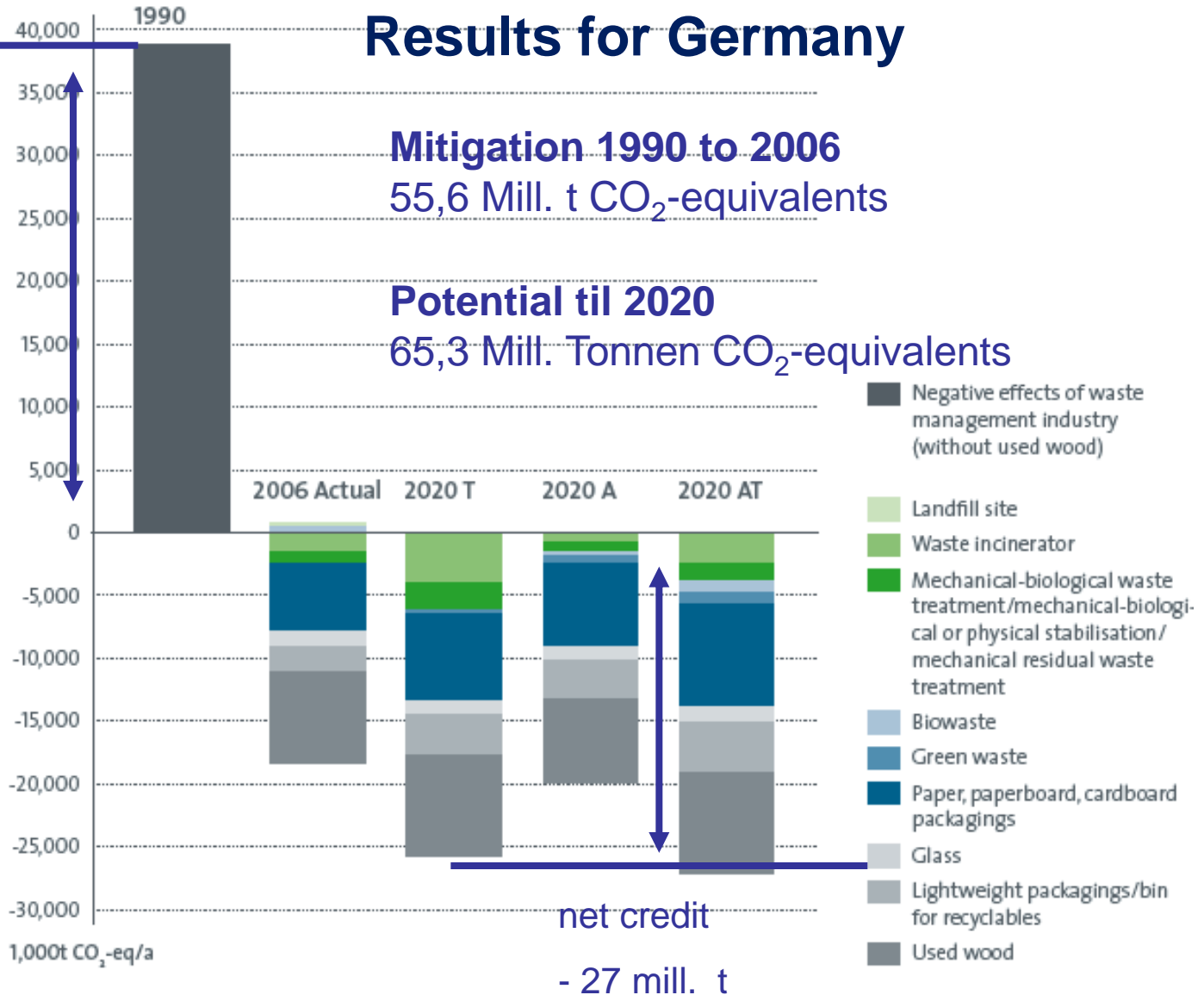
Results for Germany

Mitigation 1990 to 2006
55,6 Mill. t CO₂-equivalents

Potential til 2020
65,3 Mill. Tonnen CO₂-equivalents

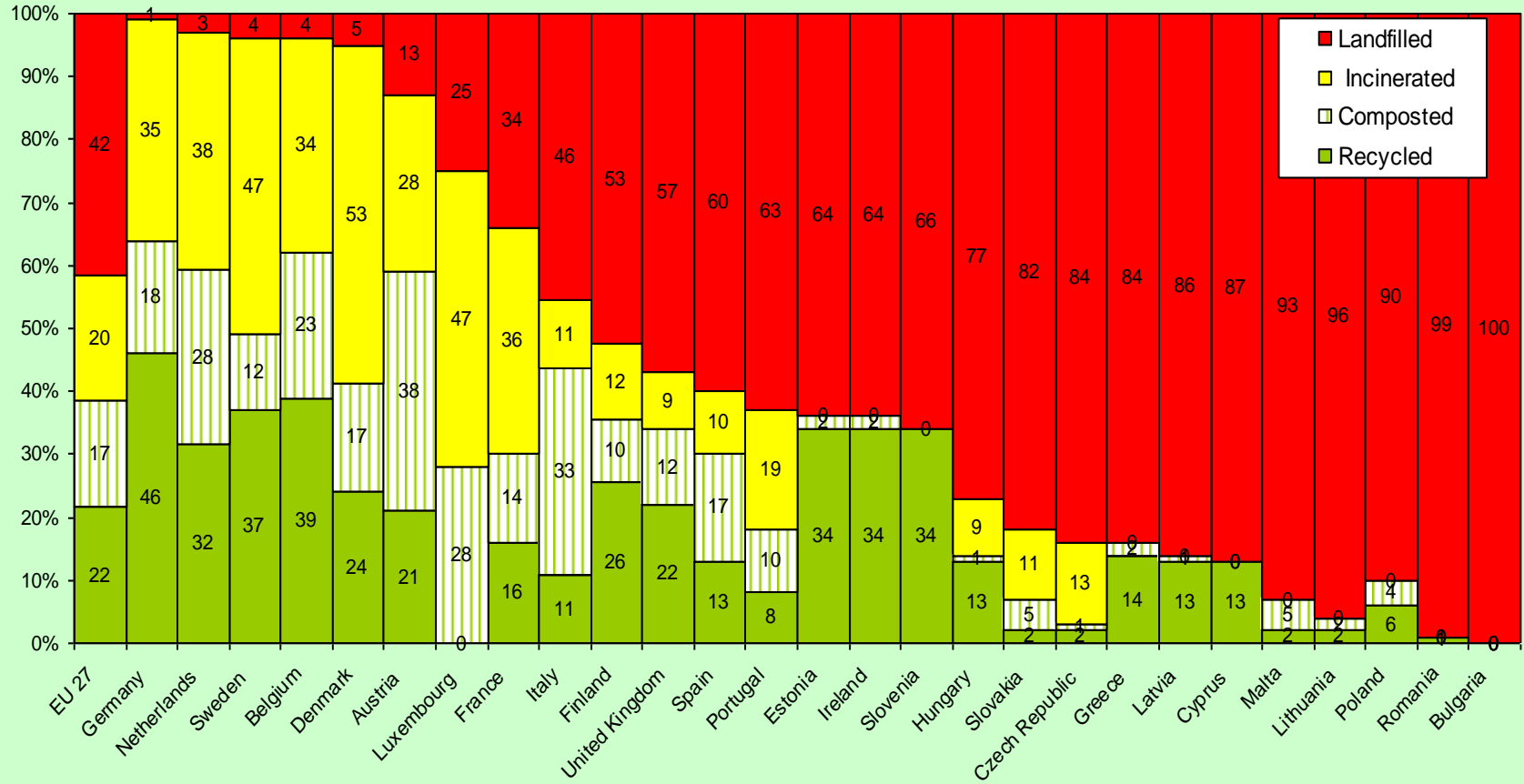
net
emission
38 mill. t

total
saving
65 mill. t



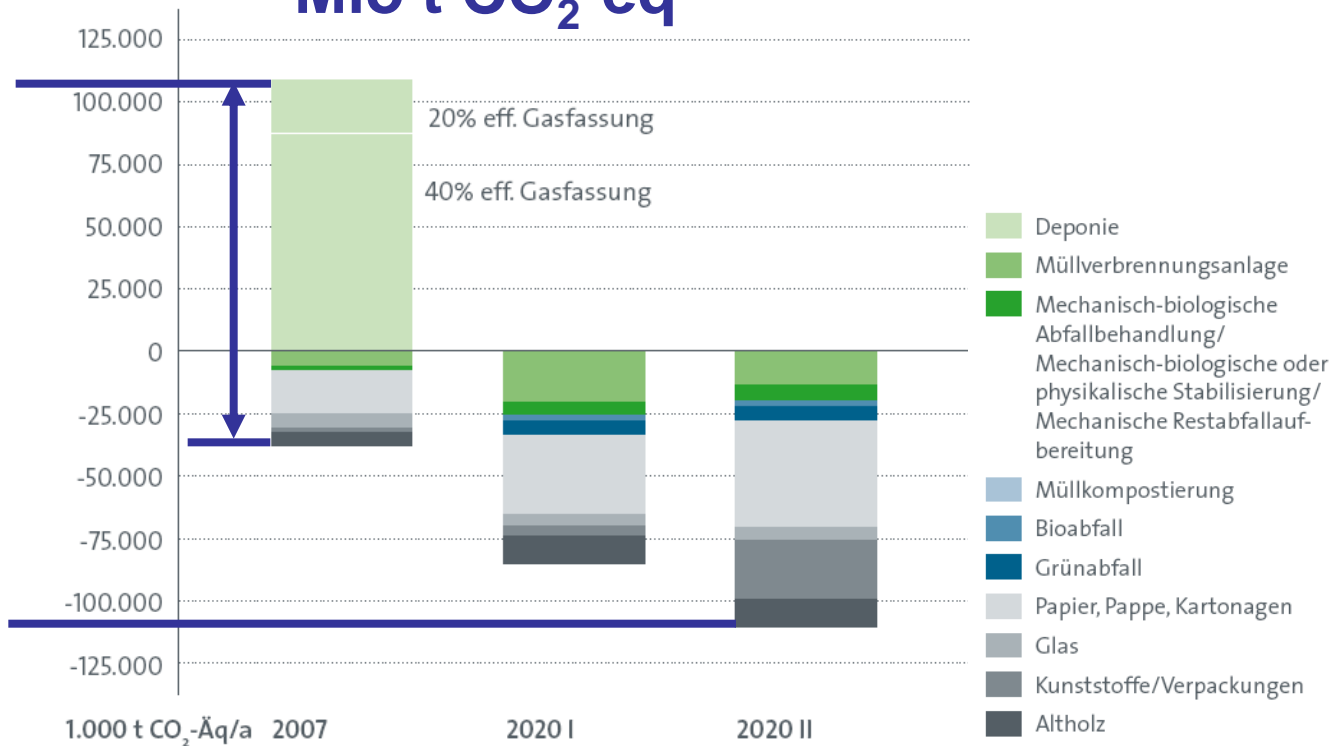
GHG emissions from waste

EUROSTAT MSW, 2007



Results EU27

- 2007 Burden from Landfilling up to 110 Mio t CO₂-eq



Potential 2020 up to 192 Mio t CO₂-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** CO₂-equivalents
- increasing the recycling rate and value
Potential 2020 recycling credits are up to **114 mill. tonnes** CO₂-equivalents
- waste-treatment with the best available technology to reduce GHG emissions

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%

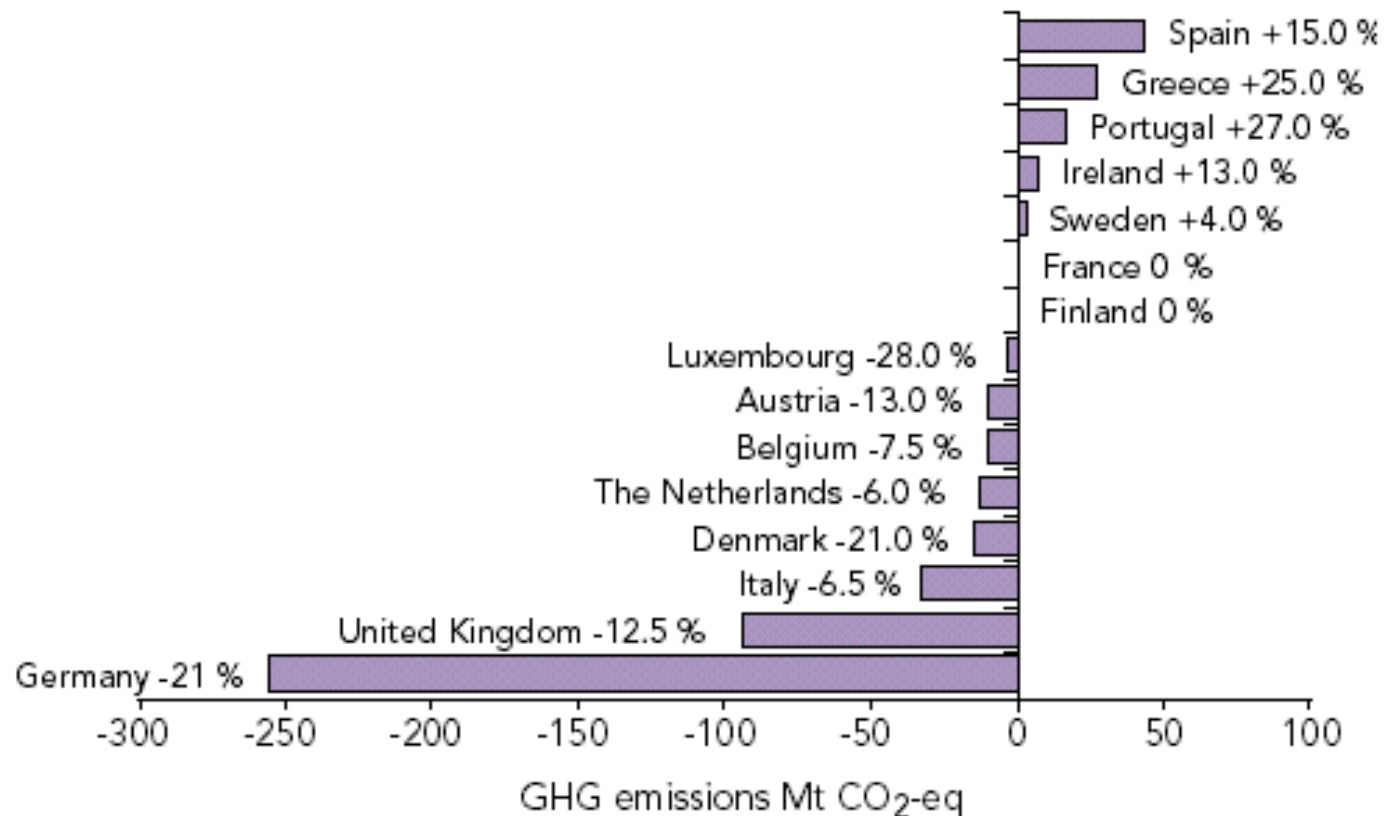
- Post-Kyoto-Process:
further development by 2020

- European Union: 20 (30) % by 2020

- Germany: 30 (40) % by 2020

EEA
2003

Greenhouse gas emission targets of EU Member States for 2008–2012 relative to base-year emissions under the EU burden-sharing decision



The Climate Protection Potential of waste management in Europe

- Changing the net emissions 78 mill. tonnes CO₂-equivalents in 2007 into a credit of up to 114 mio. tonnes CO₂-equivalents until 2020

the total net saving is

192 mio. tonnes CO₂- equivalents

This corresponds to 32% of the 600 mio. tonnes CO₂-equivalents that the EU27 still has to minimize according to the voluntary target for 2020!

for  **Öko-Institut e.V.**

Climate Protection Potential in the
Waste Management Sector

Examples: Municipal Waste and Waste Wood

FKZ 3708 31 302

Final Report


Client:
UBA
BMU
BDE




Regine Vogt
Doris Schüller
Günter Dehoust
Jürgen Giegrich

Darmstadt/Heidelberg, 20.10.09

Recycling stops greenhouse gases

The contribution of the recycling and water management
industry to climate protection



***Selected results of a study
by Öko-Institute and IFEU ***

on behalf of

Federal Environment Ministry

Federal Environment Agency

***Federation of the German Waste,
Water and Raw Materials
Management Industry***

January 2010

Why could these results be interesting for India?

Existing challenge (in some places pressure) to build up a functioning waste management system

Measures like increased recycling and better treatment of residual waste brings climate protection as a co-benefit in addition to protecting soil, water, air, human health and providing a better quality of life to citizens

Additional financing may be available from carbon markets - like for CDM projects but on a wider field in future like NAMAs or other new mechanisms with a sectoral approach

Thank you
for your attention!

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Further information:
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



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