

Germany

Sources of information

This report is mainly based on the German Monitoring Report 2001 ('Bericht 2001 der Bundesrepublik Deutschland über ein System zur Beobachtung der Emissionen von CO₂ und anderen Treibhausgasen –entsprechend der Ratsentscheidung 1999/296/EG'). The Monitoring Report 2001 does not exist in English. Therefore, the German version was analysed. The Monitoring Report 2001 has been recently submitted to the European Commission to fulfill Germany's reporting obligations in accordance with the Council Decision 1999/296/EC. The Monitoring Report 2001 is based on political scenarios of recent years such as:

- 'Politiksznarien für den Klimaschutz I, Volume 1 (1997): Szenarien und Maßnahmen zur Minderung von CO₂-Emissionen in Deutschland bis zum Jahre 2005.' Study commissioned by the Federal Environment Ministry; authors: DIW, FZJ, Fraunhofer-ISI, Öko-Institut;
- 'Politiksznarien für den Klimaschutz I, Volume 2 (1997): Emissionsminderungsmaßnahmen fuer Treibhausgase, ausgenommen energiebedingtes CO₂.' Study commissioned by the Federal Environment Ministry; authors: DIW, FZJ, Fraunhofer-ISI, Öko-Institut, and
- 'Politiksznarien für den Klimaschutz II (1999).' Study commissioned by the Federal Environment Ministry; authors: DIW, FZJ, Fraunhofer-ISI, Öko-Institut – for description of the CO₂ projection model used in the Monitoring Report 1999.

Additional sources of information have also been used:

- National Climate Protection Programme (CPP) of Germany. The Climate Protection Programme was published in October 2000. It contains a comprehensive set of P&Ms designed to bring Germany towards its 25 % national CO₂ reduction goal for 2005. The English summary of this programme was analysed, and for additional information the long German version was used. A long version in English does not exist yet.
- Member State Analysis 2001 in accordance with the Council Decision 1999/296/EC. A report produced for European Commission DG Environment by AEA Technology and FhG-ISI. October 2001 (abbreviated MSA 2001 in the report).

Furthermore, the Federal Government has commissioned studies for a review of data in order to be in line with new implemented policies, such as ecological tax reform and phasing out nuclear power. In particular, the Federal Government's decision to phase out nuclear power has been neither taken into account in the Monitoring Report 2001 nor in the Climate Protection Programme 2000, as yet.

Quality and transparency of reporting

The Monitoring Report 2001 (abbreviated MR 2001 in this report) and the Climate Protection Programme 2000 (abbreviated CPP 2000) are the basis for the initial analysis in this section.

Table 1: Information provided on policies and measures (from MR 2001 and CPP 2000)

Information provided	Level provided	Comments
Policy names	++	
Objectives of policies	+	Not always stated in MR 2001 and CPP 2000.
Which GHGs?	CO ₂ , CH ₄ , N ₂ O, HFC, PFC, SF ₆	
Status of implementation	++	In most cases stated in MR 2001. (Mostly) planned implementation dates in CPP 2000.
Implementation body specified	+	Not specified in MR 2001, sometimes in CPP 2000.
Quantitative assessment of implementation	+	In most cases stated.
Interaction with other P&Ms discussed	+	Only in very few cases stated in CPP 2000.

+, ++, +++ level of information available increases as the number of + signs increases

In the Monitoring Report 2001 inventory data for all six Kyoto greenhouse gases and NO_x, NMVOCs, CO, SO₂ is presented for the years between 1990 and 2000. The data for 1996–2000 are preliminary at this stage. Projections for the six greenhouse gases are presented for 2005 and 2010. Projections for 2020 are not given.

Table 2: Information provided on projections (from MR 2001 and MSA 2001)

Category of information	Level of information provided	Comments
Scenarios considered	++	<p>'With measures': Politikszenerarien II, Referenzszenario (for energy related CO₂); Politikszenerarien I, Band 2 (for all CH₄ and N₂O and process related CO₂); <i>Emissions and mitigation potentials of HFC, PFC and SF₆ from Schwarz and Leisewitz(cf. MSA 2001).</i></p> <p>'With additional measures': For F-gases: Emissions and mitigation potentials of HFC, PFC and SF₆ from Schwarz and Leisewitz (cf. MSA 2001).</p> <p>('Without measures' can be obtained from Politikszenerarien I, Band 1, but is not quoted in MR 2001 or CPP 2000). It is given in MR 2001.</p>
Expressed relative to inventory for previous years	++	
Starting year	1990	
Split of projections	++	For projections sector definitions according to IPCC inventory guidelines are given. However, for policies and measures different sector definitions are used. A relatively detailed split exists in the underlying IKARUS model (see later).
Presentation of results	++	
Description of model (level of detail, approach and assumptions)	++	MR 2001: Clear and short description, but no statement of date up to which P&Ms are included, and how they were included. CPP 2000: no model descriptions.
Discussion of uncertainty		Not given
Details of parameters and assumptions		Not given, parameters and assumptions of MSA 2001 were used.

+, ++, +++ level of information available increases as the number of + signs increases

Assessment of policies and measures

The National Climate Protection Programme (CPP) was published in Autumn 2000 and includes several P&Ms that up to now (Spring 2002) have been adopted or implemented. The CPP 2000 mainly refers to the national 25 % CO₂ reduction goal until 2005, which more ambitious than the Kyoto target of 21 % by 2010 for all six Kyoto gases. Furthermore, major political decisions have been taken in the time period 1998 to 2001 — namely ecological tax reform, Renewable Energy Sources Act and financial support programmes for renewable energy investments. Consequently, the Monitoring Report 2001 refers to all of them. However, it remains uncertain whether the projections given in MR 2001 fully include these recent policies and measures. The MR 2001 notes that the projections are currently under revision.

Whereas the CPP contains sub-targets for main sectors, for instance transport (15–20 Mt CO₂), private households and buildings (18–25 Mt CO₂) and industry/energy supply (20–25 Mt CO₂), the MR 2001 does not. The idea of the CPP was that concerned Ministries have to

achieve the sub-targets in their own area of influence, and in principle with political instruments of their own choice. If a Ministry feels unable to fulfil its sub-target, it should motivate another Ministry to achieve higher reductions than committed. It remains vaguely whether this idea is still on the political agenda because it is not stated in the MR 2001 as an instrument of implementation.

The MR 2001 splits policies and measures into the following main sectors: industry, residential, transport, energy transformation sector and cross-sectoral issues. The MR 2001 also refers generally to the sectors waste and agriculture whereas the sector ‘commercial and institutional’ given in MR 1999 is no longer explicitly used as category. For comparison reasons the category ‘commercial and institutional’ is still shown in Table 4 but not accounted for in Table 3. It seems important to mention that the reporting structure of Tables 3 and 4 is different to the IPCC guidelines based reporting structure of projections given in Tables 5 and 6.

In MR 2001 no totals that could be used for Table 3 are given. Therefore, Table 3 has been calculated on base of Table 4 figures. In table 4 three categories of policies and measures are presented:

- new in MR 2001,
- still reported (no indication), and
- from the last year report, no more reported in MR 2001.

Please note that only new and still reported policies and measures have been accounted for in Table 3. However, for comparison reasons no more reported policies and measures from the last year report are still presented in Table 4.

The MR 2001 just refers in very few cases –ecological tax reform, nitrate directive- to common and co-ordinated policies and measures (CCPM) of the European Union. Therefore, the link to CCPM has been mostly estimated by the authors of this analysis here. A list of CCPMs referred to in table 4 is given in the annex.

Table 3: Summary of the Effect of Policies and Measures Included in the Projections (MtCO₂-eq.) (only those quantified in the MR 2001, see Tab. 4)

	With measures	With additional measures
Industry	93.25	12.0
Commercial and Institutional	Not given	Not given
Residential	14.0–16.0	Not given
Transport	36.5	Not given
Energy Transformation Sector	49.7–54.7	Not given
Waste	32.4	Not given
Agriculture	3.2	Not given
Cross sectoral	48.2–51.2	Not given
Total	277.25–287.25	12.0

Table 4: Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Policies and measure in the with measures projection									
Industry (new in MR 2001)	Voluntary abandonment of filling tyres with SF ₆ by vehicle industry	Substitution of SF ₆ by air	SF ₆	I	Proposed		2.3		
Industry (new in MR 2001)	Promoting 'contracting' as management tool	Increasing the use of contracting	CO ₂	D	Proposed guideline	Federal government, possibly also other entities	1.0 (by 2005)		
Industry (new in MR 2001)	XPS-rigid foam ('XPS-Hartschäume')	Replacement of HFC with CO ₂ and ethyl alcohol by half of the production, starting in 2000	HFCs	V	Existing	Industry	1.3		
Industry (new in MR 2001)	Provision for the scrapping of electronic utilities ('Vorsorge bei der Verschrottung elektronischer Betriebsmittel')	Emission avoidance and recycling	SF ₆	V	Existing		1.2		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry (new in MR 2001)	Improvement of ERP, DtA and KfW credit programmes	Strengthening economic incentives with regard to energy efficiency	CO ₂	E	Proposed but mentioned in MR 2001 as existing	Federal government together with public financial institutions such as KfW	Not given		
Industry (new in MR 2001)	Training in energy saving and efficiency for SMEs	Increase in energy efficiency		ET	Proposed but mentioned in MR 2001 as existing	Small and middle sized enterprises	Not given		
Industry (new in MR 2001)	Semi-conductor production ('Halbleiterfertigung')	Improving flue gas cleaning by 2000, replacement of old plants with high efficient plants by 2009	HFC	V	Proposed		0.1		
Industry	Energy Savings Ordinance ('Energieeinsparverordnung')		CO ₂	R	Existing, in force February 2002	Federal government	6.0 (by 2005, both industry and small consumption)		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry	Voluntary commitments by German industries	Commitments by Federal Industry Association (BDI) (20 % CO ₂ reduction per output unit until 2005) and by many of its member associations (varying goals)	CO ₂	V	Existing (BDI and many of its member associations since 1996)	Industry associations with federal government; Monitoring by independent research institute RWI	32.5 (by 2005)		No
Industry	Continuation and Improvement of Voluntary commitments by industries	28 % CO ₂ reduction per output unit by 2005; 35 % reduction of all six 'Kyoto gases' per output unit by 2010	All six gases	V	Adopted (November 2000)	Industry associations with federal government;	10.0 CO ₂ plus 10.0 CO ₂ -equiv.		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry	Technical measures for adipic acid production	Agreement of Federal Government with adipic acid manufactures to introduce highly effective technical measures that will reduce N ₂ O emissions	N ₂ O	V	Existing	Industry together with Federal government	28.0		No
Industry	Declaration of German primary aluminium industry	Voluntary commitment to reduce CF ₄ /CF ₆ emissions by 50 % by the year 2005 compared to 1987 level.	PFC	V	Existing	Industry together with Federal government	0,85		No
Industry (from last year report, no more reported in MR 2001)	2 nd Ordinance of Amendment of the Ordinance for Small Firing Installations	Old system must be brought in line with new waste-gas-loss standards.	CO ₂	R	Existing since 1996	Federal government	1.4		Yes (e, m)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry (from last year report, no more reported in MR 2001)	European Recovery Programme (ERP) energy-saving programme (low-interest loans, preferentially directed at SME)	Energy savings, use of renewables and handle / treat of wastewater for facilities and machinery of commercial enterprises are supported.	CO ₂	E	Existing	Deutsche Ausgleichsbank (DtA)/ Federal Government (BMU)	No separate quantitative estimates given		Yes (h)
Industry (from last year report, no more reported in MR 2001)	Investment programme for reducing Environmental pollution	Investment subsidies/ interest subsidies for loans for businesses and municipal authorities for large scale projects	CO ₂	E	Existing	Deutsche Ausgleichsbank (DtA)/ Federal government (BMU) and Federal Environmental Agency (UBA)	No separate quantitative estimates given		Yes (e)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry (from last year report, no more reported in MR 2001)	Amendment of Heat Insulation Ordinance		CO ₂	R	Existing since 1995	Federal government	7.0 (by 2005, for all sectors)		Yes (e, m)
Industry (from last year report, no more reported in MR 2001)	Amendment of the Heating Installation Ordinance		CO ₂	R	Existing since 1994	Federal government	9.7 (by 2005, for all sectors)		Yes (e, m)
Industry (from last year report, no more reported in MR 2001)	Manufacture of HFC	Thermal decomposition of the by-product HFC	HFC	V	Existing (1994)	Industry together with Federal government	Not given		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry (from last year report, no more reported in MR 2001)	Declaration on the use of SF ₆ in electrical switching equipment and systems in Germany	Voluntary commitment of German manufacturers and users of electrical switching systems and producers of SF ₆ to take emissions control measures	SF ₆	V	Existing	Industry together with Federal government	Not given		No
Industry (from last year report, no more reported in MR 2001)	Eco-audit	Companies review their emission sources and find possible reduction areas	CO ₂	E, ET, I	Existing	EU, German federal government	Not given		Yes (n)
Commercial and Institutional (from last year report, no more reported in MR 2001)	Amendment of Heat Insulation Ordinance		CO ₂	R	Existing since 1995	Federal government	7.0 (by 2005, (for all sectors)		Yes (e)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Commercial and Institutional (from last year report, no more reported in MR 2001)	Amendment of the Heating Installation Ordinance		CO ₂	R	Existing since 1994	Federal government	9.7 (by 2005, (for all sectors)		Yes (e, m)
Commercial and Institutional (from last year report, no more reported in MR 2001)	Voluntary commitment of supply industry associations		CO ₂	V	Existing	Association of supply industry and Federal government	Included in voluntary commitment of German industry		No
Residential (new in MR 2001)	Voluntary commitment of Federal government to reduce CO ₂ -emissions in federal ministries by 25 % in 2005, by 30 % in 2010 ('Selbstverpflichtung der Bundesregierung im eigenen Geschäftsbereich')			V	Existing	Federal government			

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Residential	CO ₂ reduction programme of the Reconstruction Loan Corporation	Aims to promote the modernisation of existing houses especially in the new Federal Länder	CO ₂	E	Existing	Federal Government, Kreditanstalt fuer Wiederaufbau (KfW)	5.0–7.0		Yes (m)
Residential	Energy Savings Ordinance ('Energieeinspar-verordnung')		CO ₂	R	Adopted (November 2001), in force February 2002	Federal government	4.0 (by 2005 in the household sector)		Yes (e, m)
Residential	Measures to reduce electricity consumption of appliances	Voluntary agreements and labelling; Particular attention to stand-by losses	CO ₂	ET, V, R	Mainly Proposed	Federal government	5.0 (by 2005)		Yes (d)
Residential (from last year report, no more reported in MR 2001)	Amendment of Heat Insulation Ordinance		CO ₂	R	Existing since 1995	Federal government	7.0 (by 2005)		Yes (m)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Residential (from last year report, no more reported in MR 2001)	Amendment of the Heating Installation Ordinance		CO ₂	R	Existing since 1994	Federal government	9.7 (by 2005)		Yes (e, m)
Residential (from last year report, no more reported in MR 2001)	Subsidy programme for energy savings in existing buildings, including the implementation of energy diagnoses	2000 million DM new funds until 2005 for renovation credit programme	CO ₂	E	Existing (early 2001)	Federal government	5.0–7.0 (by 2005)		Yes (m)
Transport (new in MR 2001)	Voluntary commitment of German automobile industry ('Selbstverpflichtung der deutschen Automobilindustrie')	Reduction of new car's fuel consumption by 25 % until 2005 and after 2005 by 30 % compared to 1990	CO ₂	V	Existing	Automobile industry associations	10.0		Yes (a)
Transport	Distance based motorway tolls for Heavy duty vehicles ('Schwerlastabgabe')		CO ₂	E	Adopted, implementation 2003	Federal government	5.0 (by 2005)		Yes (c)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Transport	Information campaign on driving and maintenance behaviour		CO ₂	I		Federal government	5.0 (by 2005)		No
Transport	Additional budgetary means for investments in the infrastructure of the German railways	Total of 6000 million DM for the next 3 years (future investment programme)	CO ₂	E	Existing	Federal government in connection with Deutsche Bahn AG	Not quantifiable		Yes (c)
Transport	Fiscal promotion of fuel efficient vehicles	Temporary vehicle tax rebates for cars with CO ₂ emissions of up to 120g/km	CO ₂	F, E	Proposed (renewed programme)	Federal government	1.0 (by 2005)		
Transport	Energy efficient equipment in new cars	Use of low friction oil and low friction tyres in new cars, use of consumption indicators	CO ₂	V	Proposed	Federal government	11.00		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Transport	Air traffic: Emission based levies at Germany's airports		CO ₂	F, E	Proposed	Federal government	1.0 (by 2005)		Yes (b)
Transport	Improving intermodal transport		CO ₂	E	Proposed		3.5 (by 2005)		
Transport (from last year report, no more reported in MR 2001)	Voluntary commitment of the European, Japanese and Korean automobile industry	Reduction of new car's fuel consumption	CO ₂	V	Existing	European Commission with automobile industry associations	10.0		Yes (a)
Transport (from last year report, no more reported in MR 2001)	Annual increases in the mineral-oil tax as part of the ecological tax reform		CO ₂ ; indirectly N ₂ O	F, R, E	Existing since 1999; planned to be increased annually by 0.06 DM per litre until 2003	Federal government	6.0–8.0 (by 2005)		Yes (b)
Energy transformation sector (new in MR 2001)	CHP law ('KWK') amendment	Supporting CHP investments, applies mostly to local authorities public utilities	CO ₂	E	In force April 2002	Federal government	Not given		Yes (i)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Energy transformation on sector	CHP extension agreement with energy sector	Voluntary agreement with electricity producers and industry	CO ₂	V	Adopted in June 2001	Federal government	23.0		Yes (i)
Energy transformation on sector	Use of pit-gas from hard coal mining	Intensifying the use of pit gas	CH ₄	V	Existing	Federal government	11.7		No
Energy transformation on sector	Construction of more gas-fired combined cycle power plants		CO ₂			Federal government	15.0–20.0		Yes (i)
Energy transformation on sector (from last year report, no more reported in MR 2001)	'Ecological tax reform': new electricity tax		CO ₂	F, R, E	Existing: one-time increase of 2 Pf per kWh in 1999, 4 annual increases of 0,5 Pf per kWh between 2000 and 2003	Federal government	2.0–4.0 (in 2005)		
Energy transformation on sector (from last year report, no more reported in MR 2001)	Biomass Ordinance	Define biomass types for the promotion though the EEG	CO ₂ , CH ₄ from waste	E, R	Existing (since June 2001)	Federal government	Included in EEG		Yes (h, k)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Energy transformation sector (from last year report, no more reported in MR 2001)	Solar campaign	Foster the thermal solar market by information campaigns for customers and installation companies	CO ₂	I	Existing (since 1999)	B.A.U.M. (industry association); craftworks associations	Not given		Yes (h, k)
Energy transformation sector (from last year report, no more reported in MR 2001)	Voluntary agreements with utilities' associations	German Electricity Association: 12 % reduction of CO ₂ until 2010; Association of Local Authority Public Utilities: 25 % reduction until 2005	CO ₂	V	Existing	Federal government, utilities' associations	Not given		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Waste (new in MR 2001)	Renewable Energy Sources Act ('Erneuerbare-Energien-Gesetz -EEG')	Economic incentives for the construction of bio gas supply utilities in waste sector	CH ₄	E	Existing	Federal government	1.1		
Waste (new in MR 2001)	Technical Instruction on Waste from Human Settlements and waste placement ordinance ('Technische Anleitung Siedlungsabfall und Abfallablagerungsverordnung')	Avoiding the development of gas in new landfills; energetic use of gas from old landfills	CH ₄	R	Existing		31.0		
Waste (new in MR 2001)	Technical Instructions on Waste Management, Part 1 ('TA Abfall, Teil 1')	Reduction of CH ₄ -emissions in organic part of hazardous waste	CH ₄	R	Existing		0.3		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Waste (from last year report, no more reported in MR 2001)	Closed Substance Cycle and Waste Management Act	Aims to improve resource conservation, waste avoidance and environmental compatible waste disposal.	CH ₄	R	Existing	Federal government	Not given		
Waste (from last year report, no more reported in MR 2001)	Research on thermal treatment of waste	Funding for development and optimisation of incineration technology	CH ₄	D	Existing	Federal ministry of Education, Science Research and Technology	Not given		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Waste (from last year report, no more reported in MR 2001)	Technical Instructions on Waste from Human Settlements	Aims to reduce the amount of solid waste from human settlements that must be placed in landfills and to promote waste separating and recycling.	CH ₄	R	Existing (1993)	Federal Government	27.3		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Waste (from last year report, no more reported in MR 2001)	Technical Instructions on Waste Management, Part 1	Sets high standards for the construction, operation and post-care of installations for waste storage, chemical/ Physical and biological treatment, waste incineration and deposition	CH ₄	R	Existing (1991)	Federal Government	3.78		
Agriculture (new in MR 2001)	Renewable Energy Sources Act ('Erneuerbare-Energien-Gesetz -EEG') in agriculture	Economic incentives for the construction of bio gas supply utilities in agriculture	CH ₄	E	Existing		1.1		
Agriculture	Fertiliser Ordinance	Determination of proper practice in fertiliser use	N ₂ O	R	Existing (1996)	Transposes EC nitrate directive, Federal Government	2.1		Yes (n)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Agriculture (from last year report, no more reported in MR 2001)	Improvement of animal digestive efficiency as part of animal husbandry, in order to reduce methane emissions	Measures regarding animal feeds to decrease methane emissions per animal	CH ₄		Existing	Federal Government	Not given		
Agriculture (from last year report, no more reported in MR 2001)	Support for extensive methods of agriculture	Emphasis on support especially for measures for: extensive methods of cultivation of permanent crops, extensive management of grassland and conversion of farmland into grassland and organic farming	N ₂ O	E, I	Existing	Federal Government	Not given		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Cross sectoral (new in MR 2001)	Non-sulphur fuels	Supporting the use of non-sulphur or less-sulphur fuels through taxation	CO ₂	E	In force since November 2001, will be improved in November 2003		2.0–5.0 (by 2005)		
Cross sectoral	Ecological tax reform	Reduce fuel consumption of heating oil, natural gas and liquid gas and transport fuels due to stepwise increase of prices. Side effect raising of funds for national pension scheme	CO ₂	F, R, E	Existing (1999) further increases until 2003	Federal government	20.0		Yes (b, c, e)
Cross sectoral	Promotion of the use of 'contracting'	Increasing the use of contracting	CO ₂	D	Existing		5.0		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Cross sectoral	Renewable Energy Sources Act (EEG) (fixed grid in feed prices)	At least double the share of renewable energy in the production of electricity until 2010	CO ₂ , CH ₄ from waste	R, E	Existing (since April 2000)	Federal government	15.0		Yes (h, k)
Cross sectoral	'100 000 roofs' PV programme	300 MW new PV capacity within 6 years	CO ₂	E	Existing (since January 1999)	Federal government, Kreditanstalt fuer Wiederaufbau (KfW)	0.2		Yes (h, k)
Cross sectoral	Market Introduction Programme Renewable Energies	Promotion of thermal solar and biomass energy by credits.	CO ₂	E	Existing (since September 1999)	Federal government	6.0		Yes (h, k)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Cross sectoral (from last year report, no more reported in MR 2001)	Amendment to Heat Insulation Ordinance	Aims to reduce annual energy requirements for new buildings by 30 % in comparison with previous regulations. For existing buildings conditional requirements are set.	CO ₂	R	Existing since 1995	Federal government	7.0 (in 2005, for all sectors)		Yes (e, m)
Cross sectoral (from last year report, no more reported in MR 2001)	Amendment of the Heating Installation Ordinance	Transpose the EC heating system boiler directive (92/42/EEC).	CO ₂	R	Existing since 1994	Federal Government	9.7 (in 2005, for all sectors)		Yes (e, m)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Cross sectoral (from last year report, no more reported in MR 2001)	Energy Savings Ordinance ('Energieeinspar-verordnung')	Aims to replace and amend (tighten) the Heat Insulation and Heating Installation Ordinance	CO ₂	R	Adopted in Summer 2001	Federal government	10.0 (by 2005)		Yes (e, m)
Policies and measures in the with additional measures projection									
Industry (new in MR 2001)	Air conditioning in buildings ('Kälte-stationäre Klimatechnik')	Reducing of the leakage rates	HFC	R	Proposed		3.6		Yes (n)
Industry (new in MR 2001)	Air conditioning in cars ('Mobile Klimatechnik')	Substitution of HFC by CO ₂	HFC		Proposed		1.0		
Industry (new in MR 2001)	PU foam for construction ('PU-Montage-schäume')	Substitution of HFC by propane or butane	HFC	R, E, V	Proposed		2.6		
Industry (new in MR 2001)	PU foam products ('PU- Schaum-produkte')	Substitution of HFC by pentane or cyclopentane	HFC	V	Proposed		0.2		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry (new in MR 2001)	XPS-rigid foam ('XPS-Hartschäume')	Substitution of HFC by CO ₂ or ethyl alcohol through all producers	HFC	V	Proposed		1.0		
Industry (new in MR 2001)	Aerosol ('Dosieraerosole')	Substitution of aerosols by powder inhaler through market initiatives		V			0.5		
Industry (new in MR 2001)	Aluminium production		PFC	V	Proposed		0.1		
Industry (new in MR 2001)	Semi-conductor production ('Halbleiterherstellung')		PFC	V	Proposed		1.3		
Industry (new in MR 2001)	Prohibition of SF ₆ in noise insulation windows ('Verwendungsverbot bei Schallschutzscheiben')		SF ₆	R			1.0		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ -equiv.)		CCPM (for meaning of parenthesis see CCPM list in annex)
							2010	2020 (no data)	
Industry	Prohibition of filling tyres with SF ₆ ('Verwendungsverbot')		SF ₆	R	Proposed		0.7		
Energy transformation sector (from last year report, no more reported in MR 2001)	Abolishment of the preferential treatment of coal in the next stages of the ecological tax reform	Level the 'playing field' for the different fuels in electricity production	CO ₂	R, E	Proposed	Federal government			Yes (c)
Energy transformation sector (from last year report, no more reported in MR 2001)	Law for the promotion of ecologically efficient CHP	Expected to promote CHP meeting pre-defined standards by additional financing, probably grid feed prices	CO ₂	R, E	Proposed for late 2001 (will replace the CHP law)	Federal government	Not given		Yes (i)
Waste (from last year report, no more reported in MR 2001)	Better implementation of Technical Instructions on Waste from Human Settlements		CH ₄	R	Proposed	Federal Government	20.0		

Evaluation of projections

The figures in Tables 5 and 6 are extracted from the Monitoring Report 2001 Chapter 4.3 'Predicted Future Emission Trends (Projections)'. Tables 4-7, 4-9, 4-11, 4-13, 4-15 and 4-17 were used to calculate the projections of the sixth GHG emissions by gas and sector to be achieved in 2001 'with measures'. Tables 4-14, 4-16 and 4-18 were used as a basis to calculate the projections to be achieved in 2010 'with additional measures'. There is no data given for the CO₂, CH₄ and N₂O emissions projections to be achieved in 2010 'with additional measures' because additional measures are not reported. Therefore, the projections of these gases to be achieved in 2010 'with measures' were used. According to the MR 2001 the projections for CO₂, CH₄ and N₂O emissions do not yet take into account the Governmental decision of 14th July 2000 to phase out nuclear energy in Germany. It is further stated in the introduction of the MR 2001 that the Federal Government has not adopted any relevant emission scenario and projection, as yet.

Table 2-1 (page 2) in the MR 2001 does not fully comply with the tables in the Chapter 4.3 'Predicted Future Emission Trends (Projections)'. Therefore, for the preparation of Tables 5 and 6 below in this Report the tables from the Chapter 4.3 'Predicted Future Emission Trends (Projections)' in the MR 2001 were used. Moreover, since the Tables 4-17 and 4-18 in the MR 2001 show different figures of SF₆ emissions for 1995, the figures from the Table 4-17 were used.

Table 5: Summary of projections by gas in 2010 (MtCO₂-equiv.)

Greenhouse gases	Base year ¹	With measures	With additional measures
CO ₂	1 014.50	694.00	694.00*
CH ₄	110.74	45.54	45.54*
N ₂ O	88.59	45.19	45.19*
HFC	3.13	19.84	10.77
PFC	1.76	2.53	1.13
SF ₆	6.24	5.00	2.95
Total without (LUCF)	1224.97	812.08	799.57
% change relative to base year		-34 %	-35 %

* these figures are taken from the column 'with measures'.

It seems important to note that the MR 2001 does not give complete information on GHG emissions of all sub-sectors mentioned in Table 6. Therefore, the sub-totals in particular of the energy sector (1.) cannot be summed up. For instance, for the greenhouse gases CH₄ and N₂O Germany has reported total fuel combustion (1.A.) without reporting a detailed split (1.A.1 to 1.A.5). In the case of N₂O, values for the sub-sector transport (1.A.3) are given but no data has been reported on other sub-sectors. Therefore, the GHG totals by sub-sector (1.A.1 to 1.A.5) show only parts of the GHG total by sector (1.A.).

¹ For CO₂, CH₄ and N₂O the base year is 1990; for HFCs, PFCs and SF₆ the base year is 1995.

Table 6: Summary of projections by sector in 2010 (MtCO₂-equiv.)

Sector	Base year ²	With measures	% change relative to the base year	With additional measures	% change relative to the base year (additional measures)
1. Energy	1 035.48	698.76	-33	Not given	Not given
- A. Fuel Combustion	1 002.70	683.92	-32	Not given	Not given
- A.1. Energy Industries	412.90	247.00	-40	Not given	Not given
- A.2. Manufacturing Industries and Construction	196.46	111.00	-43	Not given	Not given
- A.3. Transport	165.47	193.51	17	Not given	Not given
- A.4. Other Sectors	203.44	124.00	-39	Not given	Not given
- A.5. Other (Military)	11.76	0.00	-100	Not given	Not given
- B. Fugitive Emissions from Fuels	32.78	14.85	-55	Not given	Not given
2. Industrial Processes	64.22	58.99	-8	14.85	-77
3. Solvent and Other Product Use	1.86	1.86	0	Not given	Not given
4. Agriculture	82.40	43.94	-47	Not given	Not given
5. Land-Use Change and Forestry	-33.72	-30.00	11	Not given	Not given
6. Waste	41.01	8.53	-79	Not given	Not given
Total emissions (without LUCF)	1 224.97	812.08	-34		

Table 7: Assessment of the target

	MtCO ₂ equiv.	% of 1990 level (six gas basket)
Base year (from projections)	1224.97	
Commitment	967.7	[-21]
With existing P&Ms	812.08	[-34]
Gap (-ve means no gap)	+155.62 *	[+13] *
Effect of additional P&Ms	799.57	[-35]

* over-fulfilment of the commitment

Description of modelling approach

A new description of the modelling approach is not given in Monitoring Report 2001. Therefore, the following description is rather similar to the section on Germany of the Member State Analysis 2001.

All gases are separately projected in the Monitoring Mechanism Report. The CO₂ projection used in the Monitoring Report is the latest comprehensive projection presented in an internationally official document and is based on the study 'Politikszenerarien II' that uses the dynamic (MARKAL) version of the IKARUS model. This tool, a linear programming model, optimises simultaneously the use of energy in all sectors; assuming certain 'bounds' (like the speed of adjustment, contractual obligations

² For CO₂, CH₄ and N₂O the base year is 1990; for HFCs, PFCs and SF₆ the base year is 1995.

etc.) and assuming that individual optimisation leads to some overall inefficiencies. The model separates nine industry branches and four other sectors (transport, energy transformation, residential, and commercial & institutional). The application of the IKARUS model is done in combination with other (sector specific) bottom-up analyses based on expert opinions. Parameters for the projections are given in the Table below.

Modelling parameters

Parameter	2000 (only 1995 data available)	2010	Unit
Population			Millions
GDP			GDP
Oil (international price)		22.8	USD (1995) / bbl
Coal (international price)	–	–	USD (2000) / tonne
Crude oil (national price)	4.36	6.47	DM/GJ in prices of 1995
Natural Gas, Type A (national price)	4.06	5.31	DM/GJ in prices of 1995
Coal (national price)	2.58	3.59	DM/GJ in prices of 1995
Transport passenger growth	900	1063	1000 million passenger times km
Freight growth	413	723	1000 million tonnes times km
Housing units	36		Million units
Households	36.9		Million households
Living space/cap.	36.8		m ² /cap.
Share of renewables		2 1/4 ²	Percent of primary energy supply
Discount rate	5 %	5 %	Real prices over all sectors
Liberalisation considered?			Yes, according to DIW

Source: Member State Analysis 2001

These economic and demographic factors are exogenic data and form the base for demand values determining energy consumption. These energy consumption values, in turn, form the endogenic part of the model. The same applies for national energy prices: they are determined by the import prices and the outcome of the optimisation simulations.

Strengths of the approach:

- Consistent model based analysis of the national energy system, including emissions and costs,
- Identification of cost efficient technologies,
- Modification of model results by experts, with regard to real behaviour of firms and households, institutional factors, and the impact of policies and measures.

Weaknesses of the approach:

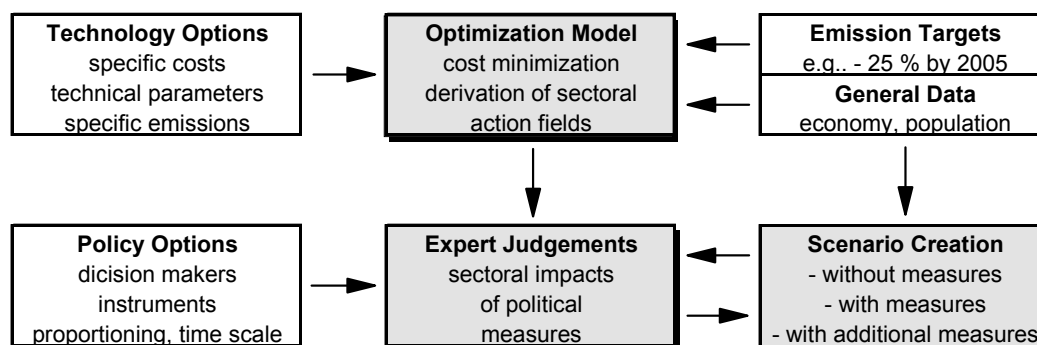
- Only 'soft' link to the economic model (MIS),
- Restricted to the analysis of energy related emissions or CO₂
- The optimisation model (by itself) does not simulate or predict the influence of policies on human behaviour.

CH₄ and N₂O projections are based on the research project 'Politikszenerarien I' modified by UBA. The approach was basically bottom-up, taking expected production figures of several industries into account. Projections for HFC, PFC and SF₆ are based on the study 'Emissionen und Minderungspotential von H-FKW, FKW und SF₆' by Schwarz and Leisewitz 1999. The scenarios were based on a bottom-up approach, with several specific assumptions for certain application areas; no general assumptions regarding GDP growth etc. were stated.

Incorporation of estimated effects of P&Ms into the projections:

The following figure illustrates the interaction of estimation methods and sources in developing a comprehensive approach that combines overall scenarios with estimated effects of individual P&Ms.

Combined Approach for Deriving Policy Scenarios



DIW 98

Within this framework, the optimisation model makes a special contribution towards identifying sectoral action fields in the sense of cost-efficient technology options. Other important influential factors are general economic and demographic data and the technology options available in the period under consideration characterised by specific costs, technical parameters and specific emissions.

Paying attention to these technology-oriented action fields, expert judgements have the aim of quantifying the impacts of appropriate policy measures on sectoral energy consumption and emissions. An essential prerequisite is the most accurate possible description of the policy options to be analysed.

Country conclusions

The last Member State Analysis performed for all MS in Summer 2001 based on Germany's Monitoring report 1999 and took into account more recent information from expert interviews and additional publications. In late summer 2001 Germany provided the Monitoring report 2000 and in March 2002 the Monitoring report 2001 (MR 2001).

Germany's GHG emissions are projected in the MR2001 to be reduced to 812 Mt CO₂-equiv. in 2010. This displays an over-fulfilment of about 150 Mt CO₂-equiv. in 2010 of its burden sharing commitment (-21 % until 2010 for all six 'Kyoto gases' relative to 1990 emissions), i.e. the With measures projections are about 13 percent points below the target. For that estimate the full implementation of the National Climate Change Programme (CPP) published in Autumn 2000 is assumed. All policies and measures (PAMs) referred to in the CCP and not named there expressly as proposed are taken into account in the With measures projections for 2010 respectively. The amount of the over-fulfilment is consistent to the last years Member state analysis, but the

difference is that the amount of GHG reduction is booked now in the With measures projections instead of the With additional measures projections in the last year.

The With additional measures projection shows GHG emissions of about 800 Mt CO₂-equiv. in 2010. This is only slightly below the With measures projection and caused by some measures affecting F-gase emissions.

The MR 2001 refers to all recent political decisions. It notes that the projections are currently under revision to regard recent developments.

The MR 2001 provides information on inventory data as well as on projections for each Kyoto gas. It also contains detailed policies & measures that aim to fulfill Germany's Kyoto commitments. The MR2001 is quite improved compared to the MR1999 and meets the reporting guidelines of the Monitoring Mechanism widely. Unfortunately, in MR 2001 some unclarity emerges because of different totals of projections given in summary and detailed tables. Therefore, only tables with detailed projections were used and summed up.

The emissions are given in different levels of sectoral split depending of the reported gas. Therefore, the aggregation of gases to GHG totals at all levels of sectoral split leads to the effect that sub-sector values (energy industries, transport, others) do not sum up exactly the above level sector value (fuel combustion) (See table 6). Furthermore, this does not allow aggregations for the EU on the sub-sector level, which would be quite useful to have. The announced current revision of projections might improve this situation.

Annex I:

List of Common and co-ordinated policies and measures (CCPMs)
(Conclusions of the Council, June 1998)

Abbreviations used in the analysis

Common measures:

- A reduction of CO₂ emissions from cars to 120 g CO₂ per km by means of:
 - A I agreement with the automotive industry on energy efficiency in new cars, including a monitoring system
 - A II energy labelling of cars
 - A III financial incentives for energy-efficient cars
 - A IV nitrous oxide from catalysers in vehicles
- B common minimum levies on energy products, including taxes on fuel for aircraft and ferries
- C lowering of subsidies for fossil fuels
- D improved and dynamic demands for energy efficiency in appliances in the form of standards, labelling or agreements
- E encourage the spreading of energy-efficient technologies and techniques, e.g., by differentiated levies on energy-economising products
- F waste handling
- G action plan for methane
- H encouragement of renewable energy in a liberalised power market

Co-ordinated policies and measures:

- I stimulate the market for CHP and remove barriers for a significant rise in use of CHP in the EU
- J encourage environmental targets in the liberalisation of power and natural gas markets
- K increased use of renewable energy through co-operation and co-ordinated policies and measures
- L influence transport needs towards types of transport which are less stressful to the environment
- M standards for energy efficiency in buildings
- N other

Annex II:

Type of instruments

- D research and development
- E economic instrument
- ET education and training
- F fiscal
- I information
- R regulation, law, guideline
- V voluntary agreement