

Germany's Efforts to Mitigate Climate Change

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Indicator	Observed Changes
Agriculture	- dry stress on ground water remote farm land - partially high harvest loss dry period of medical, spice and cereal plants
Water supply	- drop of ground water levels in Brandenburg since 30 years due to reduced summer rain and higher evaporation - floods caused by extreme rain fall - variability of the maximum yearly flowing off increased drastically
Economical losses through catastrophic extrem incidents	- storms and floods are doubled since 1970 in Germany: flood August 2002 - 18,5 Bill. €, 230 death hurricane October 2002 - 2,3 Bill. €, 33 death storm February 2002 - 500 Mio. €, 3 death dry Spring/Summer 2003 - 240 Mio. € (?)

Indicator	Observed Changes
Alp-Glacier	1850 – 1979 one third of area or half of the ice mass melted, since 1980 loss of further 25 % (Schneeferner withdrawal 10 cm/day, Ice cover Zugspitze today only a 1/5 (Basis 1930))
Ice cover of rivers and lakes	Müggelsee: Reduction since the seventies from about 2 – 3 month to about 1 month
Tierverhalten	Birds of passage stay up to 20 days longer in Germany than 30 years ago Every 3rd bird species sits about 9 days earlier



Goals of the German Climate Protection Policy

25 % CO₂ reduction until 2005 (basis: 1990)
 reduction of the 6 Kyoto-Gases (CO₂, CH₄, N₂O, SF₆,
 HFCs and PFCs) by 21 % until 2008/2012 (basis:
 1990)

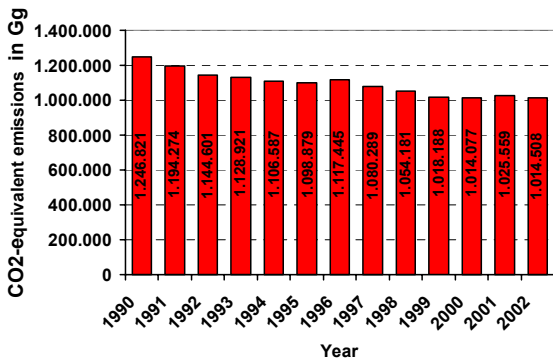
Reduction of Kyoto-Gases until 2020 by
40 %, if EU adopts 30 % reduction

- double the share of renewable energies on primary energy consumption until 2010 from 2,4 to 5 %; power generation from 5 to 10 %
- Extension of cogeneration with the goal to save 10 Mill. t CO₂ in 2005 and 23 Mill. t CO₂ in 2010
- Remarkable improvements of energy productivity

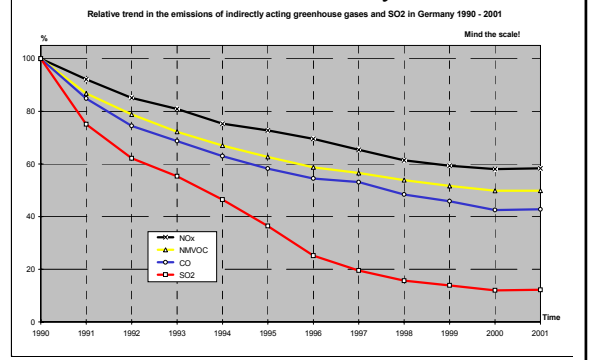
GHG Emissions in Germany- Changes compared to 1990

GREENHOUSE GAS EMISSIONS	Base year	1990	1995	2000	2001	2002
	CO ₂ equivalent (Gg)					
Net CO ₂ emissions/removals	1.023.087,65	1.023.087,65	907.131,24	874.369,68	888.072,32	878.023,28
CO ₂ emissions (without LUCF)	1.015.572,42	1.015.572,42	901.478,32	860.272,66	874.263,81	864.116,77
CH ₄	139.766,68	139.766,68	109.173,08	86.548,58	83.000,30	81.446,68
N ₂ O	81.379,86	81.379,86	73.475,88	55.817,57	56.116,75	55.834,20
HFCs	6.359,92	3.510,00	6.359,92	6.630,04	8.129,66	8.247,14
PFCs	1.758,78	2.696,00	1.758,78	789,70	722,92	785,94
SF ₆	6.632,79	3.895,70	6.632,79	4.017,98	3.325,31	4.076,88
Total (with net CO₂ emissions/removals)	1.258.985,69	1.254.335,88	1.104.631,70	1.028.173,56	1.039.367,30	1.028.414,08
Total (without CO₂ from LUCF)	1.251.470,46	1.246.820,66	1.098.878,78	1.014.076,53	1.025.558,79	1.014.507,57

Development of total GHG in Germany



Relative Trends in the Emissions of indirectly acting Green House Gases in Germany 1990- 2001



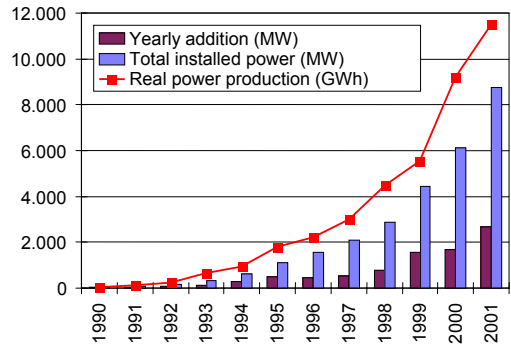
THG	Name	Description	Typ	Implementation status	Expected Effect 2005 in Mio t	Effect in 2008 2012 CO ₂ -Äqu.
CO ₂	adopted	Measures since 1998				
CO ₂	Ecological Tax reform	Ecological steering effects,	R	In force, several Steps until 2003	-10	-20
CO ₂	Renewable energy law	Priority of use of renewable energy for power generation	R	In force	-10	-15
CO ₂	Market incentive program to favor renewable energy	Förderung des Einsatzes erneuerbarer Energien bei der Strom- und Wärmeerzeugung	E	In force	-2,5	-6
CO ₂	100000-roof Solar power program	Förderung einer installierten photovoltaischen Leistung von 300 MW bis 2003	E	In force	-0,2	-0,2

CO ₂	Energy reduction ordinance- (area private household)	Existing regulations tightened Heat protection ordinance and heating systems	R	Adopted and in force	-4	
CO ₂	CO ₂ -Building refurbishment program of KfW	Economical incentives for realisation of energetically demanding refurbishment measure packages or existing buildings budgets: 200 Mill. € yearly for 5 years until 2005	E	Decision of Government	-5 bis -7	
CO ₂	Improvement of energy efficiency Electro- und Electronic- products in households and bureaus	For reduction of energy consumption in use, specially in idle (stand-by-losses) product related labeling, like energy label, information and advisory service for user and voluntary agreements with electro- electronic industry and law measures	ET, V, R	Extend existing Activity	-5	
CO ₂	Forced construction of NG co gen. power plants				5 bis -10	-15 bis -20

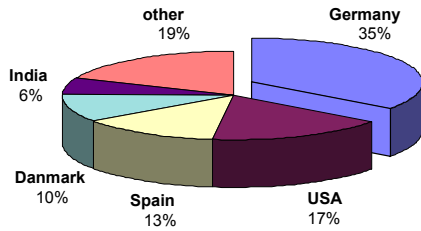
Law for the Priority of Renewable Energies (EEG)

- o Goal: At least to double the share of renewable energy of the total energy consumption until 2010 (§ 1)
- o Compensation only for electricity which is produced only from renewable energy (§ 2 Abs. 1)
- o Obligation for net operators to buy the electricity (§ 3 Abs. 1)
- o Minimum compensation for feed electricity (§§ 4 - 8)
 - Differentiated by technology, plant size, location, yield
 - Compensation duration 20 years
 - Digressive compensation new plant for adoption of technical progress (learning curve)
- o Federal wide compensation of the payments up to end customer (§ 11)
- o Biannual report to the German Parliament (§ 12)

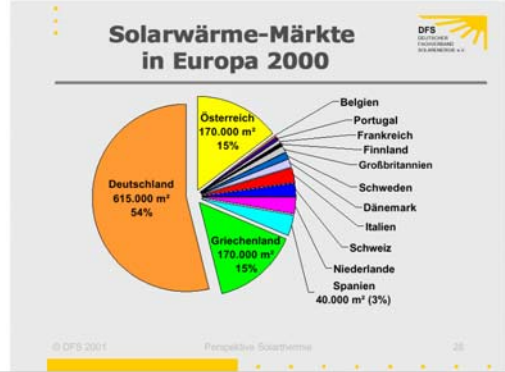
Development of Wind Energy in Germany



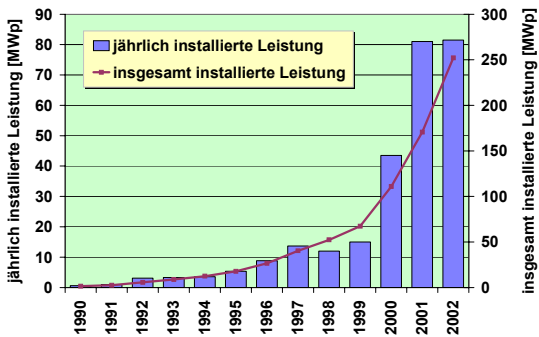
World Wide installed Wind Power 2001 total: 25.000 MW



Solar Heat Market in Europe 2000

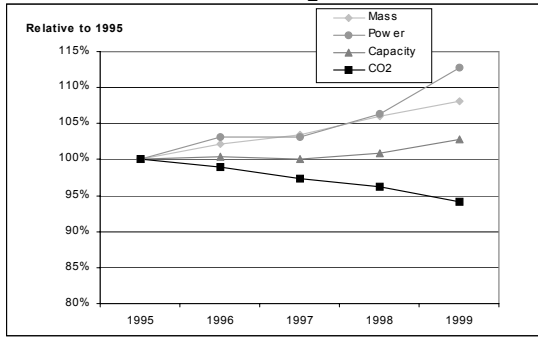


Development of Photovoltaic Market



Transport

Trends in physical fleet characteristics and specific CO₂ emissions

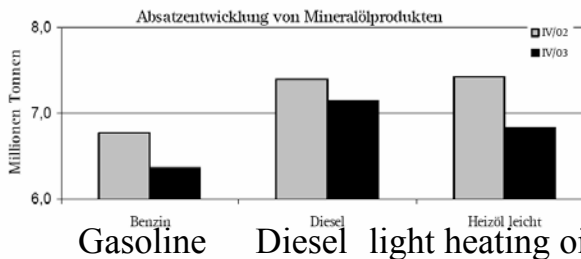


Emissions of Road Transport (in Gg)

	CO ₂	CH ₄	N ₂ O
1990	150.261,54	62,73	9,46
2000	171.160,70	16,32	16,19
2002	166.002,00	12,82	14,45

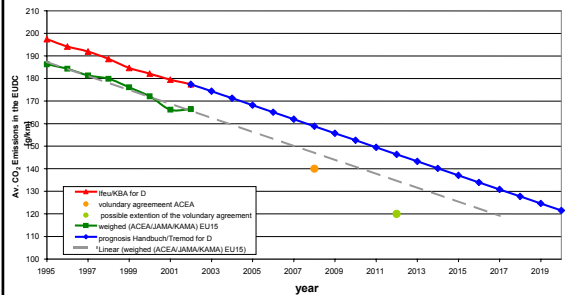
	NO _x	CO	NM VOC	SO ₂
1990	1284,78	6684,18	1463,85	90,20
2000	781,29	2380,13	283,36	19,66
2002	664,63	1910,61	213,69	2,81

Sales of Mineral Oil Products



Quellen: Bundesamt für Wirtschaft und Ausfuhrkontrolle (BAFA), MWV-Berechnungen

Development of the CO₂ Emissions of newly registered Cars



Measure	Reduction in mio t until 1990 compared to 1990	Reduction in mio t until 2010 compared to 1990
Eco tax reform	6 to 8	
CO ₂ -reduction by new vehicles / voluntary agreement with automotive industry	4 to 7	10
Financial incentives for low sulfur fuels	2 to 5 Estimate of the German car manufactures. Reductions already included in the voluntary agreement	

Measure	Reduction in mio t until 1990 compared to 1990	Reduction in mio t until 2010 compared to 1990
Energy Strategy in the transport sector	-	1 to 2 Estimate of the German vehicle manufactures
Integrated Transport planning	not quantifiable	not quantifiable
Financial incentives for low sulfur fuels	not quantifiable	not quantifiable

Measure	Reduction in mio t until 1990 compared to 1990	Reduction in mio t until 2010 compared to 1990
Revision of the Federal transport master plan	not quantifiable	not quantifiable
Anti-congestion programm 2003 - 2007	0.5	not quantifiable
	not quantifiable	not quantifiable

Carbondioxide reduction of the PC Transport

- CO₂- Emission limits (- 35%)
- EU- Directive low friction lub. oil (- 5%)
- EU- Directive low rolling resistance tires(- 5%)
- Driver training (up to 15%)
- special requirements for fleet operations
- Replacement of the EU used car directive by a life cycle balance

Emission Trading

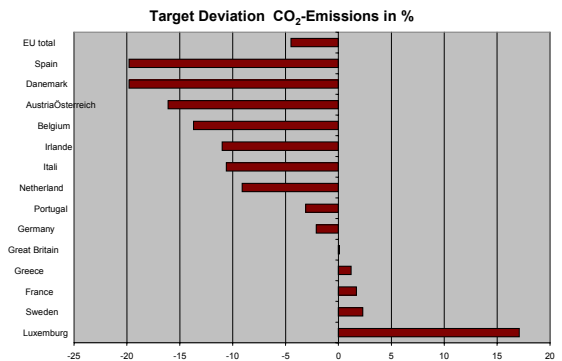
Time Table at EU Level for the Introduction of an Emission Trading System

- Start in 2000: To achieve the Kyoto goal, emission trading should be used as an important instrument EU-wide.
- Common position of the EU Environment Minister Council 9.12.2002
- June 2003: compromise between EP and Minister council
- September 2003: EU directive came to effect
- 31th of March 2004: date of delivery for the national allocation plans of the member states, check through the EU commissions
- 2005 Start of EU-Emission trading

Goal of the Directive

- Emission trading on company level, to use cost efficient reduktion potentials EU-wide.
- Include the most important emitters (emission trade include about 46 % of the CO₂ emissions of the EU in 2010)
- No overload of the system: For the time being only CO₂; only for the industry sector.
- Collect experience for the begin of international trading from 2008.

Target Deviation (EU burden sharing / 2000)

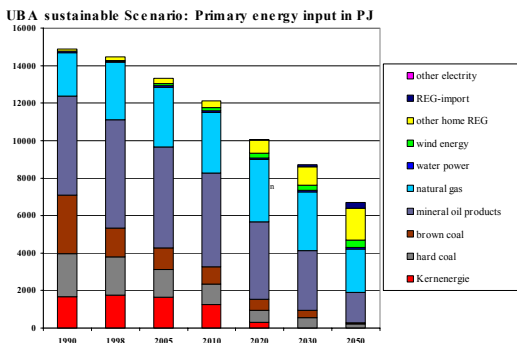


Participant (according to Annex I)

- **Energie producer incerators** (>20 MW, excluding toxic waste and household waste)
 - Mineral oil refineries and cokeries
- **Metal producing and processing**
- **Mineral processing industry**
 - Plants for the production of: Cement clinker (>500t/d), lime (>50t/d), glass and glass fibre (melting cap. >20t), ceramic products through fire
- **Other Industry sectors**
 - Plants for productions of pulp form wood and other fibre products and paper (>20t/d)
- **Not specially named:**
Chemical industry, waste, non iron metals

Long Term Vision

UBA-Long Term Scenario



When will this
terrible heat end?
It's getting damn
narrow here.



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**No Freedom
without
Wastefulness**



Solar Assisted Air
Conditioning of Buildings –
Examples of realised plants
and ongoing projects

