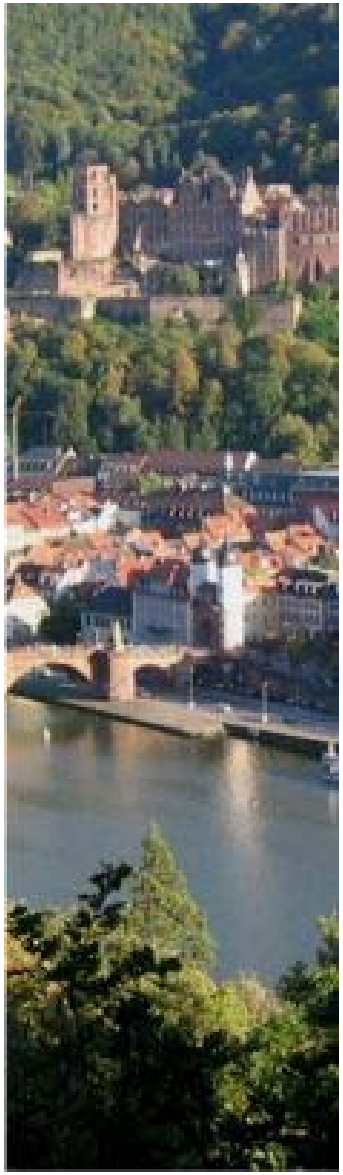


Germany‘s Experience with „Closed Loops Policy“ in Waste Management

Presentation

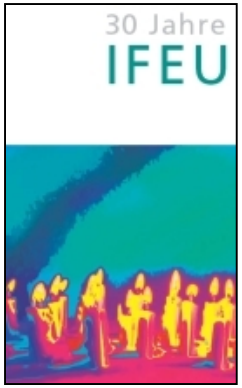
Seattle
April 16, 2010

Jürgen Giegrich

IFEU – Institute Heidelberg

(IFEU stands for Institute for Energy and Environmental Research)

- **Independent non profit research institute**
- **Founded 1978 by scientists of the University of Heidelberg – with background of the German environmental movement**
- **Staff: about 50 employees – mostly natural scientists**
- **Research and consultancy regarding environmental aspects of**
  - **Energy systems (including renewable energy)**
  - **Transportation**
  - **Waste management and resources**
  - **Life Cycle Assessment of products**
  - **Environmental Impact Assessment**

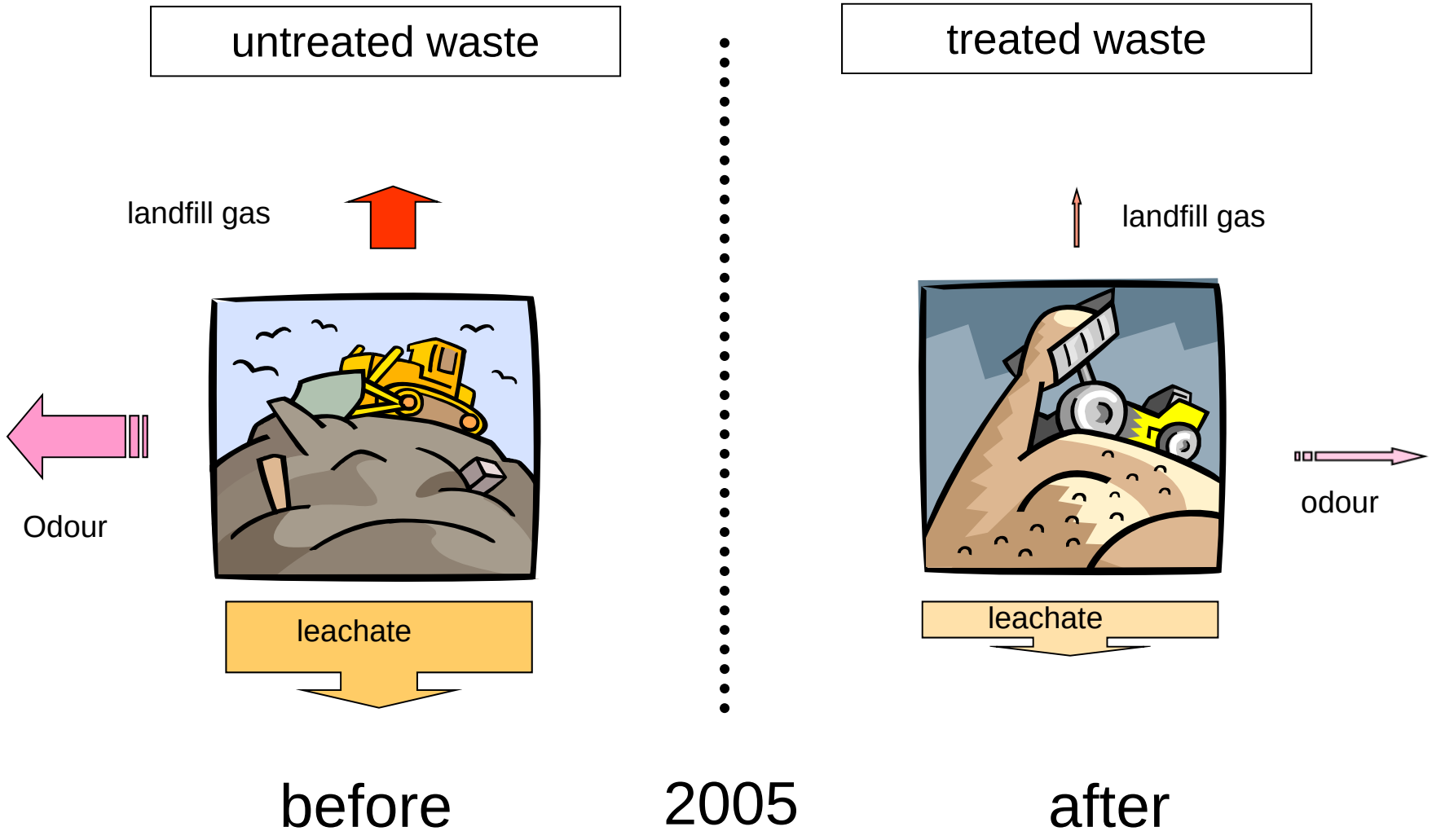


19 years experience with “closed loops policies”

Important and decisive regulations in Germany

- Technical guidance for municipal solid waste 1991
- Packaging Regulation 1992
- 17. Regulation to the Clean Air Act for waste incineration plants 1992
- Law about „Kreislaufwirtschaft“ and Waste Management 1996
- Regulation on Biowaste 1998
- Regulation on Disposal of Waste 2001
- Waste Wood Regulation 2002, End-of-live-vehicle Regulation 2002 und others
- Law concerning the Management waste of electronic and electrical devices 2005

Landfill ban of untreated waste by technical guideline 1991

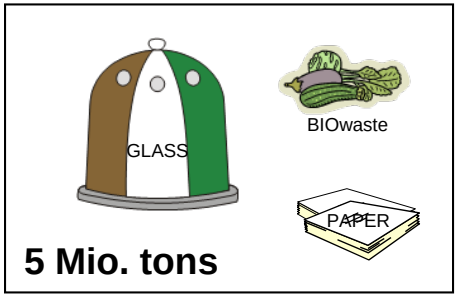


Increase of separate collection by Packaging Regulation 1992

1990

87 %

13 %

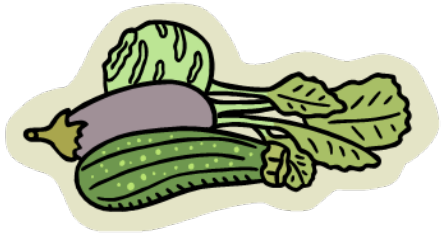


2004

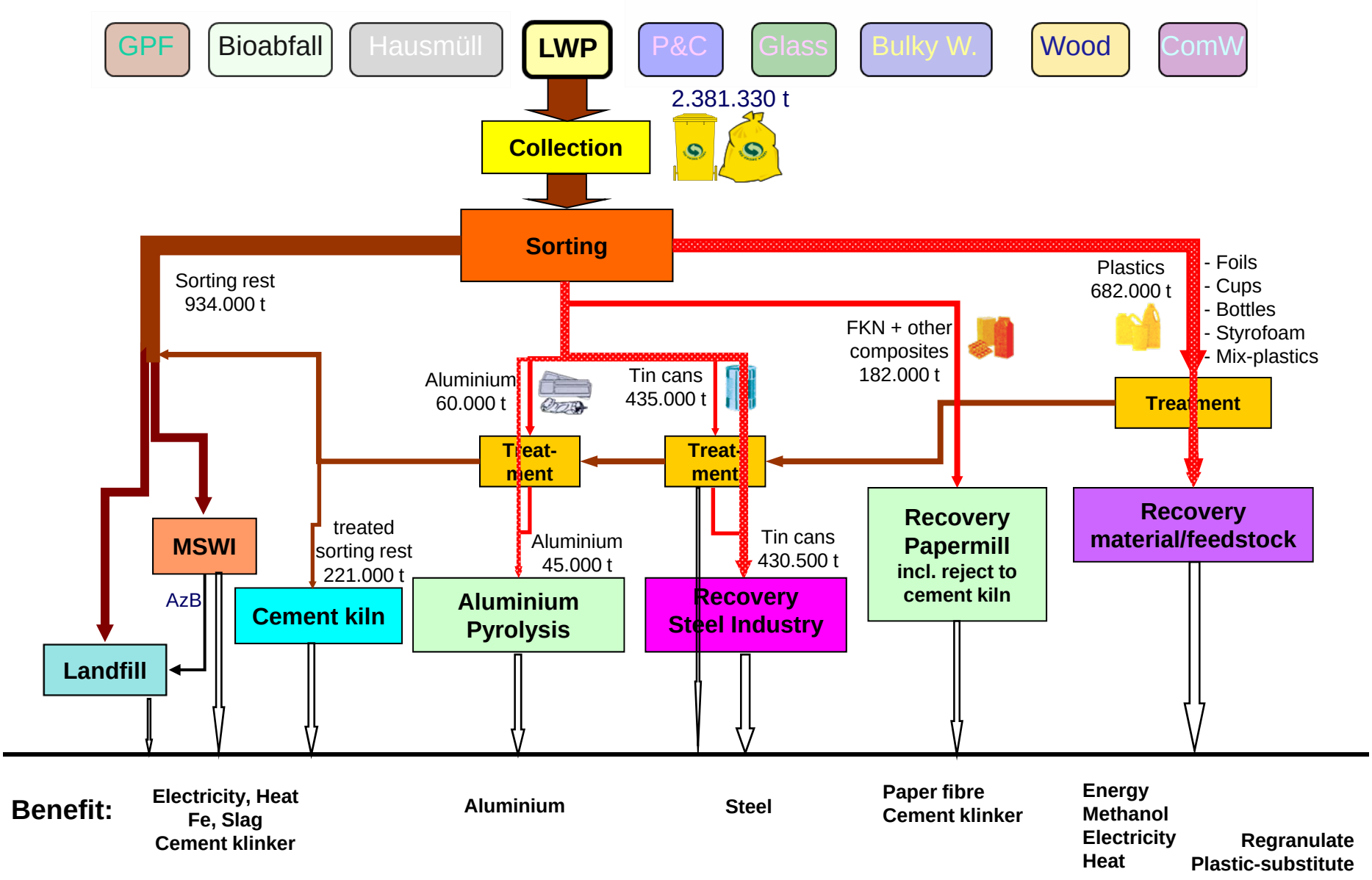
43 %

57 %

Separately collected valuable materials

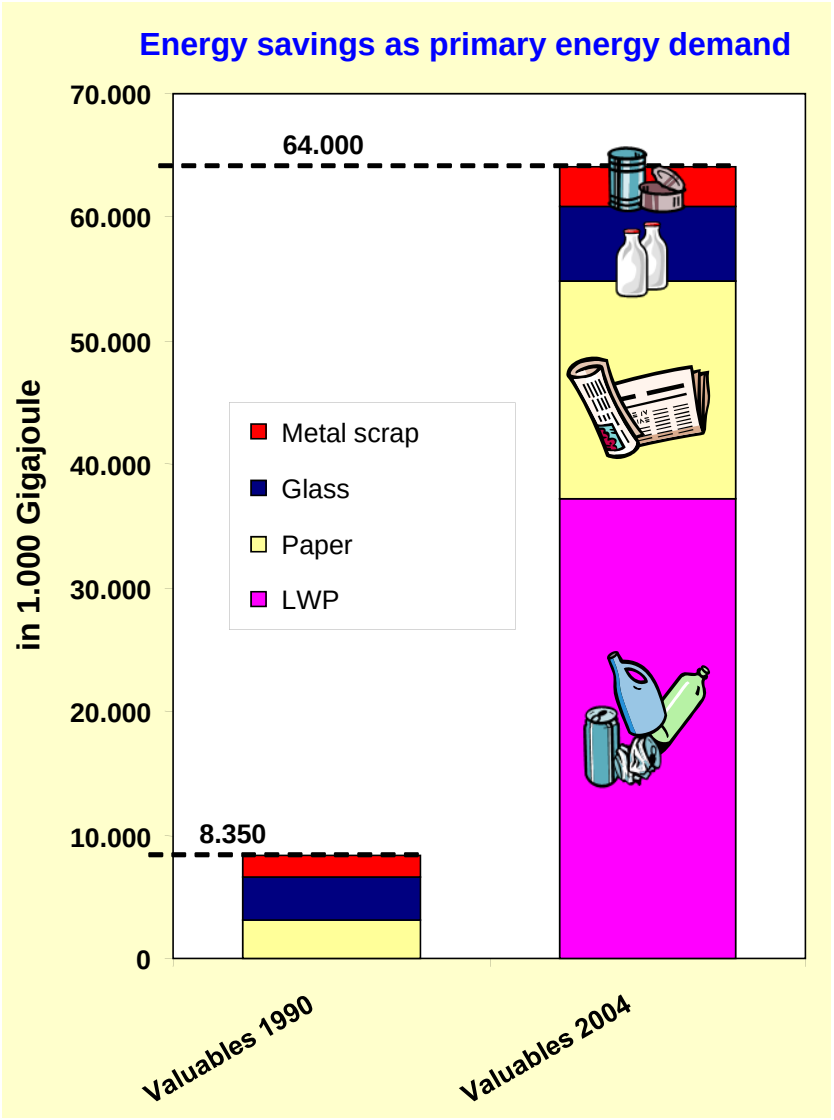
	1990		2004	
2 Mio. Tons		→		8 Mio. Tons
1,6 Mio. Tons		→		7,7 Mio. Tons
1,3 Mio. Tons		→		3,1 Mio. Tons
0 Tons		→		4,7 Mio. Tons

Complex material flows for recycling of light weight packaging



Energy savings through recycling and energy recovery

Recycling stands for the saving of energy between 1990 and 2004 equivalent to the annual energy demand of 450,000 people



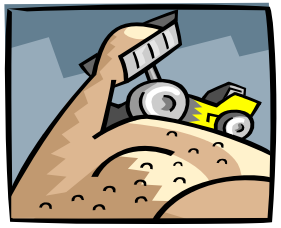
Ferrous metals
Glass

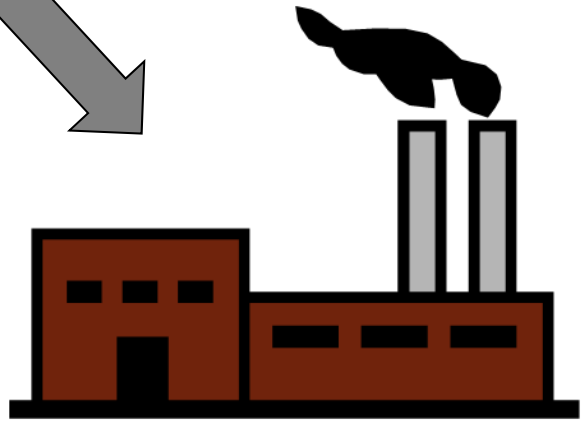
Paper and cardboard

Light weight packaging

Pre-treatment of residual waste

Mechanical-biological treatment

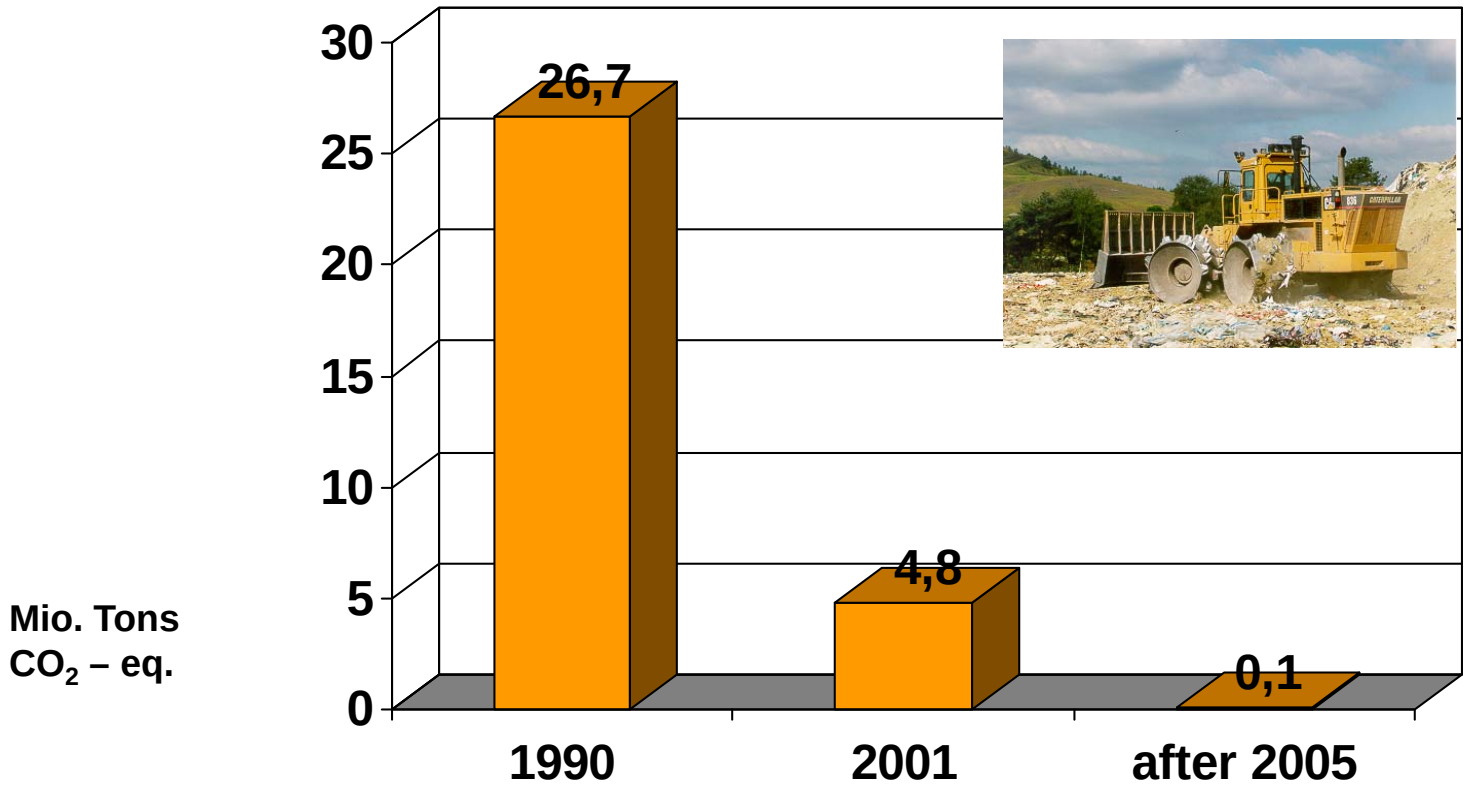




Waste Incineration

Reduction of GHG emission from landfills

calculated for waste in landfill which are disposed of in one specific year but integrated over the whole emission period



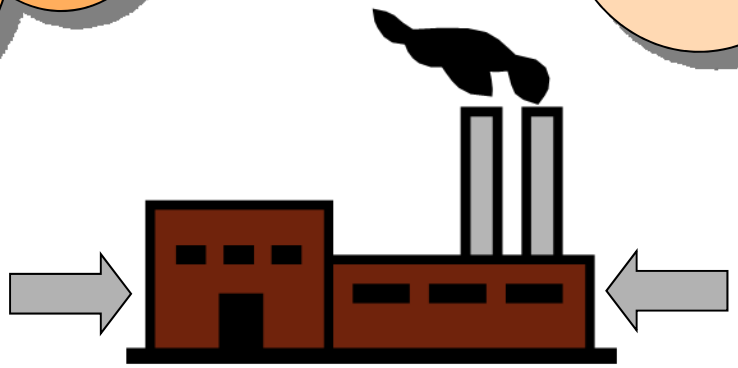
Environmental impact by household waste incineration

1990

10.000 t	Nitrous oxide
20.000 t	Sulphur dioxide
5.000 kg	Cadmium
350 kg	Mercury
290 g	Dioxin-Equivalent

2004

2.500 t	Nitrous oxide
68 t	Sulphur dioxide
64 kg	Cadmium
5 kg	Mercury
0,2 g	Dioxin-Equivalent

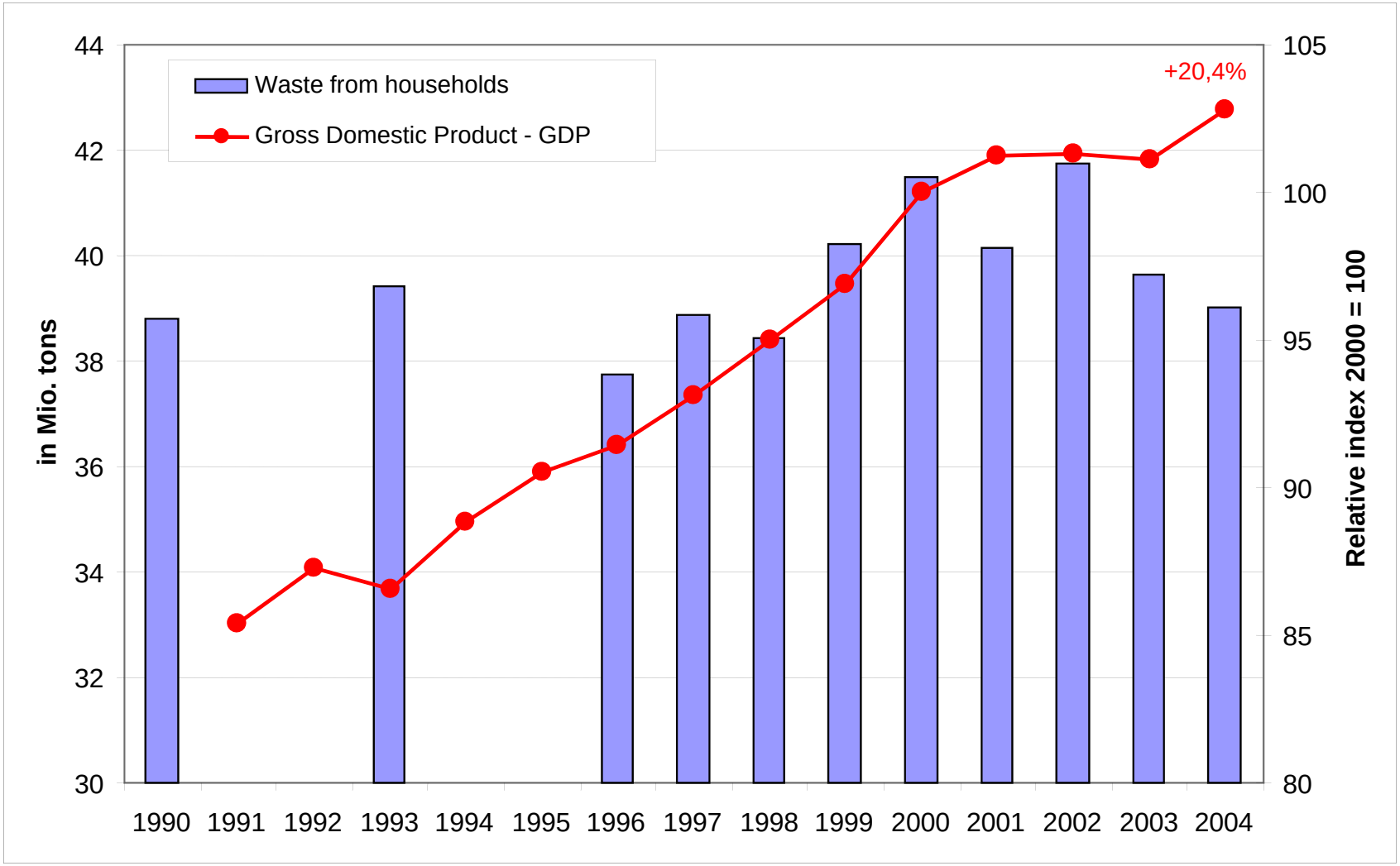


With 6 Mio. t of incinerated waste from households

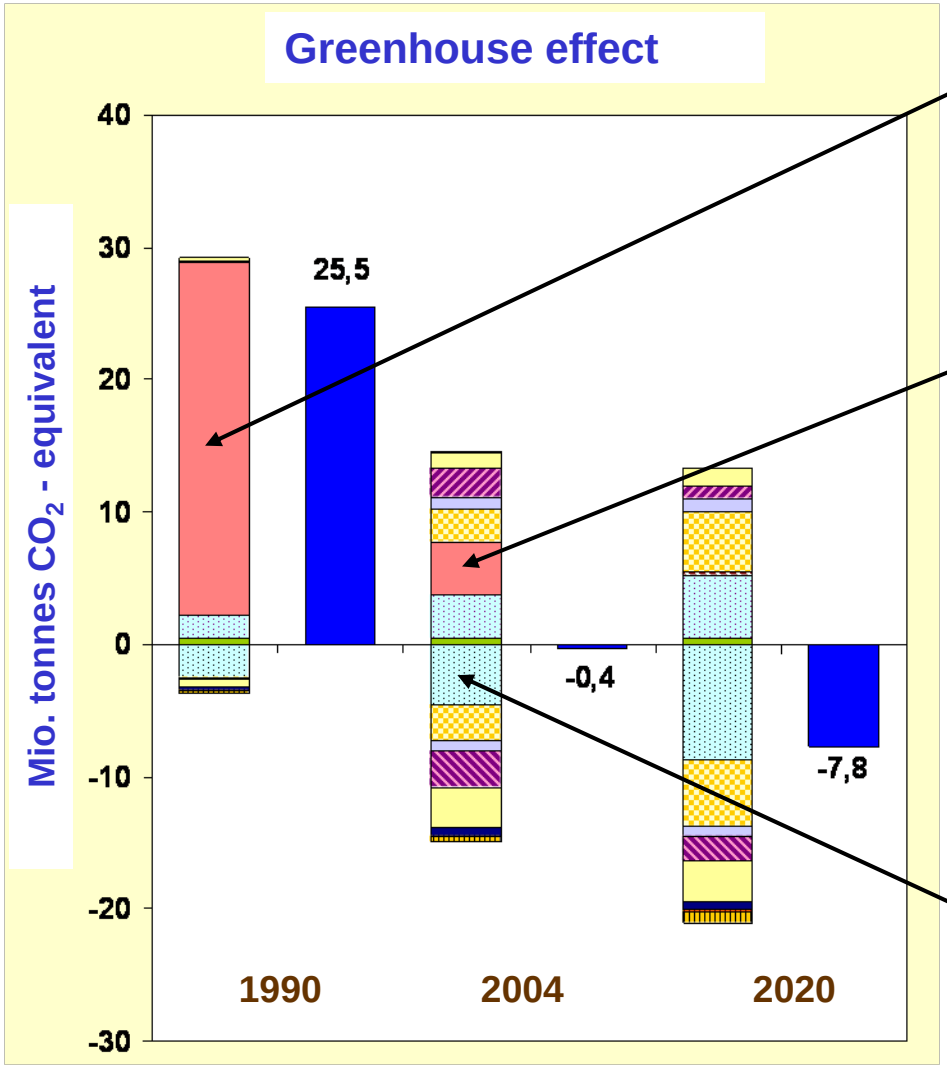
With 9 Mio. t of incinerated waste from households

Constant waste generation from households in Germany

Decoupling of amounts of waste from households and economic growth



Climate protection by integrated waste management



Impacts by methane 1990 dominated by landfill

Reduction of green house gas emissions 2004 mainly by diverting waste from landfill to recycling and incineration

Green house gas credits for incineration by substituting fossil fuels in energy generation

Final conclusions with a view into the future

- The development of the waste amounts from households has maintained relatively constant. Subsequently a decoupling of waste arisings and economic growth has been achieved. The reasons are still not investigated.

- With the help of regulations and voluntary self commitments a high potential of separately collected valuable material was made available. The separately collected material is still a prerequisite for a high recycling rate.

- The landfill ban of untreated waste has caused the largest contribution of waste management to climate gas mitigation. On top of the ban the higher cost for disposal (pretreatment and disposal) has supported the economics of recycling.

- The strict emission standards for waste incineration have contributed to an extraordinary reduction of environmental impacts through waste management. It has to be ensured that co-incineration of waste in industrial furnaces does not undermine the achieved high standards.

- There is still a huge potential for waste minimization and an increase of waste recycling.