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Martin Jänicke:  
**ETR: Implications for Sustainable Growth,  
Innovation and the Environmental Industries**  
(petrE / WP 1c)

London July 16 2009

- \* Eco taxes within the policy mix
- \* Examples
- \* The underestimated, “invisible”  
Environmental Industry
- \* Innovation: Lessons from the  
German  
case.

# ETR within the Policy Mix

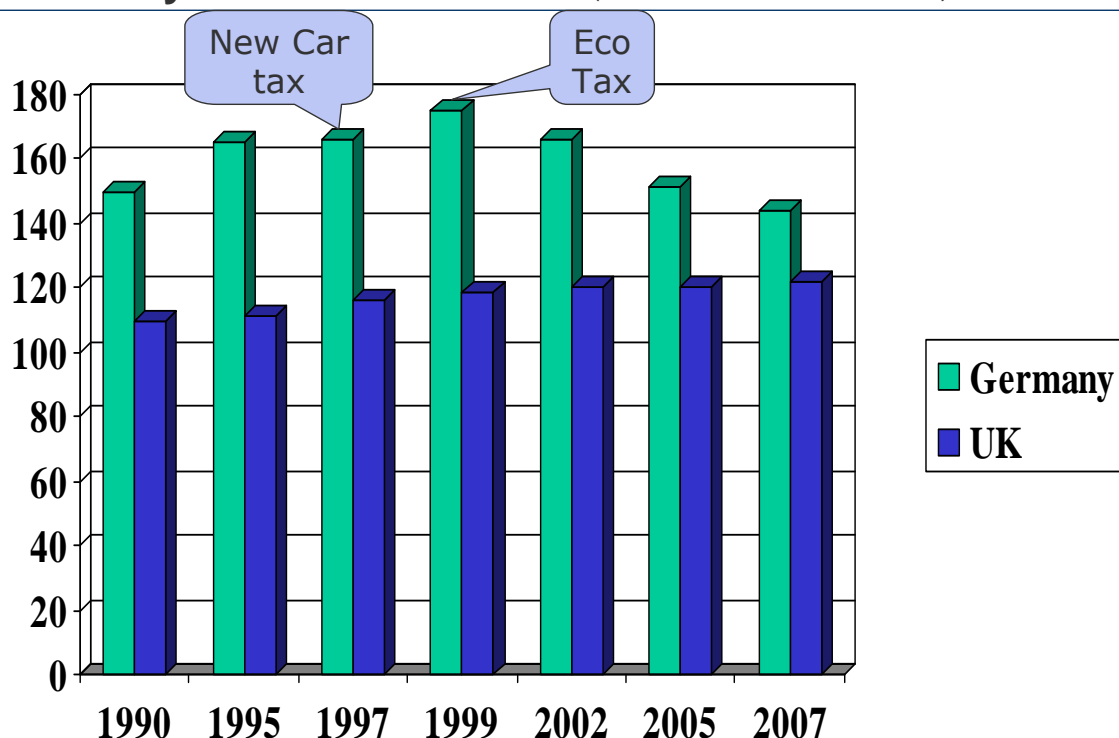
## ETR within a Policy-Mix

- Environmental Taxes (or Certificates) are not the only effective instrument in environmental policy – as a rule we need a policy mix ore a “multi-impulse approach”.
- WP 1c however exemplifies the high importance of ET within the policy mix.
- This will be shortly shown – within the limits of a two-country comparison - using three examples from *climate policy*: Car traffic, energy-efficient buildings and (via negationis) the power sector.

1. **Ambitious, broadly accepted and reliable targets**
2. A **flexible policy mix** supporting the innovation cycle from invention to diffusion (and back to invention).
3. **Instruments:**
  - **specific, dynamic regulation** to exploit specific innovation potentials and to overcome specific obstacles and
  - **general price incentives** (MBI) such as taxes, targeted subsidies or ET to influence the general direction and to prevent rebound effects (x).
  - supporting instruments such as dynamic labelling (Top Runners!), green public procurement, EMAS etc.
4. Competent inclusive **networks**.

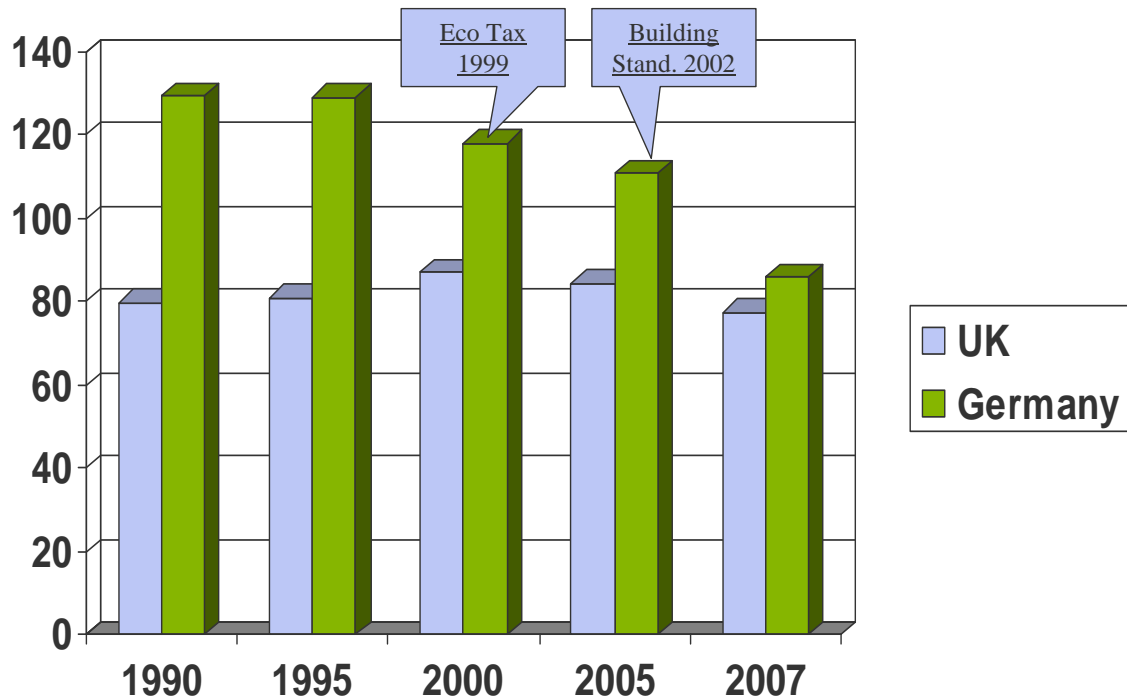
M. Jänicke 2008

## CO2 Emissions from Road Traffic in Germany and UK 1990-2007 (Stabu 2009, DEFRA 2009)



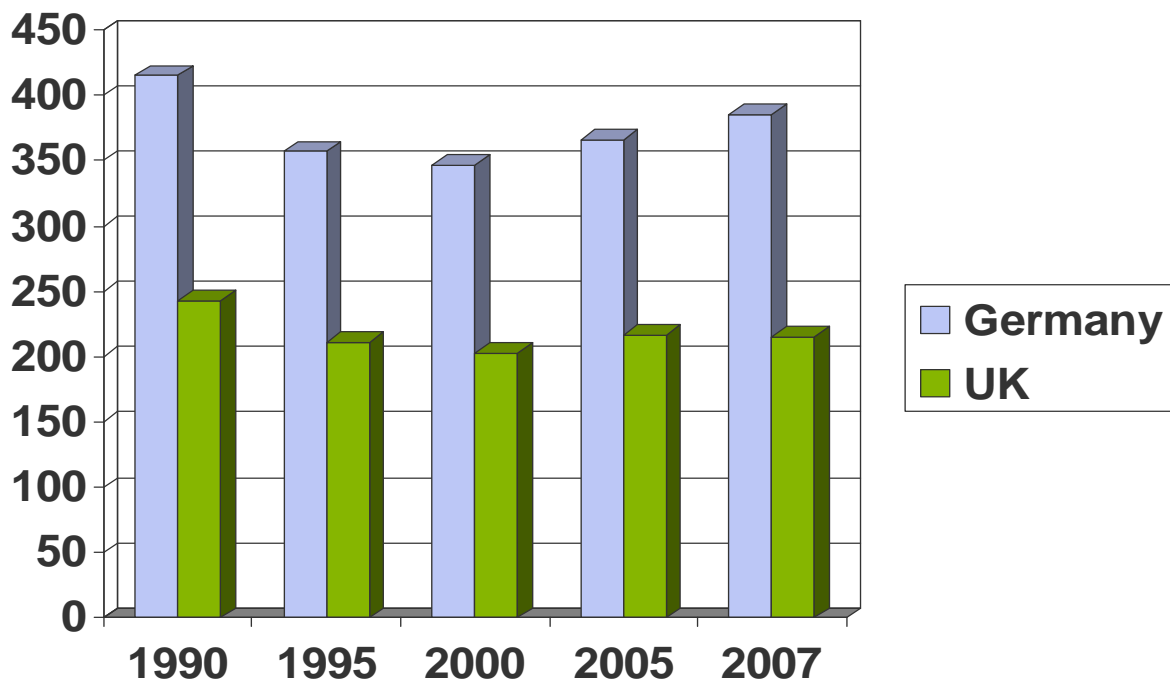
# CO<sub>2</sub> Emissions from the Residential Sector in UK and Germany 1990-2007

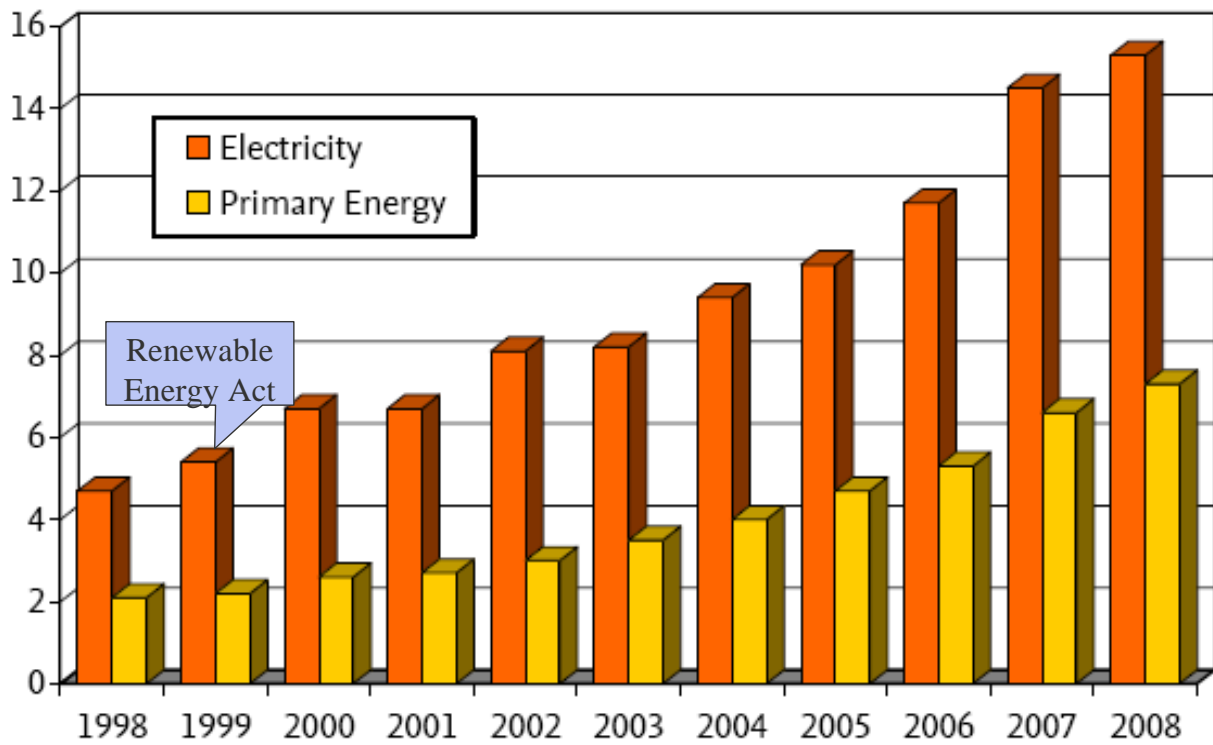
(in Mt Ziesing 2009, DEFRA 2009)



# CO<sub>2</sub> Emissions of the Energy Sector in Germany and UK 1990-2007

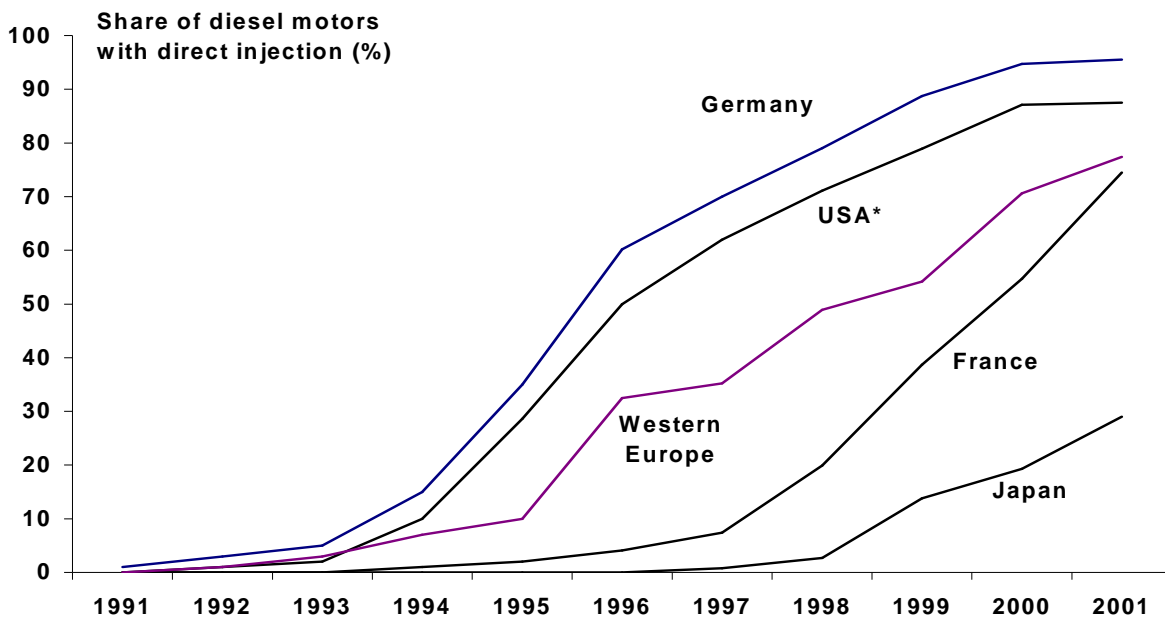
(Ziesing 2009, DEFRA 2009)





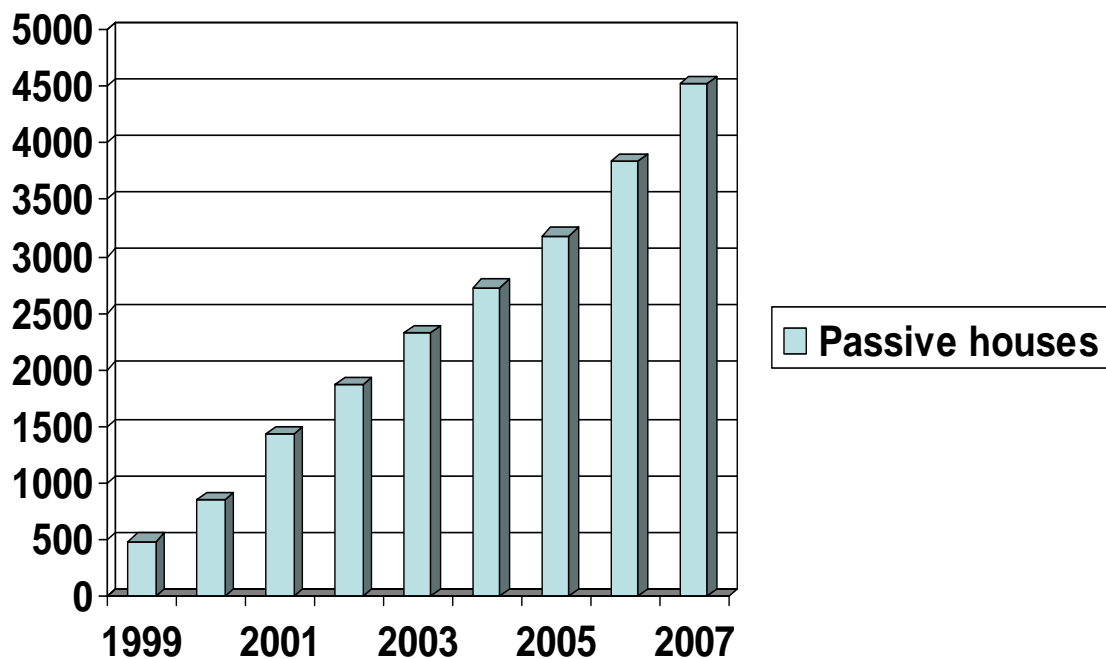
## Co-Benefits

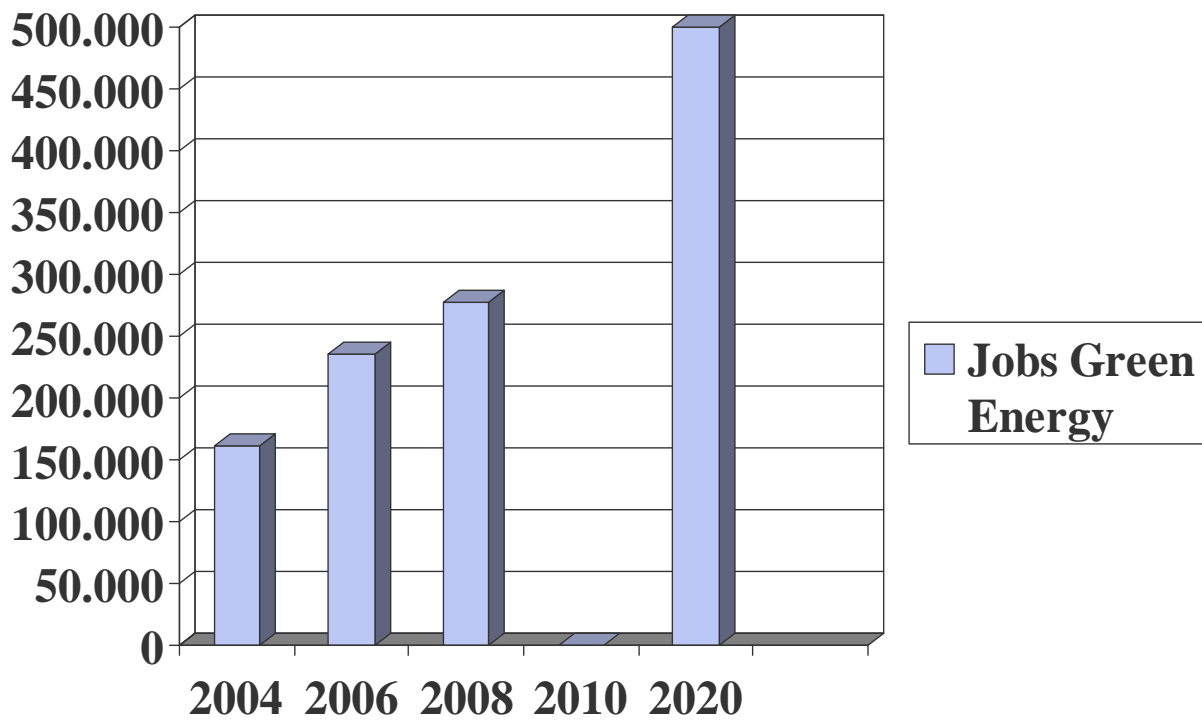
## Lead Markets for fuel-efficient Diesel Cars



Source: ZEW, Bosch  
 \* USA: predominantly light trucks

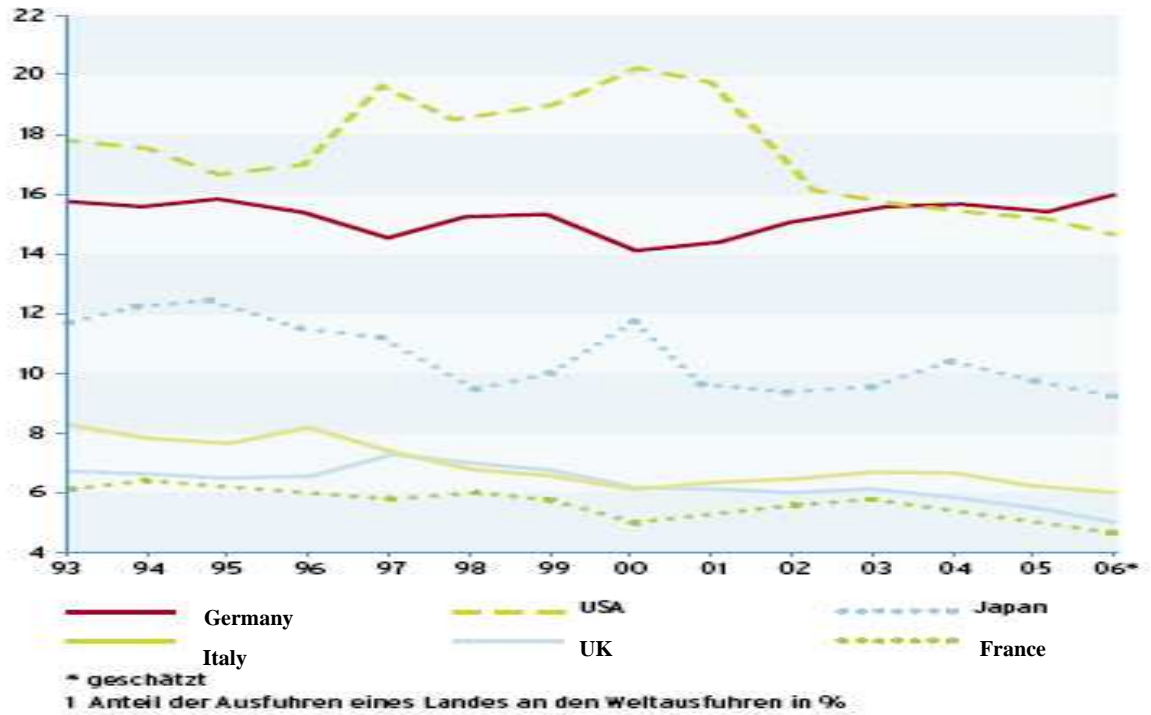
## Passive Houses in Germany 1999-2007 (KfW 2007)





## The Environmental Industry

# Eco-Industry: World Market Share of OECD Countries (in %) (BMU/UBA 2009)



Quellen: OECD; ITCS – International Trade BY Commodities, Rev. 3 (versch. Jgge.); COMTRADE-Datenbank; WTO; Berechnungen des NIW

# Comparison between 1999 and (updated) 2004 Expenditures

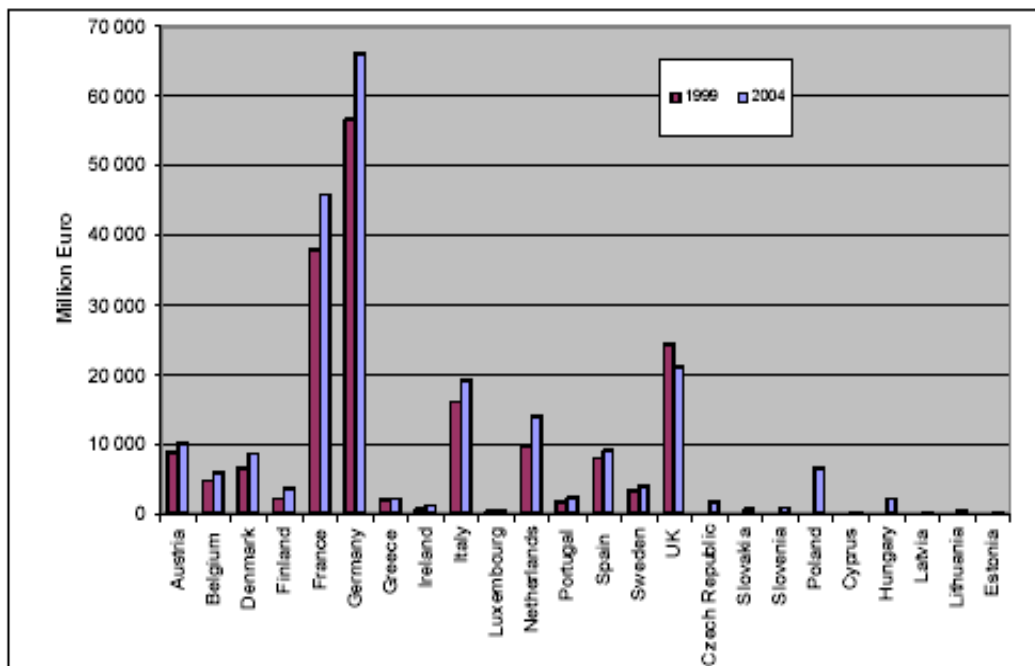


Figure 13: Comparison between updated 2004 expenditure data and 1999 expenditure data

N.B.: Data available for the 10 NMS from the previous Analysis of the size and employment of the eco-industries of the candidate countries report are not used because here because they are incomplete or not directly comparable (differences in sources, perimeter, extrapolation method).



* Roland Berger (2007) <sup>1)</sup> :	€ 1.400 bn.
Forecast 2020:	€ 3.100 bn.
- Renewable Energy / Energy Efficiency:	€ 695 bn. (2020: 1.645)
- Resource Efficiency / Recycling:	€ 148 bn. (> 335)
- Sustainable Water Management:	€ 361 bn. (805)
- Sustainable Mobility:	€ 200 bn. (300)
* Innovas (2007/8) <sup>2)</sup> :	\$ 4.400 bn. (3.040 bn.L)
- Pollution Control:	21,6 %
- Renewable Energy:	30,9 %
- Low Carbon Activities:	47,5 %

- 1) BMU (Roland Berger)(Ed.): GreenTech made in Germany 2.0, München 2009
- 2) Innovas, March 2009: Low Carbon and Environmental Goods and Services: An Industry Analysis (London)

## Trends: Green Jobs (UNEP 2009 + other Sources)

<b>USA:</b>	<b>&gt;5,3 Mio</b> green jobs (2005).(Steiner) Obama (2008) proposed 5 Mio jobs more. <b>9,1 Mio. (2007):</b> 8,6 Energy efficiency, 0,5 renewabl. energy (ASES/MISI 2008).
<b>EU-27:</b>	<b>&gt;3,4 Mio.</b> (2004)(Ernst & Young 2006) WWF (6-09): Additional 5 Mio. indirect jobs
<b>Germany:</b>	<b>&gt;1,8 Mio.</b> (2006)(BMU 2007)
<b>UK:</b>	<b>0,9 Mio.</b> (2007/8), 1,3 planned (2017)
<b>Japan:</b>	<b>1,4 Mio.</b> (Reuters 7. 1. 09), 2,2 Mio. planned 2020 (2009)
<b>China:</b>	1 Mio only Renewable Energy (UNEP)
<b>South Korea:</b>	<b>1 Mio jobs 2012</b> (Green New Deal) (UNEP),

## Megatrend: Global Markets for Eco-efficient Technologies (annual growth)

### Annual growth 2006-08:

-PV (grid-connected capacity):	60 %
-Bio Diesel:	41 %
-Investment in renewable energies (capacity):	38 %
-Wind energy (capacity):	28 %

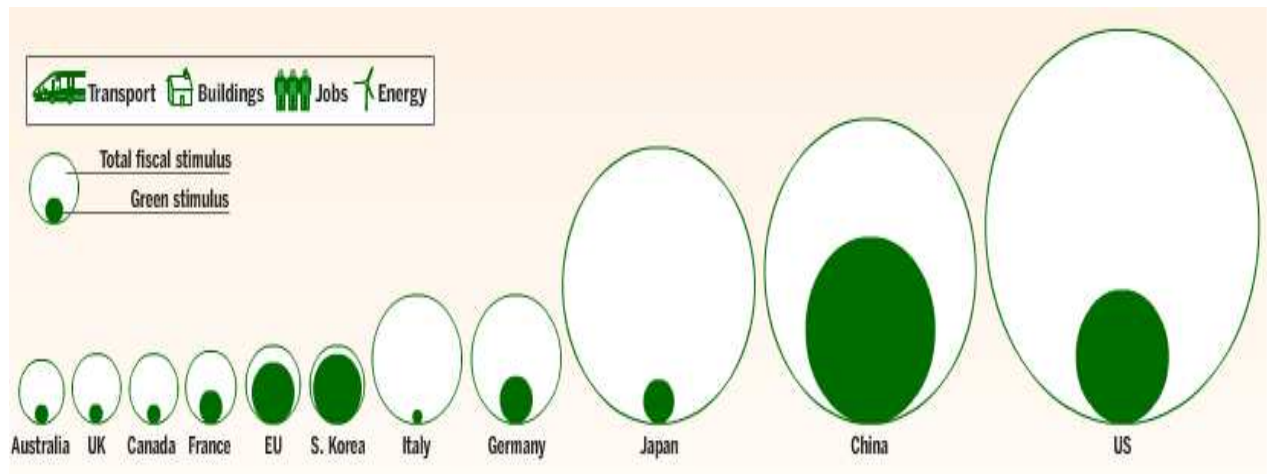
### Forecast 2020:

-Bio plastics:	35 %
-Energy-efficient cars:	29 %
-Automatic waste separation:	15%
-White biotech:	10%
-Water supply:	6 %.

Source: BMU/Roland Berger 2009, REN21 2009

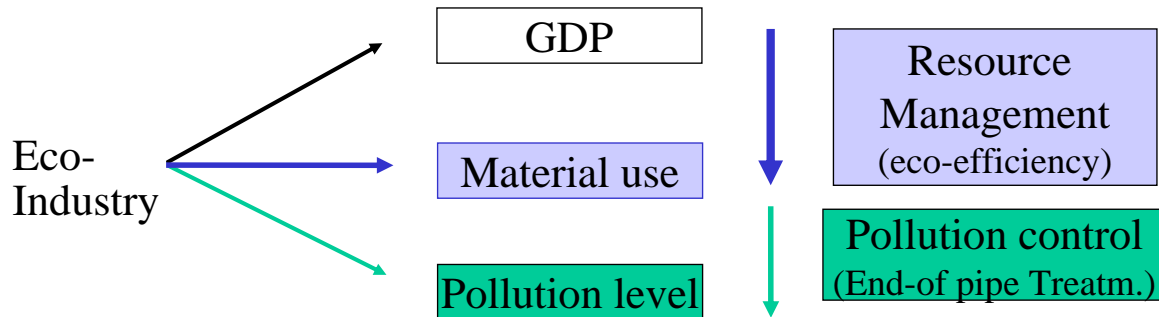
## Structure and Growth of the German „GreenTech“ Industry

	German Share of GreenTech World market	Annual Turnover Growth 2005-2007	Expected Annual Turnover Growth 2008-10
Environmental-friendly energy supply	30 %	29 %	35 %
Energy efficiency	12 %	20 %	22 %
Material efficiency	6 %	21 %	24 %
Recycling	24 %	18 %	16 %
Sustainable water supply	10 %	15 %	14 %
Sustainable mobility	18 %	15 %	17 %

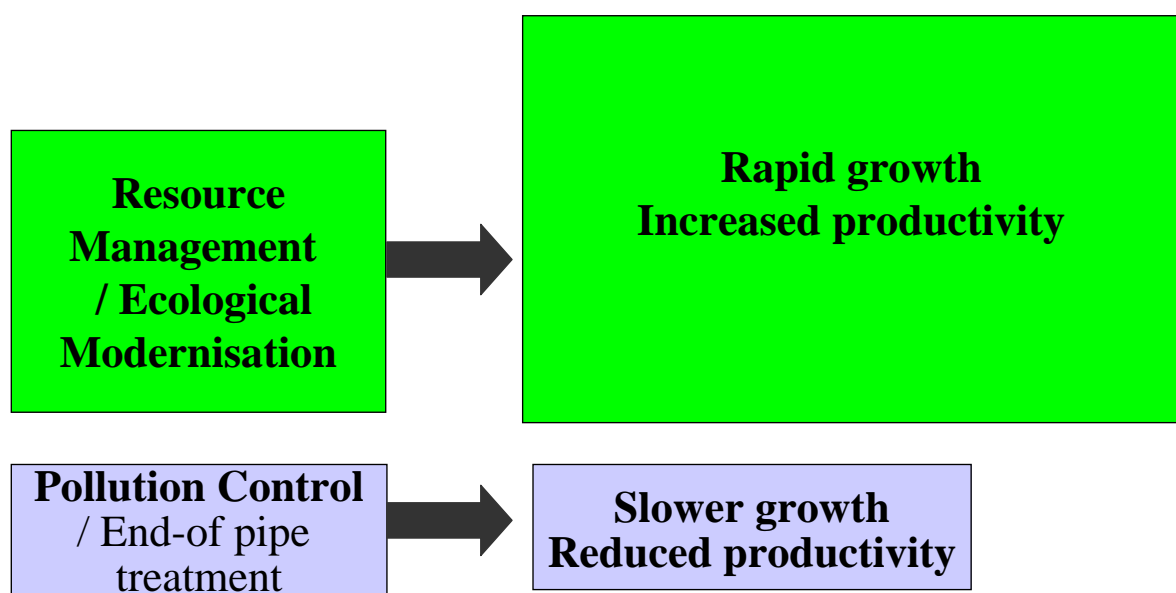


## The Two Faces of Environmental Industry

# Two Functions of the Eco-Industry: Pollution Control + Resource Management



## Two Faces of the Environmental Industry



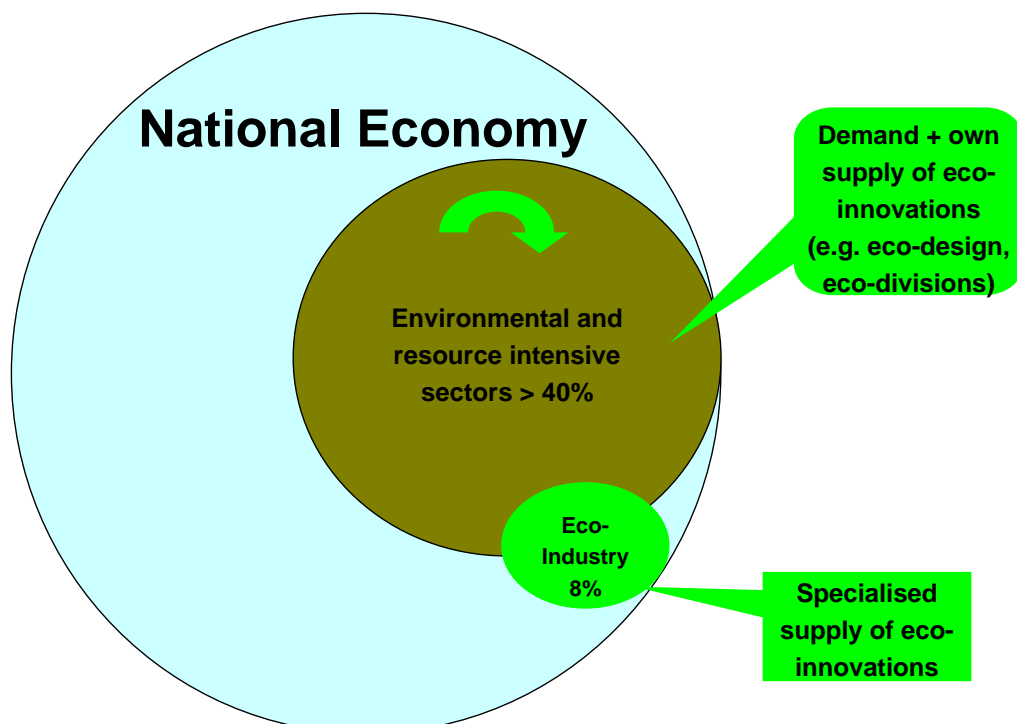
## A Wasteful Mode of Production

- „...more than 95% of the resources lifted from nature are wasted before the finished goods reach the market. And many industrial products – such as cars – demand additional resources while being used“.

Reid, A. / Miedzinski, M.: Eco-Innovation. Final Report for Sectoral Innovation Watch, May 2008, [www.technopolis-group.com](http://www.technopolis-group.com).

- According to Gofman, Lemeshev and Reimer (1974) in the old Soviet Union even 98,6 % of the material input was wasted before consumption. (The break-down of SU was also due to an extremely inefficient use of resources. And to a certain degree was their crisis an early warning also for our resource-intensive pattern of industrial growth).

## The Visible and the “Unvisible” Eco-Industry (figures for Germany)



- By preventing critical external damage costs and loss of welfare (Quality of life) they are the necessary condition for long-term sustainable growth.
- This condition creating long-term and global markets for the environmental friendly technologies/products
- They imply high growth in the eco-tech sector
- By reducing the costs of material resources (especially energy costs) they increase the productivity of the total national economy.
- Due to market failures they are essentially policy-driven, particularly if a high speed of innovation is necessary.

## INNOVATION

Climate policy 1998 being conceived as „ecological modernisation“ conceived (after 2005 as „ecolog. industrial policy“)

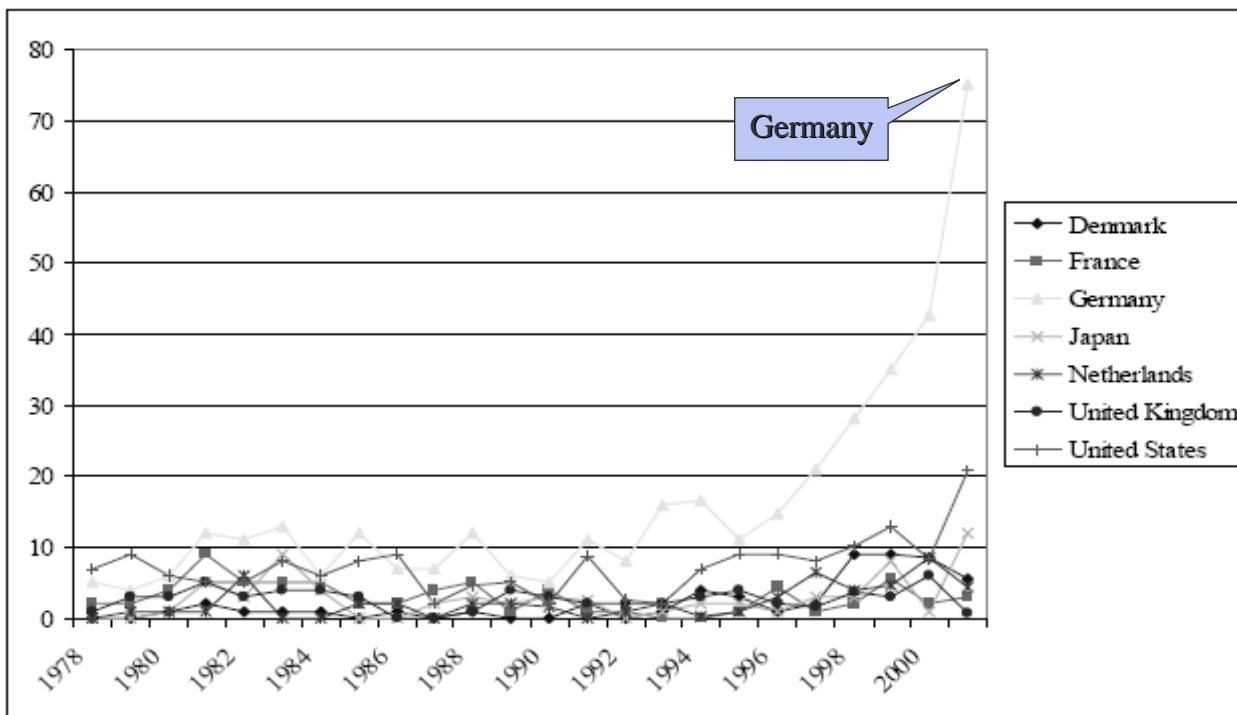
- **Effectivity:** Ambitious targets can be established, implemented, achieved and even surpassed - although the potential has been by far not been exploited (utilities, cars, CHP)
- **Innovation:** Ambitious targets (THG plus phasing out of nuclear energy) can create high pressure for innovation (patents!)
- **Acceleration:** By stimulating innovation ambitious targets can enlarge the space for further climate policy action.
- **Growth:** Positive economic effects: exports, employment, a booming „climate protection industry“ (2005: 5% GDP)
- **Productivity:** Cost reductions and increased productivity
- **Lead markets:** domestic first-mover advantages and global benefits, inflow of foreign capital
- **Demonstration effect** + competitive pressure on others.

**ffu** The neo-classic paradigm has proven wrong (The costs have regularly been overestimated, the innovation effect too often ignored) <sup>29</sup>

## Thank You!

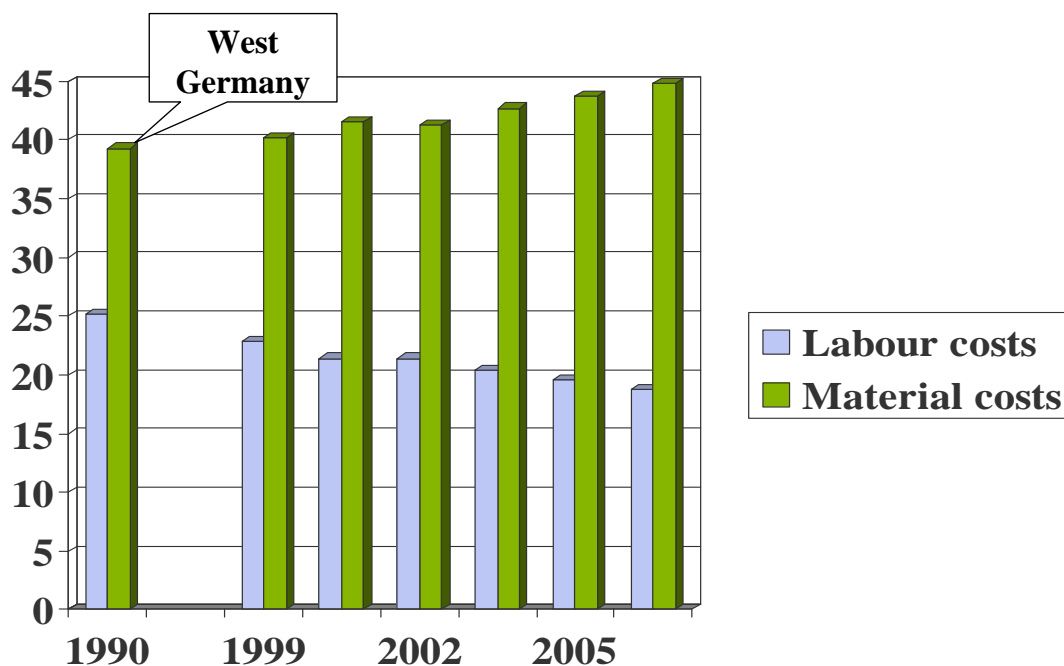
# Patents for Renewable Energy Technologies in selected OECD Countries

(OECD 2005)



# Material Costs vs. Labour Costs in the German Industry 1990-2006

(% of total Costs in %)



Source: Statist. Bundesamt 2009



# „Green Jobs“: Definition

„Green jobs reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. (They mean)...work in agriculture, industry, services and administration that contributes to preserving or restoring the quality of environment“

(UNEP: Green Jobs: Towards decent work in a sustainable, low-carbon world, Nairobi 2008)

## Eco Industry: EU, UK and Germany 2004

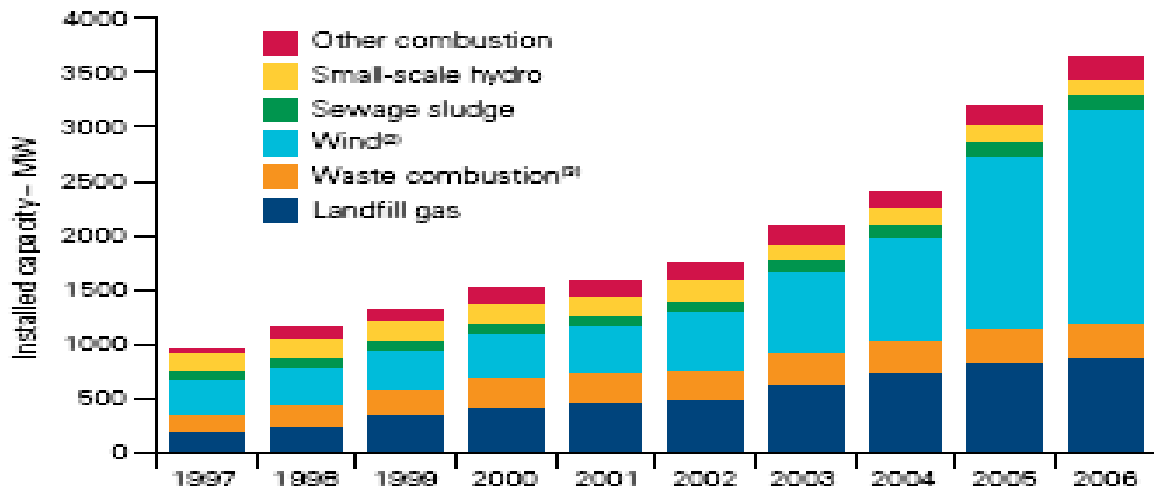
Source: Ernst & Young 2006, partly changed.

	<b>EU-25</b>	<b>UK</b>	<b>Germany</b>
<b>Pollution control</b> (+ nature protection)	<b>82,0</b>	<b>4,7</b>	<b>26,5</b>
<b>Resource management:</b>	<b>168,5</b>	<b>14,8</b>	<b>75,3</b>
- Waste Management & Recycling:	52,4	6,4	14,9
- Recycled Materials:	24,3	3,5	6,8
- Renewable Energy Production:	6,1	0,4 <sup>1)</sup>	2,2
- Water Supply:	45,7	4,5	11,4
- Eco-construction (estimated):	40 <sup>1)</sup>	n.a.	40,0 (2005) <sup>1)</sup>
<b>Administration, Management &amp; Research</b>	<b>19,8</b>	<b>2,0</b>	<b>4,4</b>

1) Estimate, not included in the Study      **270**                      **21,5**                      **106,2**

## (UK Renewable Energy Strategy, 2008)

Figure 3.1: Electricity generating capacity of renewable energy plant (excluding large-scale hydro)<sup>(1)</sup>



- (1) Large-scale hydro capacity was 1,369 MW in 2006.  
 (2) Wind includes both onshore and offshore and also includes solar photovoltaics (9.9 MW in 2006) and alkaline wave (0.5 MW in 2006).  
 (3) All waste combustion plant is included because both biodegradable and non-biodegradable wastes are burned together in the same plant.

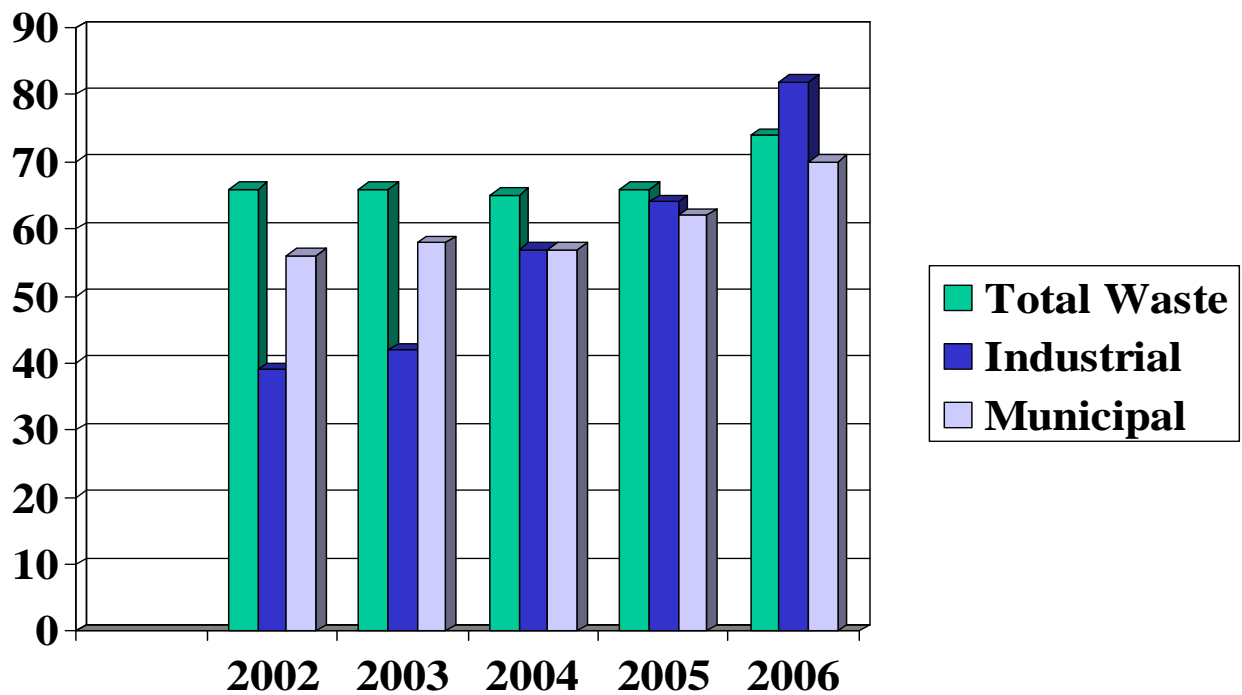
Source: Digest of United Kingdom Energy Statistics 2007, Chart 7.3

## Eco Industry: Four German Success Stories

	<i>Fuel-efficient Diesel Cars</i>	<i>Low-Energy Buildings</i>	<i>Industrial Recycling</i>	<i>Renewable Energies</i>
<b>Taxes / Price Mechanism</b>	Car Tax, Eco Tax, (Oil Price)	Eco Tax (Oil Price)	(Raw Material Prices)	(Oil Price)
<b>Other dominant instruments</b>		Standards, Subsidies	Regulation	Feed-in Tariffs, Subsidies
<b>Growth</b>	++	+	++	++
<b>Employment</b>		+		++
<b>Innovation</b>	+	++	++	++
<b>Export</b>	++	+	++	++
<b>Environmental Impacts</b>	++	++	+	++

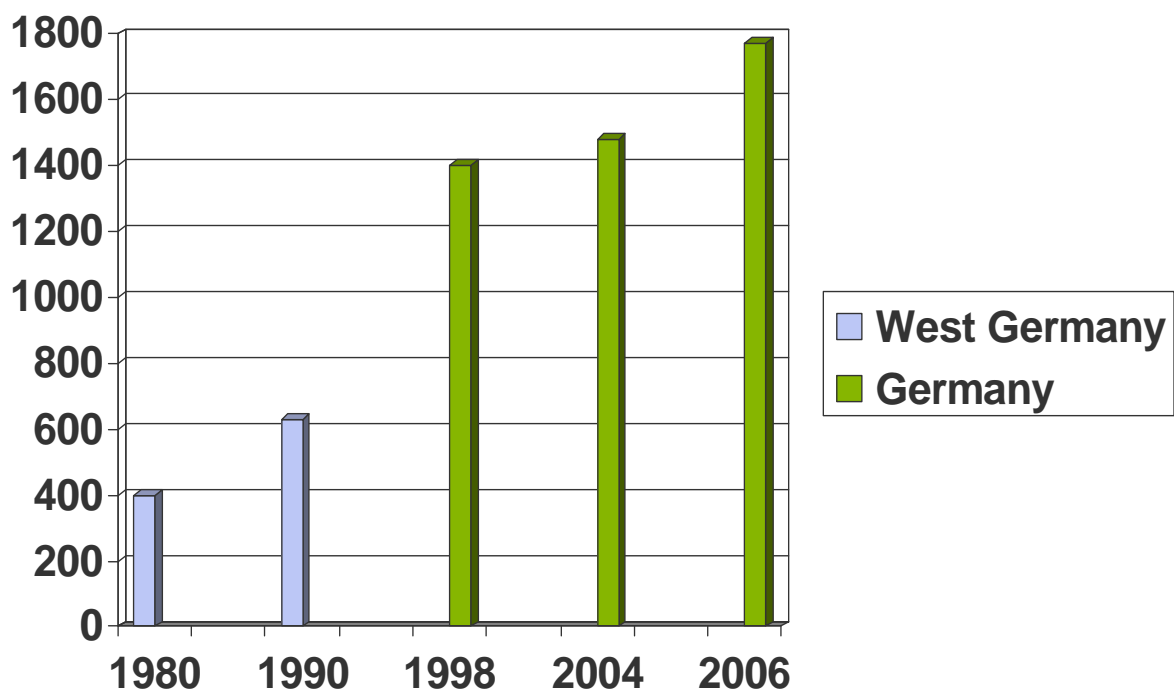
## Recycling Rates in Germany 2002-2006

(in %, incl. incineration). Source: Statist. Bundesamt 2008



## Employment in the German Eco Industry

(BMU, UBA 2008)



# BASF: GHG Balance (BASF 2008)

