

# Germany

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## **1. SOURCES OF INFORMATION**

- Germany's 4<sup>th</sup> National Communication; Fourth National Report by the Government of the Federal Republic of Germany (July 2006)

- Endbericht zum Forschungsvorhaben Politikszenerarien für den Klimaschutz IV - Szenarien bis 2030 für den Projektionsbericht 2007(Politikszenerarien IV), not yet published by UBA
- Germany's National Allocation Plan 2008-2012 submitted to the EU Commission on 28 June 2006, approved by the EU Commission on 29 November 2006

### **Base year emissions**

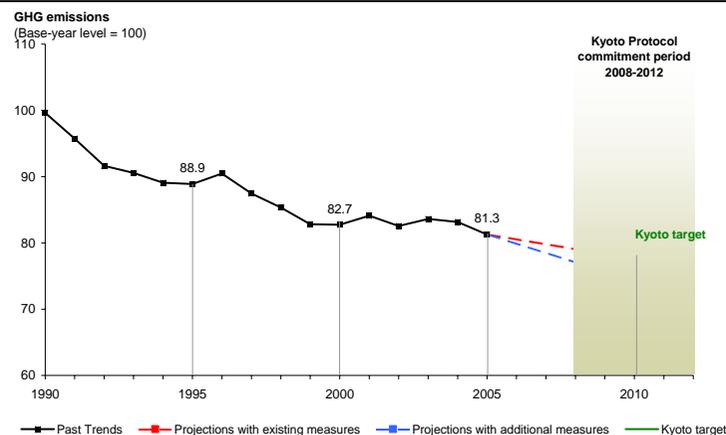
Base year emissions of greenhouse gases are calculated using 1990 emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) and 1995 emissions of fluorinated gases (SF<sub>6</sub>, HFCs and PFCs).

Base year data used in this country profile is as reported by the Member State in the sources noted above. The base year level is 15.8 Mt CO<sub>2</sub> eq lower than the level reported in *The European Community's initial report under the Kyoto Protocol - Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol (Submission to the UNFCCC Secretariat)*, EEA Technical report No. 10/2006. This data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.

## 2. SUMMARY

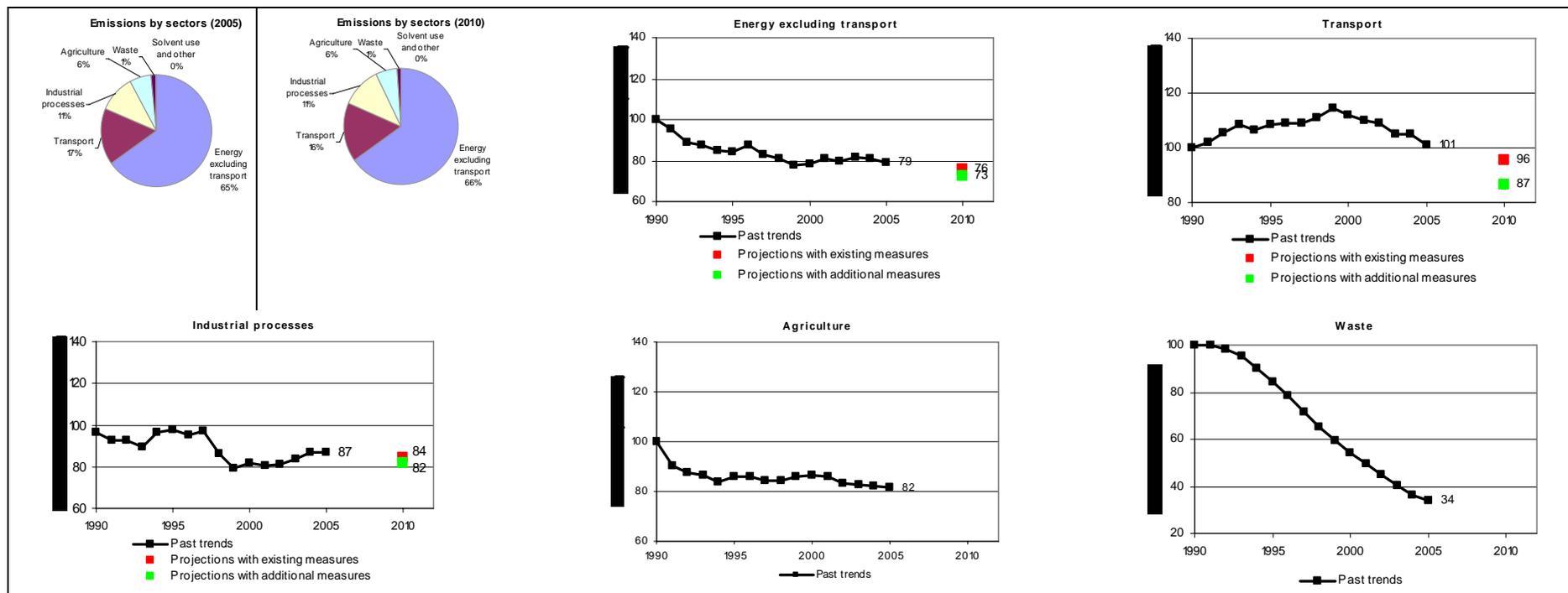
### GERMANY

Share in total EU-15 GHG emissions 2005	23.9 %
Emissions base year (initial report)	1 232.5 Mt
Emissions 2005	1 001.5 Mt
Emissions base year (for projections)	1 231.5 Mt
Projections 2010 with existing measures	955.4 Mt
Projections 2010 with additional measures	914.5 Mt
Kyoto target (absolute)	973.7 Mt
Kyoto target (% from base year)	- 21.0 %
Change base year to 2005	- 18.7 %
Change 2004-05	- 2.3 %
Change base year to 2010 with existing measures	- 22.4 %
Change base year to 2010 with additional measures	- 25.7 %
Distance to linear target path 2005	- 3.0 index points
Use of Kyoto mechanisms	n.a.
Sinks (Articles 3.3. and 3.4)	n.a.
Emissions in 1990 (Article 3.7)	n.a.



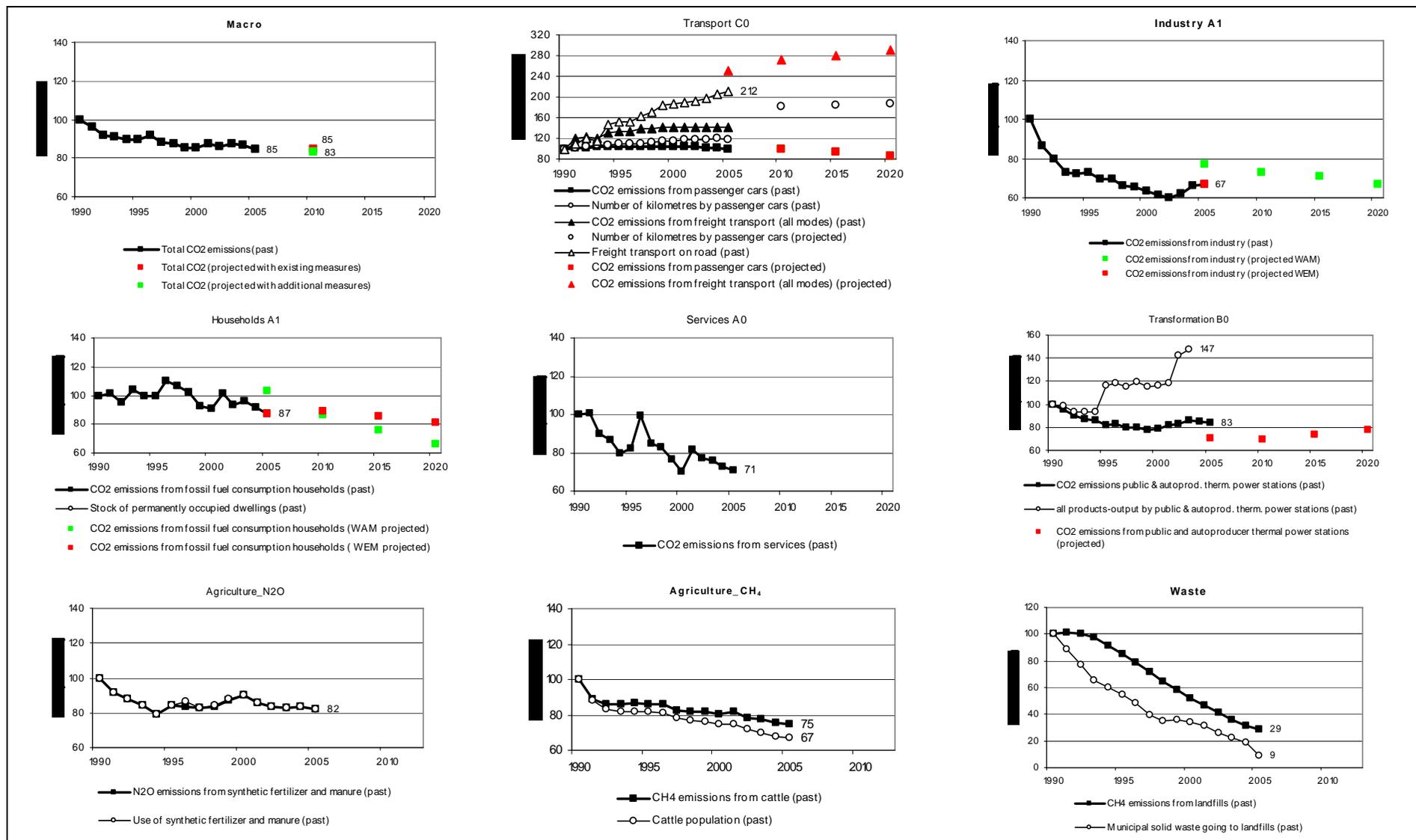
**Past emissions:** Germany's GHG emissions were 2.3 % below those of 2004 and 18.7 % below base-year levels in 2005. The main factors for decreasing emissions with regard to 2004 were decreasing fossil fuel combustion from public electricity and heat production, from households and from road transport. The main reasons for the decreases since 1990 are efficiency increases in power and heating plants and the economic restructuring in the new federal states after German unification. Other important factors were emission reductions in eastern German households and services, abatement measures in adipic acid production, the decline of coal mining, and emission reductions from landfills.

**Emission projections:** Emissions in 2005 were four percentage points above the 'with existing measures' projection for 2010. Germany projects that it will reach the Kyoto target with existing domestic measures. With additional measures Germany projects to over-achieve the Kyoto target by five percentage points.



### 3. REPORTED INDICATORS

Note, that due to the use of different definitions and different timing of submission projected values may be inconsistent with past values.



## Germany

Priority Indicators		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Macro	Total CO <sub>2</sub> emissions, kt	1,032,348	994,629	947,040	937,176	922,804	921,190	943,286	913,006	904,951	879,186	883,055	901,209	886,263	901,068	896,775	872,943
	GDP, Bio Euro (EC95)	NA	1,761	1,800	1,785	1,833	1,867	1,886	1,920	1,959	1,998	2,063	2,088	2,088	2,084	2,110	2,129
Macro B0	CO <sub>2</sub> emissions from energy consumption, kt	948,191	915,420	870,690	862,974	843,414	840,553	866,886	831,418	824,361	801,265	800,238	822,680	808,149	822,291	816,291	795,211
	GDP, Bio Euro (EC95)	NA	1,761	1,800	1,785	1,833	1,867	1,886	1,920	1,959	1,998	2,063	2,088	2,088	2,084	2,110	2,129
Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	106,754	107,747	109,371	111,367	111,772	112,146	111,786	110,860	111,265	111,877	110,282	110,947	110,816	108,141	108,616	104,853
	Number of kilometres by passenger cars, Mkm	488,574	496,380	509,987	522,027	524,100	530,900	535,200	537,700	547,100	558,900	560,300	571,300	579,500	574,500	587,733	579,407
Industry A1	CO <sub>2</sub> emissions from industry, kt	154,482	133,337	123,242	112,947	111,962	112,275	107,866	107,721	102,528	101,101	97,700	94,737	92,569	95,837	101,734	102,781
	Gross value-added total industry, Bio Euro (EC95)	NA	472	508	473	491	490	470	477	495	499	520	518	510	510	520	NA
Households A1	CO <sub>2</sub> emissions from fossil fuel consumption households, kt	129,446	131,674	123,500	134,095	128,563	129,180	142,486	138,386	132,035	119,936	117,910	131,250	121,388	124,362	118,334	113,032
	Stock of permanently occupied dwellings, 1000	NA	NA	NA	33,235	NA	NA	NA	NA	34,604	NA	NA	NA	35,813	NA	NA	NA
Services A0	CO <sub>2</sub> emissions from fossil fuel consumption in commercial and institutional sector, kt	63,950	64,521	57,606	55,343	50,962	52,714	63,495	54,366	52,844	48,768	45,065	52,290	49,375	48,680	46,486	45,094
	Gross value-added services, Bio Euro (EC95)	NA	958	999	1,018	1,040	1,077	1,109	1,129	1,164	1,189	1,230	1,259	1,275	1,279	NA	NA
Transformation B0	CO <sub>2</sub> emissions from public and autoproducer thermal power stations, kt	440,859	421,177	396,074	381,861	377,195	361,466	365,730	351,810	352,974	342,494	349,314	359,509	363,789	377,372	374,852	367,988
	All products - output and autoproducer thermal power stations, PJ	1,360	1,345	1,272	1,263	1,271	1,580	1,613	1,569	1,623	1,564	1,575	1,607	1,932	2,002	NA	NA
<b>Additional Priority Indicators</b>		<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Transport D0	CO <sub>2</sub> emissions from freight transport on road, kt	25,191	29,900	30,648	29,942	32,896	33,639	33,769	34,666	34,957	35,927	35,610	35,756	35,526	35,476	35,656	35,756
	Freight transport on road, Mtkm	185,212	203,878	219,892	210,012	273,061	280,055	280,922	302,241	315,986	341,746	346,300	353,000	354,000	363,900	380,400	392,500
Industry A1.1	Total CO <sub>2</sub> emissions from iron and steel, kt	61,333	57,363	53,042	48,531	53,821	54,838	52,357	56,080	56,497	53,189	57,497	55,384	54,836	55,483	59,148	59,167
	Gross value-added - iron and steel industry, Bio Euro (EC95)	NA	16	16	14	15	15	15	16	17	17	17	18	18	17	16	NA
Industry A1.2	Energy related CO <sub>2</sub> emissions chemical industries, kt	IE,NO															
	Gross value-added - chemical industry, Bio Euro (EC95)	NA	34	35	34	36	37	38	39	38	38	41	43	44	45	47	NA
Industry A1.3	Energy related CO <sub>2</sub> emissions - glass pottery and building materials industry, kt	19,212	16,796	17,762	17,170	18,576	18,047	17,310	17,603	17,097	17,223	17,021	15,166	14,481	14,936	14,990	14,719
	Gross value added - glass pottery and building materials industry, Bio Euro (EC95)	NA	15	15	15	17	17	16	16	16	16	16	16	15	15	15	NA
Industry C0.1	Total CO <sub>2</sub> emissions from iron and steel, kt	61,333	57,363	53,042	48,531	53,821	54,838	52,357	56,080	56,497	53,189	57,497	55,384	54,836	55,483	59,148	59,167
	Production of oxygen steel	33,052	32,842	30,612	28,946	31,915	31,908	29,447	33,134	31,951	29,795	33,051	31,654	31,809	31,377	32,158	30,857
Industry C0.2	Energy related CO <sub>2</sub> emissions from glass, pottery and building materials, kt	19,212	16,796	17,762	17,170	18,576	18,047	17,310	17,603	17,097	17,223	17,021	15,166	14,481	14,936	14,990	14,719
	Cement production, kt	37,772	34,341	37,331	36,649	40,512	35,862	34,318	34,148	35,601	37,438	35,414	32,118	31,009	32,749	31,854	30,619

## Germany

Supplementary Indicators		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Transport B0 (diesel)	CO <sub>2</sub> emissions of diesel-driven cars, kt	16,569	17,493	18,039	19,488	19,994	19,840	19,907	19,411	19,412	20,753	21,460	24,271	26,440	27,101	31,152	31,883
	Number of km, of diesel-driven passenger cars, Mio km	81,513	86,406	89,041	96,045	99,372	99,274	100,465	99,173	100,801	110,357	116,790	136,077	151,735	158,951	186,460	197,111
Transport (B0) (petrol)	CO <sub>2</sub> emissions of petrol-driven cars, kt	90,185	90,255	91,332	91,879	91,778	92,306	91,879	91,449	91,852	91,124	88,822	86,676	84,376	81,041	77,465	72,969
	Number of km, of petrol-driven passenger cars, Mio km	407,061	409,974	420,946	425,983	424,728	431,626	434,735	438,527	446,299	448,543	443,510	435,223	427,765	415,549	401,273	382,296
Transport C0	CO <sub>2</sub> emissions from passenger cars, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Passenger transport by cars, Mpkm	679,507	701,177	719,359	728,534	812,701	821,453	822,371	823,356	834,930	855,728	838,277	858,902	866,420	854,587	874,798	860,435
Transport E1	CO <sub>2</sub> emissions from domestic air transport, kt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Domestic air passenger, Mio	15	14	15	16	16	17	17	18	19	20	21	20	20	21	21	22
Industry A1.4	Energy related CO <sub>2</sub> emissions food industry, kt	1,989	1,875	2,190	2,052	1,942	1,552	1,419	1,338	1,372	838	1,261	1,274	1,032	1,032	1,032	1,032
	Gross Value Added food, drink and tobacco industry, Mio EUR (EC95)	NA	39,120	35,019	34,804	37,469	35,081	33,978	35,416	33,563	34,586	36,680	35,148	34,336	34,150	34,243	NA
Industry A1.5	Energy related CO <sub>2</sub> emissions - paper and printing industry, kt	4	5	8	10	13	7	10	8	10	13	14	15	14	16	15	16
	Gross value added paper and printing industry, Mio EUR (EC95)	NA	33,810	34,558	32,798	32,592	31,808	32,307	32,828	32,691	33,462	34,030	32,141	30,309	29,048	29,896	NA
Households A0	Surface area of permanently occupied dwellings, Mio m <sup>2</sup>	139,509	141,707	133,533	144,129	138,597	139,271	152,577	155,451	149,755	138,150	136,222	152,170	141,765	146,079	139,955	135,573
	Specific CO <sub>2</sub> emissions of households for space heating, t/m <sup>2</sup>	NA	NA	NA	2,796	NA	NA	NA	NA	2,993	NA	NA	NA	3,195	NA	NA	NA
Services B0	CO <sub>2</sub> emissions from space heating in commercial and institutional, kt	63,950	64,521	57,606	55,343	50,962	52,714	63,495	54,366	52,844	48,768	45,065	52,290	49,375	48,680	46,486	45,094
	Surface area of services buildings, Mio m <sup>2</sup>	NA															
Transformation D0	CO <sub>2</sub> emissions from public thermal power stations, kt	318,085	312,658	301,537	294,558	295,235	291,672	304,867	293,149	299,549	290,779	304,267	316,126	317,216	330,945	326,470	318,513
	All products output by public thermal power stations, PJ	1,069	1,066	1,025	1,012	1,028	1,327	1,393	1,354	1,418	1,370	1,393	1,435	1,445	1,516	NA	NA
Transformation E0	CO <sub>2</sub> emissions from autoproducer, kt	122,773	108,518	94,537	87,303	81,960	69,794	60,862	58,662	53,425	51,714	45,047	43,383	46,573	46,426	48,382	49,475
	All products output by autoproducer thermal power stations, PJ	290	278	248	250	244	252	220	215	205	194	182	171	488	495	NA	NA
Transformation	CO <sub>2</sub> emissions from classical power production, kt	440,859	421,177	396,074	381,861	377,195	361,466	365,730	351,810	352,974	342,494	349,314	359,509	363,789	377,372	374,852	367,988
	All products output by public and autoproducer power stations, PJ	1,980	1,942	1,920	1,893	1,897	2,234	2,284	2,272	2,299	2,282	2,326	2,361	2,685	2,761	NA	NA
Transport	CO <sub>2</sub> emissions from transport, kt	162,487	166,044	171,712	176,588	172,957	176,625	176,766	177,265	180,547	186,235	182,379	178,663	177,197	170,889	171,325	164,207
	Total final energy consumption from transport, PJ	2,379	2,428	2,522	2,596	2,554	2,614	2,625	2,643	2,691	2,781	2,751	2,698	2,672	2,595	2,636	2,628
Industry	Energy related CO <sub>2</sub> emissions paper and printing industries, kt	4	5	8	10	13	7	10	8	10	13	14	15	14	16	15	16
	Physical output of paper, kt	12,773	12,762	12,941	13,034	14,457	14,827	14,733	15,930	16,311	16,742	18,182	17,879	18,526	19,310	20,391	21,679
Industry	CO <sub>2</sub> emissions from the industry sector	154,482	133,337	123,242	112,947	111,962	112,275	107,866	107,721	102,528	101,101	97,700	94,737	92,569	95,837	101,734	102,781
	Total final energy consumption from industry, PJ	2,977	2,694	2,560	2,432	2,463	2,473	2,424	2,440	2,397	2,384	2,421	2,364	2,322	2,348	2,460	2,460
Households	CO <sub>2</sub> emissions from households, kt	129,446	129,446	131,674	123,500	134,095	128,563	129,180	142,486	138,386	132,035	119,936	117,910	131,250	121,388	124,362	118,334
	Total final energy consumption from households, PJ	2,383	2,516	2,436	2,617	2,558	2,655	2,890	2,854	2,782	2,613	2,584	2,821	2,689	2,792	2,706	2,640

#### 4. OVERVIEW OF CCPM IMPLEMENTATION IN MEMBER STATE

Germany's CCPM status is preliminary - it is yet to submit the descriptions of policies for implementation of the CCPMs.

**Table 1. Information provided on the implementation of policies and measures**

Sector	CCPM	*Germany
Cross-cutting	Kyoto Protocol project mechanisms 2004/101/EC	N
Cross-cutting	Emissions trading 2003/87/EC	N
Cross-cutting	Integrated pollution prevention and control 96/61/EC	R
Energy supply	Promotion of cogeneration 2004/8/EC	B
Energy supply	Taxation of energy products 2003/96/EC	B
Energy supply	Internal electricity market 2003/54/EC	N
Energy supply	Promotion of electricity from RE sources 2001/77/EC	B
Energy supply	Internal market in natural gas 98/30/EC	N
Energy supply	Emissions from large combustion plants 88/609/EEC	E
Energy consumption	Directives on energy labelling of appliances	N
Energy consumption	End-use efficiency and energy services 2006/32/EC	N
Energy consumption	Ecodesign requirements for energy-using products 2005/32/EC	N
Energy consumption	Energy performance of buildings 2002/91/EC	R
Energy consumption	Eco-management & audit scheme (EMAS) EC 761/2001	N
Energy consumption	EC Regulation No 2422/2001 on a Community energy efficiency labelling programme for office equipment	
Energy consumption	Efficiency fluorescent lighting 2000/55/EC	N
Energy consumption	Efficiency of hot water boilers 92/42/EEC	R
Transport	Environmental performance freight transport (Marco Polo Programme)	B
Transport	Motor challenge, voluntary EC programme	R
Transport	Promotion of biofuels for transport 2003/30/EC	R
Transport	Integrated European railway area (2nd + 3rd Railway package) (COM(2002)18 final)	R
Transport	Transport modal shift to rail 2001/12/EC etc.	B
Transport	Consumer information on cars 1999/94/EC	N
Transport	Agreement with car manufacturers ACEA etc.	R
Industrial Process	F-gas regulation (Regulation No 842/2006)	R
Industrial Process	Industrial Process: HFC emissions from air conditioning in motor vehicles 2006/40/EC	
Agriculture	Support under CAP (1782/2003)	N/R
Agriculture	Support under CAP - amendment (1783/2003)	N/R
Agriculture	Nitrates 91/676/EEC	R
Agriculture	Water Framework Directive (2000/60/EC)	R
Agriculture	Regulations related to rural development support and financing of the CAP	R
Agriculture	Agricultural production methods compatible with environment Regulation (EEC) No 2078/92	
Agriculture	Aid scheme for forestry measures in agriculture (Regulation (EEC) No 2080/92)	B

Agriculture	Emission by engines to power agricultural or forestry 2000/25/EC	
Agriculture	Pre-accession measures for agriculture and rural development Regulation (EC) No 1268/1999	
Waste	Directive on waste 2006/12/EC	
Waste	Landfill directive 1999/31/EC	B
Waste	Packaging and packaging waste (Directive 94/62/EC, 2004/12/EC, 2005/20/EC)	

\*Germany's CCPM status is preliminary - they are yet to submit the descriptions of policies implementing the CCPMs

#### Legend

**New** National PAM implemented after CCPM was adopted

Existing National PAM **re-enforced** by CCPM

National PAM already in force **before** CCPM was adopted

Not reported

Expired

N
R
B
E

Source: Preliminary status.

## 5. COMPLETENESS OF REPORTING

Germany provides extensive information on policies and measures and good information on projections in its 4<sup>th</sup> National Communication. The information contained in this document is clear. The level of information is summarised in Tables 1 and 2.

**Table 2. Information provided on policies and measures**

Information provided	Level of information provided	Comments
Policy names	+++	
Objectives of policies	+++	Good descriptions in the text.
Which greenhouse gases?	All	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, PFC, SF <sub>6</sub>
Status of Implementation	+++	Status of implementation is given in detail.
Implementation body specified	+++	
Quantitative assessment of implementation	+++	In most cases stated.
Interaction with other policies and measures discussed	+	Only stated in very few cases.

o,+, ++, +++ the higher the number of + signs, the greater the amount of available information

**Table 3. Information provided on projections**

Category of Information	Level of information provided	Comments
Scenarios considered	+++	Projections without, with and with additional measures are provided.
Expressed relative to base year	++	
Starting year	1990	
Split of projections	+++	Detailed sectoral split, all gases projected
Presentation of results	+++	Detailed background study with assumptions and results
Description of model (level of detail, approach and assumptions)	++	Included in background study.
Sensitivity analysis (key inputs to model / high, central and low projections scenarios / robustness of model)	+	Main results are listed.
Discussion of uncertainty		No uncertainty assessment.
Details of parameters and assumptions	+++	Most parameters are available

## 6. ASSESSMENT OF POLICIES AND MEASURES

The 4<sup>th</sup> National Communication describes policies and measures implemented since 1990, including the updated and improved National Climate Protection Programme 2005, which contains specific reduction targets for CO<sub>2</sub> and the other Kyoto greenhouse gases as absolute requirements. These greenhouse gas emission reduction targets were to be supported by the implementation of various sub-goals geared to the sustainability approach.

Alongside the implementation of policies and measures by the government, climate policy activities by the *Laender*, local authorities and other actors are described.

The projections presented are based on the study "Policy scenarios III – Climate protection in Germany to 2030". The data on which this study is based date from 2003. Climate policy measures recently introduced by the Federal Government, the expansion of renewable energies which has been much more dynamic than assumed in the study and the second national allocation plan under the EU ETS for 2008-12 are not included in the projections. Projections for three scenarios are given in the 4<sup>th</sup> National Communications: The "without measures" scenario does not include the measures taken or approved between 1998 and 2002. The measures taken by the Federal Government between 1990 and 1998 are already covered in the "without measures" as well as in the "with measures" scenarios. The "with additional measures" scenario makes use of the "reduction scenario II" which was also developed within the study "Policy scenarios III – Climate protection in Germany to 2030". This scenario differs from the "with measure" scenario in several methodological aspects, especially the use of a different baseline scenario (model base scenario) as the basis for the calculation of the additional effects. The model base scenario shows the technological and economic potential of the measures and does not include realistic assumptions on market penetration and constraints. For this reason a comparison between the forecast "with measures" and the forecast "with additional measures" is only of limited value. The projected annual emission reductions by sector for the year 2010 are listed in Table 4. The effect of the "with additional measures" variant is calculated in comparison to the model base scenario which projects approx. 30 Mt. CO<sub>2</sub>-eq lower emissions in 2010 than the "with measures" scenario.

**Table 4. Summary of the effect of policies and measures included in the 2010 projections (Mt CO<sub>2</sub>-eq.)**

	With measures	With additional measures
<b>Energy (total, excluding transport)</b>	<b>40.0</b>	<b>22.5</b>
Energy Industries	30.2	15.8
Manufacturing Industries and Construction	0.6	0.4
Other	9.2	6.3
<b>Transport (energy, national)</b>	<b>20.4</b>	<b>15.0</b>
<b>Fugitive Emissions from Fuels</b>	<b>0.1</b>	<b>0.2</b>
<b>Industrial Processes</b>	<b>13.0</b>	<b>3.2</b>
Mineral Products	0.0	0.0
Chemical Industry	0.9	0.3
Metal Production	1.4	0.2
Production of Halocarbons and SF <sub>6</sub>	0.0	0.0

Consumption of Halocarbons and SF6	8.1	1.5
Other	2.5	1.2
<b>Solvents</b>	<b>0.0</b>	<b>1.6</b>
<b>Agriculture</b>	<b>0.0</b>	<b>0.0</b>
Enteric Fermentation	0.0	0.0
Manure Management	0.0	0.0
Agricultural Soils	0.0	0.0
<b>Waste management.</b>	<b>0.0</b>	<b>0.0</b>
Solid Waste Disposal on Land	0.0	0.0
Waste-water Handling	0.0	0.0
Other	0.0	0.0
<b>Total (excl. LUCF)</b>	<b>73.4</b>	<b>40.9</b>

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Table 5. Detailed information on policies and measures

## Policies and measures in the “with measures” projection

<u>Sector</u>	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]			<u>Costs</u> [EUR/t]
						2005	2010	2020	
Cross-cutting		<a href="#">Ecological Tax Reform</a>	Economic Fiscal Regulatory	CO <sub>2</sub>	implemented		12,200		
Cross-cutting		<a href="#">Emission Trading</a>	Economic	CO <sub>2</sub>	implemented				
Cross-cutting		<a href="#">Research and Development</a>	Research	CH <sub>4</sub> CO <sub>2</sub> HFC N <sub>2</sub> O PFC SF <sub>6</sub>	implemented				
Cross-cutting		<a href="#">Information and education measures by the federal government</a>	Information	CH <sub>4</sub> CO <sub>2</sub> HFC N <sub>2</sub> O PFC SF <sub>6</sub>	implemented				
Energy supply		<a href="#">Renewable-Energies Act, Biomass Ordinance</a>	Economic Regulatory	CH <sub>4</sub> CO <sub>2</sub>	implemented	25,000	27,900		
Energy supply		<a href="#">Voluntary undertaking by industry to promote CHP</a>	Economic Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented	10,000	21,500		
Energy supply		<a href="#">Increased use of mine gas under the undertaking by the German Coalmining Industry Association</a>	Voluntary/ negotiated agreement	CH <sub>4</sub>	implemented	1,900	1,900		
Energy supply		<a href="#">Biomass Ordinance</a>	Economic Regulatory	CH <sub>4</sub> CO <sub>2</sub>	implemented				
Energy supply		<a href="#">Reduction of methane losses in the extraction and transportation of natural gas</a>	Research	CH <sub>4</sub>	implemented	200	200		

Sector	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]			Costs [EUR/t]
						2005	2010	2020	
Energy supply		<a href="#">COORETEC-Programme</a>	Research	CO <sub>2</sub>	implemented				
Energy supply		<a href="#">Market Incentives Programme</a>	Economic	CO <sub>2</sub>	implemented		6,000		
Energy supply		<a href="#">CHP Act, Act on maintenance, modernisation and expansion of CHP 2002</a>	Economic	CO <sub>2</sub>	implemented		4,000		
Energy supply		<a href="#">Renewable energies in agriculture</a>	Economic	CH <sub>4</sub> CO <sub>2</sub>	implemented		4,000		
Energy supply		<a href="#">Biofuels</a>	Fiscal	CO <sub>2</sub>	implemented				
Energy consumption		<a href="#">Energy Savings Ordinance ("Energieeinsparverordnung")</a>	Regulatory	CO <sub>2</sub>	implemented		7,200		
Energy consumption		<a href="#">CO2 reduction programme of the Reconstruction Loan Corporation ("Kreditanstalt fuer Wiederaufbau (KfW)")</a>	Economic	CO <sub>2</sub>	implemented	6,000			
Energy consumption		<a href="#">Voluntary commitment of Federal Government to reduce CO2 emissions in federal ministries by 25% in 2005 and by 30% in 2010 ("Selbstverpflichtung der Bundesregierung im eigenen Geschäftsbereich")</a>	Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented				
Energy consumption		<a href="#">Public Housing Assistance Scheme</a>	Economic	CO <sub>2</sub>	implemented				
Energy consumption		<a href="#">KfW programmes to reduce CO2/ space heating and hot water segments</a>	Economic	CO <sub>2</sub>	implemented		8,400		
Energy consumption		<a href="#">Atmosfair</a>	Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented				
Energy consumption		<a href="#">Measures and independend savings outside the KfW programmes</a>	Regulatory	CO <sub>2</sub>	implemented		3,200		
Transport		<a href="#">Change of petroleum tax law</a>	Fiscal	CO <sub>2</sub>	implemented		5,000		
Transport		<a href="#">Promotion of cars powered by natural gas</a>	Economic	CO <sub>2</sub>	implemented				
Transport		<a href="#">Reduction in average fuel consumption of new cars</a>	Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented		10,000		
Transport		<a href="#">Distance based motorway tolls for heavy duty vehicles (Schwerlastabgabe)</a>	Economic	CO <sub>2</sub>	implemented		1,000		
Transport		<a href="#">Modern driving campaign</a>	Information	CO <sub>2</sub>	implemented	5,000			

<u>Sector</u>	<u>Projection Scenario</u>	<u>Name</u>	<u>Type</u>	<u>GHG</u>	<u>Status</u>	<u>Absolute Reduction [kt CO<sub>2</sub> eq. p.a.]</u>			<u>Costs [EUR/t]</u>
						<u>2005</u>	<u>2010</u>	<u>2020</u>	
Transport		<a href="#">Energy efficient equipment in new cars</a>	Voluntary/ negotiated agreement	CO <sub>2</sub>	implemented	4,000			
Transport		<a href="#">Promoting the use of zero sulphur fuels</a>	Fiscal	CO <sub>2</sub>	implemented		2,000		
Transport		<a href="#">Integrated transport planning</a>	Regulatory Research	CO <sub>2</sub>	implemented				
Transport		<a href="#">Promotion of cycling</a>	Planning	CO <sub>2</sub>	implemented		1,000		
Transport		<a href="#">Energy consumption labelling obligations for cars</a>	Information	CO <sub>2</sub>	implemented				
Transport		<a href="#">Emission-based road tax for cars</a>	Fiscal	CO <sub>2</sub>	implemented		1,000		
Transport		<a href="#">Promotion of renewable energy sources</a>		CO <sub>2</sub>	implemented		3,000		
Transport		<a href="#">Campaign on climate protection in the transport sector</a>	Information	CO <sub>2</sub>	implemented		2,000		
Industrial Processes		<a href="#">Modernisation of aluminium industry</a>	Voluntary/ negotiated agreement	PFC	implemented		1,200		
Industrial Processes		<a href="#">Provision for the scrapping of electronic utilities</a>	Voluntary/ negotiated agreement	SF <sub>6</sub>	implemented		300		
Industrial Processes		<a href="#">Non-use of SF6 for filling car tyres</a>	Regulatory Voluntary/ negotiated agreement	SF <sub>6</sub>	implemented		700		
Industrial Processes		<a href="#">Replacement of SF6 as a shielding gas in magnesium production</a>	Regulatory Voluntary/ negotiated agreement	SF <sub>6</sub>	Other		500		
Industrial Processes		<a href="#">Semiconductor production</a>	Regulatory	HFC PFC SF <sub>6</sub>	implemented		600		
Agriculture		<a href="#">Common Agriculture Policy</a>	Economic	CH <sub>4</sub> N <sub>2</sub> O	implemented				
Agriculture		<a href="#">Federal Nature Conservation Act</a>	Regulatory	CO <sub>2</sub>	implemented				
Agriculture		<a href="#">Assistance Programme for agricultural investments</a>	Economic	CH <sub>4</sub> CO <sub>2</sub>	implemented				

<u>Sector</u>	Projection Scenario	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]			<u>Costs [EUR/t]</u>
						2005	2010	2020	
Agriculture		<a href="#">Expansion of organic farming</a>	Economic	N <sub>2</sub> O CH <sub>4</sub> CO <sub>2</sub> N <sub>2</sub> O	implemented				
Agriculture		<a href="#">Soil conservation</a>	Regulatory	N <sub>2</sub> O	implemented				
Agriculture		<a href="#">Agro-environmental measures</a>	Other	CH <sub>4</sub> CO <sub>2</sub> N <sub>2</sub> O	implemented				
Agriculture		<a href="#">Package of measures in the agricultural sector</a>		CH <sub>4</sub> N <sub>2</sub> O	implemented		1,800		
Forestry		<a href="#">National forest policy</a>	Economic Regulatory	CO <sub>2</sub>	implemented	30,000	30,000		
Forestry		<a href="#">Wood charta</a>	Information	CO <sub>2</sub>	implemented				
Waste		<a href="#">Waste Wood Ordinance</a>	Regulatory	CH <sub>4</sub> CO <sub>2</sub>	implemented				
Waste		<a href="#">Waste Deposition Ordinance and Technical Instruction on municipal waste (TASi)</a>	Regulatory	CH <sub>4</sub> CO <sub>2</sub>	implemented				

## Policies and measures in the “with additional measures” projection

<u>Sector</u>	<u>Projection Scenario</u>	<u>Name</u>	<u>Type</u>	<u>GHG</u>	<u>Status</u>	<u>Absolute Reduction [kt CO<sub>2</sub> eq. p.a.]</u>			<u>Costs [EUR/t]</u>
						<u>2005</u>	<u>2010</u>	<u>2020</u>	
Energy consumption		<a href="#">Improvement of ERP, DtA and KfW credit programmes</a>	Economic	CO <sub>2</sub>	planned				
Transport		<a href="#">Anti-traffic-jam programme</a>	Regulatory	CO <sub>2</sub>	planned	500			
			Research						
Industrial Processes		<a href="#">Stationary and mobile air-conditioning systems</a>	Regulatory	HFC	planned		4,000		
Industrial Processes		<a href="#">Replacement of metering aerosols containing HFC</a>	Economic	HFC	planned		500		
Industrial Processes		<a href="#">Substitution of SF6 in sound insulation windows</a>	Economic	SF <sub>6</sub>	planned		1,000		
			Education						
Industrial Processes		<a href="#">Fluorinated Greenhouse Gases</a>	Regulatory	HFC PFC SF <sub>6</sub>	planned				

Source: Öko Institut, (accessed 14/06/2007), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>



## 7. EVALUATION OF PROJECTIONS

Table 6 shows the results of the projections for the year 2010 for the “with measures” and the “with additional measures” variant. The results are differentiated by greenhouse gas. The same information differentiated by sector is presented in Table 7; table 8 shows a breakdown by sector *and* gas.

Figure 1 demonstrates the share of greenhouse gas emissions by sector for the year 2010 according to the “with existing measures” projections. In Table 9, the total emissions of the projections for the years 2010, 2015 and 2020 for the “with additional measures” variant are summarised.

In Table 10 the results of the target assessment are shown and a comparison of 2010 projections in 2005, 2006 and 2007 is made. In the 2007 “with measures” scenario, the projected 2010 total GHG emissions will be 1.4% below the Kyoto target, overachieving the target by approximately 14.7 Mt CO<sub>2</sub>-eq annually for reaching Germany’s Kyoto target (-21%). In the “with additional measures” scenario, emissions are projected to be 25.7% below the base year level. Germany does not plan to make use of the flexible mechanisms (JI and CDM) in the first commitment period under the Kyoto Protocol.

**Table 6. Summary of projections by gas in 2010 (Mt CO<sub>2</sub>-eq.)**

	Base year <sup>a</sup>	With measures	With additional measures
Carbon dioxide (excl. LUCF)	1032.3	830.7	793.1
Methane	99.3	46.0	45.9
Nitrous oxide	84.4	62.6	62.3
HFCs	6.6	11.0	9.4
PFCs	1.7	0.6	0.6
SF <sub>6</sub>	7.2	4.4	3.2
<b>Total (excl. LUCF)</b>	<b>1231.5</b>	<b>955.4</b>	<b>914.5</b>
% change relative to base year (excl. LUCF)		-22.4%	-25.7%

<sup>a</sup> For CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O the base year is 1990; for HFCs, PFCs and SF<sub>6</sub> the base year is 1995.

Source: Submission of 4 September 2007 under Decision 280/2004/EC (Monitoring Mechanism)

**Table 7. Summary of projections (6 gas basket) by sector in 2010 (Mt CO<sub>2</sub>-eq.)**

	Base year	with measures	% change relative to base year	with additional measures	% change relative to base year
<b>Energy (total, excluding transport)</b>	796.2	607.2	-24%	584.6	-27%
Energy Industries	419.8	338.7	-19%	322.9	-23%
Manufacturing Industries and Construction	156.3	92.2	-41%	91.7	-41%

## Germany

Other	220.0	176.3	-20%	169.9	-23%
<b>Transport (energy, national)</b>	164.4	157.4	-4%	142.4	-13%
<b>Fugitive Emissions from Fuels</b>	27.2	14.7	-46%	14.5	-47%
<b>Industrial Processes</b>	123.5	104.9	-15%	101.7	-18%
Mineral Products	22.6	18.9	-16%	18.9	-16%
Chemical Industry	35.6	29.0	-19%	28.7	-19%
Metal Production	51.5	41.5	-20%	41.3	-20%
Production of Halocarbons and SF6	4.4	0.0	-100%	0.0	-100%
Consumption of Halocarbons and SF6	9.4	13.5	43%	12.0	27%
Other	0.0	2.1		0.8	
<b>Solvents</b>	2.1	1.2	-44%	1.2	-44%
<b>Agriculture</b>	77.7	59.7	-23%	59.7	-23%
Enteric Fermentation	24.1	19.9	-17%	19.9	-17%
Manure Management	10.0	5.1	-49%	5.1	-49%
Agricultural Soils	43.6	34.7	-20%	34.7	-20%
<b>Waste management.</b>	40.4	10.3	-74%	10.3	-74%
Solid Waste Disposal on Land	35.9	6.9	-81%	6.9	-81%
Waste-water Handling	4.4	2.4	-47%	2.4	-47%
Other	0.1	1.0	1537%	1.0	1537%
<b>Total (excl. LUCF)</b>	<b>1 231.5</b>	<b>955.4</b>	<b>-22%</b>	<b>914.5</b>	<b>-26%</b>

Source: Submission of 4 September 2007 under Decision 280/2004/EC (Monitoring Mechanism)

Table 8. Summary of projections by sector and by gas in 2010 (Mt CO<sub>2</sub>-eq.) compared to base year emissions

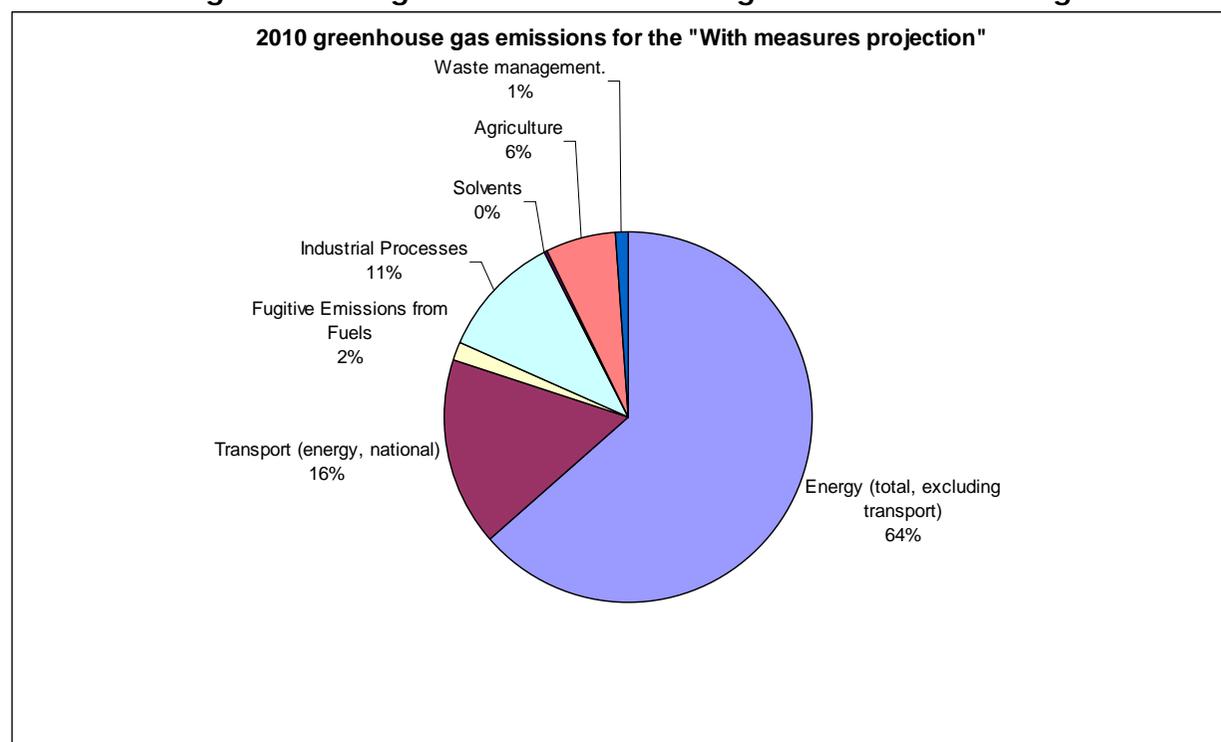
	Carbon Dioxide			Methane			Nitrous Oxide			F-gases (SF <sub>6</sub> , HFCs and PFCs)		
	Base year <sup>a</sup>	With measures	With additional measures	Base year <sup>a</sup>	With measures	With additional measures	Base year <sup>a</sup>	With measures	With additional measures	Base year <sup>a</sup>	With measures	With additional measures
<b>Energy (total, excluding transport)</b>	785.7	601.0	578.5	3.2	1.0	1.1	7.2	5.2	5.0	NA	NA	NA
Energy Industries	415.1	335.0	319.3	0.2	0.1	0.1	4.6	3.6	3.5	NA	NA	NA
Manufacturing Industries and Construction	154.5	91.2	90.7	0.2	0.1	0.1	1.6	0.9	0.9	NA	NA	NA
Other	216.1	174.8	168.5	2.8	0.8	0.8	1.1	0.7	0.7	NA	NA	NA
<b>Transport (energy, national)</b>	162.5	155.9	141.1	1.3	0.2	0.2	0.7	1.3	1.2	NA	NA	NA
<b>Fugitive Emissions from Fuels</b>	0.0	0.0	0.0	27.2	14.7	14.5	NA	NA	NA	NA	NA	NA
<b>Industrial Processes</b>	84.2	73.8	73.5	0.0	0.0	0.0	23.8	15.1	15.1	15.5	16.1	13.2
Mineral Products	22.6	18.9	18.9	NE	NO	NO	NE	NO	NO	NA	NA	NA
Chemical Industry	11.8	13.9	13.7	0.0	0.0	0.0	23.8	15.1	15.1	NA	NA	NA
Metal Production	49.8	41.0	41.0	0.0	0.0	0.0	NO	NO	NO	1.7	0.5	0.3
Production of Halocarbons and SF <sub>6</sub>	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.4	IE	IE
Consumption of Halocarbons and SF <sub>6</sub>	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4	13.5	12.0
Other	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	2.1	0.8
<b>Solvents</b>	NE	NO	NO	NE	NO	NO	2.1	1.2	1.2		NO	NO
<b>Agriculture</b>	0.0	0.0	0.0	29.3	22.5	22.5	48.4	37.2	37.2	NA	NA	NA
Enteric Fermentation	NE			24.1	17.5	17.5	NE	2.5	2.5	NA	NA	NA
Manure Management	NE			5.9	5.1	5.1	4.1	0.0	0.0	NA	NA	NA
Agricultural Soils	NO			-0.7	0.0	0.0	44.3	34.7	34.7	NA	NA	NA

<b>Waste management.</b>	0.0	0.0	0.0	38.2	7.5	7.6	2.2	2.7	2.7	NA	NA	NA
Solid Waste Disposal on Land	NE	NO	NO	35.9	6.9	6.9	0.0	NO	NO	NA	NA	NA
Waste-water Handling		NO	NO	2.2	0.1	0.1	2.2	2.3	2.3	NA	NA	NA
Other	NO	NO	NO	0.0	0.5	0.6	0.0	0.4	0.4	NA	NA	NA
<b>Total (excl. LUCF)</b>	<b>1 032.3</b>	<b>830.7</b>	<b>793.1</b>	<b>99.3</b>	<b>46.0</b>	<b>45.9</b>	<b>84.4</b>	<b>62.6</b>	<b>62.3</b>	<b>15.5</b>	<b>16.1</b>	<b>13.2</b>

<sup>a</sup> For CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O the base year is 1990; for HFCs, PFCs and SF<sub>6</sub> the base year is 1995.

Source: Submission of 4 September 2007 under Decision 280/2004/EC (Monitoring Mechanism)

**Figure 1. Share by sector of 2010 greenhouse gas emissions according to the "with existing measures" projections**



**Table 9. Summary of projections (6 gas basket) in 2010, 2015 and 2020 for the 'with additional measures' projections (Mt CO<sub>2</sub>-eq.)**

	Base year <sup>a</sup>	2010	2010, % of base year level	2015	2015, % of base year level	2020	2020, % of base year level
Total (excluding LUCF)	1231.5	914.5	74.3%	809.2	65.7%	738.8	60.0%

<sup>a</sup> For CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O the base year is 1990; for HFCs, PFCs and SF<sub>6</sub> the base year is 1995.

Source: Submission of 4 September 2007 under Decision 280/2004/EC (Monitoring Mechanism)

**Table 10. Assessment of the target (6 gas basket), with a comparison of 2010 projections in 2005, 2006 and 2007 national reports**

	Emissions in MtCO <sub>2</sub> -equiv., excluding LUCF			
	2010 projections from 2005	2010 projections from 2006	2010 projections from 2007	2010 projections from 2007, % of base year level
Base year emissions used for projections	1248.3	1248.3	1231.5	100%
Kyoto Commitment/burden sharing	986.2	986.2	972.9	-21.0%
With existing P&Ms projections	1000.9	1000.9	955.4	77.6%
Gap (negative means overachievement of target)	14.7	14.7	-17.6	-1.4%
With additional P&Ms projections	985.7	985.7	914.5	74.3%
Remaining gap	-0.5	-0.5	-58.4	-4.7%

The above table excludes LUCF. LUCF will be covered in the main report, based on submissions of the questionnaire. The source for the 2005 and 2006 data is Germany's Monitoring Mechanism Submission of August 2005. Source for 2007 data is the Submission of 4 September 2007 under Decision 280/2004/EC (Monitoring Mechanism).

\* Base year data is almost consistent with data reported in *The European Community's initial report under the Kyoto Protocol - Report to facilitate the calculation of the assigned amount of the European Community pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol (Submission to the UNFCCC Secretariat)*, EEA Technical report No 10/2006 (1.232,5 MtCO<sub>2</sub>.eq). This data is currently undergoing a review procedure by UNFCCC and is therefore subject to change.

In Table 11 a comparison is drawn with regard to the projections for the trading sector between the “with measures” scenario and the NAP 2. NAP 2 projections show 3.5% higher emissions than the scenario submitted for this report. In the NAP 2, the projections are not differentiated by the energy and industry sectors; rather, only total CO<sub>2</sub> emissions are provided.

**Table 11. Comparison with projections for the trading sector (EU ETS)**

	<b>4<sup>th</sup> NC (with measures)</b>	<b>NAP 2 projections</b>	<b>Difference</b>
Energy sector	426.2 <sup>a</sup>	not differentiated	--
Energy sector included in EU ETS	--		--
Industry sector	73.8 <sup>b</sup>		--
Industry sector included in EU ETS	--		--
<b>Total Energy &amp; Industry</b>	<b>500.0</b>	<b>517.5<sup>c</sup></b>	<b>3.5%</b>

Energy use from industry is normally included in the energy sector in projections under the UNFCCC and included in the industry sector for NAP 2 projections. Due to these and other differences in the sector definitions, projections for the individual sectors might not be comparable.

<sup>a</sup> CO<sub>2</sub> emissions from energies as well as manufacturing industries and construction.

<sup>b</sup> CO<sub>2</sub> emissions from industrial processes.

<sup>c</sup> CO<sub>2</sub> emissions from the energy and industry.

## 8. DESCRIPTION OF MODELLING APPROACH

### Overview of modelling approach

For the scenario development, an energy system model is deployed, with the help of which the results of detailed – and in part, model-based – sectoral analyses are consolidated to a consistent and comprehensive data set for the energy-economic development. Specific analyses are undertaken for the sectors of space heating and warm water, electrical devices, transport and electricity production from renewable energies as well as from fossil fuels. For the remaining source sectors, the results of other analyses were adopted or incorporated.

The results of the energy-economic modelling constitute - together with supplementary and partially model-based analyses for industrial processes, product use as well as waste management - the basis for the detailed calculation of greenhouse gas emissions. The latter are determined in a way suitable to the structure and emissions levels of the current German greenhouse gas inventory.

The scenario development and assessment of measures are undertaken in such a way that broadly satisfies the requirements of the Projection Report in view of the emission results, as well as background parameters and indicators; a high degree of transparency and comparability is also ensured in the process.

The methodology used is described in full detail in “Policy Scenarios for Climate Protection, Volume 4: Methodological Guideline for Assessing the Impact of Measures for Emission Mitigation”; Study commissioned by the Federal Environment Ministry; authors: DIW, FZJ, Fraunhofer-ISI, Öko-Institut, 1998.

### Sensitivity analysis

Very limited sensitivity assessment for some sectors has been undertaken, e.g. an analysis of different carbon prices on the development in the electricity generation sector. No overall sensitivity analysis was performed and no alternative scenarios calculated..

### Details of the uncertainty assessment

There was no assessment of the uncertainty in 4<sup>th</sup> NC or “Politikszenerarien III”.

## 9. PROJECTION INDICATOR REPORTING

In addition to information about absolute emissions relative indicators such as emissions per unit of GDP or emissions per passenger kilometre can be used to assess the underlying reasons for changes in emission trends. Table 12 provides an overview of the indicators for assessing the effectiveness of policies and measures for the “with measures” forecast by 2010.

## 10. REPORTING OF PARAMETERS ON PROJECTIONS

Important drivers for emission projections such as population, oil prices or GDP growth are normally not part of the projections but provided as input parameters from other sources. In “Politikszenerarien IV”, the parameters and growth assumptions used for the projections are documented in good detail. Most mandatory indicators are provided for the years 2010 and 2020 and for the energy, industry and transport sectors as well as the assumptions for buildings

An overview of the model parameters is provided in Table 13.

Table 12. Indicators for projections to monitor and evaluate progress with policies and measures (2005/166/EC) Annex III

Description of Indicators					<i>With Measures</i>			
No	Nomenclature in Eurostat energy efficiency indicators	Indicator	Numerator / denominator	Emissions Base Year (what year is this?)	2005	2010	2015	2020

**Mandatory Indicators specified in Annex III**

<b>Indicator: Total CO2 intensity of GDP, t/Mio Euro</b>				<b>545</b>	<b>410</b>	<b>344</b>	<b>310</b>	<b>287</b>
1	MACRO	Total CO2 intensity of GDP, t/Mio Euro	Total CO2 emissions, kt	1 032 348	873 107	793 311	772 089	767 054
			GDP, Bio Euro (EC95) or (2000)	1 895	2 129	2 305	2 487	2 669
<b>Indicator: Passenger Car CO2 Gg/Mvkm)</b>				<b>No Data</b>	<b>No Data</b>	<b>0.15754599</b>	<b>No Data</b>	<b>0.142109071</b>
2	TRANSPORT C0	Passenger Car CO2 Gg/Mvkm)	CO2 emissions from passenger cars, kt	109 541	104 340	95 946	NA	93 934
			Number of kilometres by passenger cars, Mkm	NA	NA	609 000	NA	661 000
<b>Indicator: Freight Transport CO2 (Gg/Mtkm)</b>				<b>No Data</b>	<b>No Data</b>	<b>0.069366152</b>	<b>No Data</b>	<b>0.057790549</b>
3	TRANSPORT D0	Freight Transport CO2 (Gg/Mtkm)	CO2 emissions from freight transport (All modes), kt	39 496	45 843	41 897	NA	42 245
			Freight transport (All modes),	NA	NA	604 000	NA	731 000

			Mtkm					
<b>Indicator: Energy related CO2 intensity of industry, t/Mio Euro</b>				<b>No Data</b>	<b>224</b>	<b>192</b>	<b>156</b>	<b>140</b>
4	INDUSTRY A1	Energy related CO2 intensity of industry, t/Mio Euro	CO2 emissions from fossil fuel combustion in industry, kt	154 482	102 945	91 179	79 414	75 988
			Gross value-added total industry, Bio Euro (EC95) or (2000)	NA	460	474	508	542
<b>Indicator: Specific CO2 emissions of households, t/dwelling</b>				<b>3.671603163</b>	<b>2.885081857</b>	<b>2.910400702</b>	<b>2.765372859</b>	<b>2.628572322</b>
5	HOUSEHOLDS A.1	Specific CO2 emissions of households, t/dwelling	CO2 emissions from fossil fuel consumption households, kt	129 446	113 032	115 441	110 181	105 198
			Stock of permanently occupied dwellings, 1000	35 256	39 178	39 665	39 843	40 021
<b>Indicator: CO2 intensity of the Service Sector, t/Mio Euro</b>				<b>No Data</b>	<b>37.71081401</b>	<b>38.48212316</b>	<b>33.07696847</b>	<b>28.46456207</b>
6	SERVICES A0	CO2 intensity of the Service Sector, t/Mio Euro	CO2 emissions from fossil fuel consumption in services, kt	86 693	53 239	59 367	55 189	51 074

			Gross value-added services, Bio Euro (EC95) or (2000)	NA	1 412	1 543	1 669	1 794
<b>Indicator: Specific CO2 emissions of public and autoproducer power plants, t/TJ</b>				<b>0.799574185</b>	<b>0.612660217</b>	<b>0.523362553</b>	<b>0.518969777</b>	<b>0.538524932</b>
7	TRANSFORMATION B0	Specific CO2 emissions of public and autoproducer power plants, t/TJ	CO2 emissions from public and autoproducer thermal power stations, kt	439 665	369 377	319 635	312 201	321 491
			All products – output by public and autoproducer thermal power stations, PJ	549 874	602 906	610 733	601 578	596 984
<b>Indicator: Specific N2O emissions of fertiliser and manure use, kg/kg</b>				<b>No Data</b>				
8	AGRICULTURE	Specific N2O emissions of fertiliser and manure use, kg/kg	N2O emissions from synthetic fertiliser and manure use, kt					

			Use of synthetic fertiliser and manure, kt nitrogen					
<b>Indicator: Specific CH 4 emissions of cattle production, kg/head</b>				<b>No Data</b>	<b>No Data</b>	<b>No Data</b>	<b>No Data</b>	<b>No Data</b>
9	AGRICULTURE	Specific CH 4 emissions of cattle production, kg/head	CH 4 emissions from cattle, kt					
			Cattle population, 1 000 head					
<b>Indicator: Specific CH 4 emissions from landfills, kt/kt</b>				<b>0.028488372</b>	<b>0.381538462</b>	<b>No Data</b>	<b>No Data</b>	<b>No Data</b>
10	WASTE	Specific CH 4 emissions from landfills, kt/kt	CH 4 emissions from landfills, kt	1 225	496	329	226	163
			Municipal solid waste going to landfills, kt	43 000	1 300			

Source: Submission of 4 September 2007 under Decision 280/2004/EC (Monitoring Mechanism)

Table 13. List of parameters on projections (Annex IV of Implementing Provisions<sup>1</sup>)

Activity	Units	Base Year	With Measures			
			2005	2010	2015	2020
<b>Assumptions for general economic parameters:</b>	-	-	-	-	-	-
1a. Gross Domestic Product (GDP 2000 basis)	Value (Euro 2000 basis)	1 895	2 129	2 305	2 487	2 669
1b. Gross Domestic Product growth Rate	Annual growth rate		0.8%	1.6%	1.5%	1.4%
2a Population growth	Thousand People	79 753	82 438	82 411	81 902	81 393
2b Population Growth Rate and Base Year Value	% of 2005 value		0.2%	0.0%	-0.1%	-0.1%
3. International coal prices	€ per tonne or GJ (Gigajoule)	1.66	2.11	1.81	1.79	1.77
4. International oil prices	€ per barrel or GJ	3.35	7.00	8.25	8.13	8.02
5. International gas prices	€ per m3 or GJ	2.29	4.27	4.44	4.31	4.17
<b>Assumptions for the energy sector:</b>	-	-	-	-	-	-
6. Total gross inland consumption		13 119	12 071	12 285	12 041	12 211
6a. - Oil (fossil)	Petajoule (PJ)	5 238	4 985	4 939	4 761	4 738
6b. - Gas (fossil)	Petajoule (PJ)	2 316	2 774	2 870	2 824	2 889
6c. - coal	Petajoule (PJ)	5 507	3 700	3 584	3 430	3 391
6d. - Renewables	Petajoule (PJ)	58	612	892	1 027	1 193
6e. - Nuclear (IEA definition for energy calc.)	Petajoule (PJ)	1 668	1 864	1 588	1 195	489
6f. Net Electricity import (- +)	Petajoule (PJ)	3				
6g. - Other Please Specify in Column I	Petajoule (PJ)	126	99	118	137	155
Total electricity production		378 155	414 253	445 358	470 062	527 988

<sup>1</sup> Commission Decision of 10<sup>th</sup> February 2005 laying down rules implementing Decision No. 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol.

by fuel type						
7. - Oil (fossil)	Gwhe	10 829	4 600	2 710	819	532
8. - Gas (fossil)	Gwhe	35 909	41 730	45 785	49 841	74 097
9. – coal	Gwhe	311 705	301 033	306 898	312 763	328 419
10. – Renewable	Gwhe	19 712	66 890	89 965	106 638	124 940
11. Nuclear (IEA definition for energy calc.)	Gwhe	152 468	169 606	144 484	108 782	44 504
12. - Other Please Specify in Column I	Gwhe	19 251	19 047	20 891	22 735	24 493
Energy Demand by Sector		7451	12510.3237	12316.4841	11621.9958	11004.1308
13. Energy Industries			5876.88906	5622.92206	5163.16237	4691.81889
13a. Oil (fossil)	Petajoule (PJ)	NA	520	449	404	392
13b. Gas (fossil)	Petajoule (PJ)	NA	219	310	317	441
13c. coal	Petajoule (PJ)	NA	2 984	2 854	2 725	2 719
13d. Renewables	Petajoule (PJ)	NA	290	422	522	651
13e. -- Nuclear (IEA definition for energy calc.)	Petajoule (PJ)	NA	1 864	1 588	1 195	489
13e. - Other Please Specify in Column I	Gwhe	NA	14 313	12 495	11 665	11 855
14. Industry		2128	1490.15	1399.2	1338	1276.8
14a. Oil (fossil)	Petajoule (PJ)	308	179	170	162	155
14b. Gas (fossil)	Petajoule (PJ)	936	847	756	715	674
14c. coal	Petajoule (PJ)	884	446	450	436	421
14d. Renewables	Petajoule (PJ)	NA	18	23	25	28
14e. - Other Please Specify in Column I	Gwhe	235 833	227 597	229 083	228 972	228 861
15. Commercial (Tertiary)		1193	959.790504	1012.71349	969.906836	928.300186
15a. Oil (fossil)	Petajoule (PJ)	603	379	390	350	311
15b. Gas (fossil)	Petajoule (PJ)	301	544	563	548	536
15c. coal	Petajoule (PJ)	289	28	47	44	41
15d. Renewables	Petajoule (PJ)	NA	9	13	27	41
15e. - Other Please Specify in Column I	Gwhe	154 444	154 015	153 812	150 102	146 392

16. Residential		1801	1952.95	2019.30918	1951.27724	1885.86916
16a. Oil (fossil)	Petajoule (PJ)	740	659	677	649	622
16b. Gas (fossil)	Petajoule (PJ)	633	1 059	1 076	1 023	973
16c. coal	Petajoule (PJ)	428	45	47	44	43
16d. Renewables	Petajoule (PJ)	NA	190	220	235	249
16e. - Other Please Specify in Column I	Gwhe	161 667	190 406	194 899	189 244	183 981
17. Transport		2329	2230.54418	2262.33938	2199.64931	2221.34252
17a. Oil (fossil)	Petajoule (PJ)	2 329	2 108	2 018	1 928	1 926
17b. Gas (fossil)	Petajoule (PJ)		1	6	27	48
17d. Renewables	Petajoule (PJ)	NA	122	238	244	248
17e. - Other Please Specify in Column I	Gwhe	13 611	37 080	36 078	36 231	36 402
<b><u>Assumptions on weather parameters</u></b>						
18a. Heating Degree Days	Annual HDD	NE	NE	NE	NE	NE
18b. Cooling Degree Days	Annual CDD	NE	NE	NE	NE	NE
<b><u>Assumptions for the Industry Sector (for industrial sectors contributing significantly to the national total for the base or target year)</u></b>						
19. Gross value-added total industry, Bio Euro (EC95) 2000 . For Member States using Macroeconomic Models:	Value (Euro 2000 basis)	NA	460	474	508	542
20. The share of the industrial sector in GDP . ...A row for each industrial sector....	Value (Euro 2000 basis)					
21. The growth of the industrial sector in GDP	Growth in Value (Euro 2000 basis)/year					
Value (Euro 2000 basis)						

. For Member States using other models:						
22. The production index for Industrial Sector: (suggested split is energy intensive industry based on physical production and manufacturing industry based on monetary value)						
<i>Mining and quarrying</i>	2000 = 100	NA	NA	90	90	90
<i>Food and tobacco</i>	2000 = 100	NA	NA	101	105	108
<i>Pulp and paper</i>	2000 = 100	NA	NA	102	104	105
<i>Basic chemicals</i>	2000 = 100	NA	NA	107	113	119
<i>Other chemical industry</i>	2000 = 100	NA	NA	114	124	133
<i>Rubber and plastic products</i>	2000 = 100	NA	NA	112	121	129
<i>Glass, ceramics</i>	2000 = 100	NA	NA	88	88	88
<i>Mineral products</i>	2000 = 100	NA	NA	80	79	77
<i>Ferrous metals</i>	2000 = 100	NA	NA	100	98	95
<i>Non-ferrous metals</i>	2000 = 100	NA	NA	104	107	110
<i>Metal products</i>	2000 = 100	NA	NA	113	123	132
<i>Machinery</i>	2000 = 100	NA	NA	116	133	149
<i>Motor vehicles and transport equipment</i>	2000 = 100	NA	NA	122	132	142
<b>Assumptions for the transport sector</b>	-	-	-	-	-	-
. For Member States using macroeconomic models:						
23. The growth of transport relative to GDP	Gg fuel consumed/GDP					
. For Member States using other models:						
24a. Growth of Passenger person kilometres	Million passenger km	NA	NA	1 086 000	NA	1 153 000
24b. Number of kilometres by passenger cars, Mkm	Mkm	NA	NA	609 000	NA	661 000

25a. The growth of freight tonne kilometres	Million tonne km	NA	NA	604 000	NA	731 000
25b. Freight transport (all modes), Mtkm	Mtkm	NA	NE	NE	NE	NE
<b>Assumptions for buildings (in residential and commercial or tertiary sector)</b>	-	-	-	-	-	-
26. Gross value-added — services, Bio Euro (EC95)	Value (Euro 2000 basis)	NA	1 412	1 543	1 669	1 794
. For Member States using macroeconomic models:						
27. The level of private consumption (excluding private transport)	Value (Euro 2000 basis)					
28. The share of the tertiary sector in GDP and the growth rate (Implied Commercial GDP)	Value (Euro 2000 basis)					
. For Member States using other models:						
. The rate of change of floor space for tertiary buildings and dwellings						
29. Average floor space per dwelling	M <sup>2</sup> /dwelling	NA	NA	NA	NA	NA
30. Average Floor space per employee	M <sup>2</sup> /Employee	NA	NA	NA	NA	NA
. The number of dwellings and number of employees in the tertiary sector						
31a. The number of dwellings	1000 dwellings	35256	39178	39665	39843	40021
31b. Number of employees in the tertiary sector	1000 employees	NA	NA	29963	30267	30571

<b>Assumptions in the agriculture sector</b>	-	-	-	-	-	-
. For Member States using macroeconomic models:						
32. The share of the agriculture sector in GDP and relative growth	Value (Euro 2000 basis)					
. For Member States using other models:						
. The livestock numbers by animal type						
33. Total Cattle						
33a. Dairy cattle	1000 heads					
33b. Non-dairy cattle	1000 heads					
34. sheep	1000 heads					
35. swine	1000 heads					
36. poultry	1000 heads					
37. Other, please specify	1000 heads					
38. The area of crops by crop type						
. ... Please add rows and specify crop type....	Hectares					
39. Fertilizer Used (Synthetic & Manure)	kt Nitrogen					
. The emissions factors						
40. enteric fermentation Dairy cattle	Tonnes CO <sub>2</sub> e /Thousand Heads					
41. enteric fermentation Non-dairy cattle	Tonnes CO <sub>2</sub> e /Thousand Heads					
42. enteric fermentation sheep	Tonnes CO <sub>2</sub> e /Thousand Heads					

43. manure management Dairy cattle	Tonnes CO2e /Thousand Heads					
44. manure management Non-dairy cattle	Tonnes CO2e /Thousand Heads					
45. manure management sheep	Tonnes CO2e /Thousand Heads Consistent Units					
46. manure management Swine	Tonnes CO2e /Thousand Heads					
47. manure management Poultry	Tonnes CO2e /Thousand Heads					
48. fertilizer use & Crops						
. ... Please add rows and specify fertilizer type....	kg N2O-N/kg N					
. ... Please add rows and specify crop type and pollutant....	tonne by crop type					
<b>. Assumptions in the waste sector</b>	-	-	-	-	-	-
49. Municipal solid waste generation	kt	55 000	40 900	40 900	40 900	40 900
50. The organic fraction of municipal solid waste	%	26%	28%	28%	28%	28%
51. Municipal solid waste disposed to landfills	%	78%	3%			
52. Municipal solid waste disposed incinerated	%	16%	38%	46%	46%	46%
53. Municipal solid waste disposed composted	%	NA	35%	48%	48%	48%
54. Municipal solid waste disposed to landfills	kt	<b>43000</b>	<b>1300</b>	-	-	-

<b>Assumptions in the Forestry Sector</b>	-	-	-	-	-	-
55. Forest Definitions	Text..	add definition text here.....				
56. Area of Managed Forest	Hectares					
57. Area of Unmanaged Forest	Hectares					

Source: Submission of 4 September 2007 under Decision 280/2004/EC (Monitoring Mechanism)

## 11. COUNTRY CONCLUSIONS

Germany's submission under the monitoring mechanism 4<sup>th</sup> National Communication provides comprehensive information on policies and measures. The projections are based on a submission under the monitoring mechanism in 2007. The new projections give a detailed breakdown by sector and gas and the different scenarios use consistent assumptions.

In the presented "with measures" scenario, Germany will meet its target under the burden sharing agreement. In the "with additional measures" variant Germany will overshoot the required reduction by 58 Mt CO<sub>2</sub> eq.