

Annex 4: EU Member States' policies and measures, emission projections and methodologies

Annex 4 provides for each EU Member State a detailed overview of policies and measures, GHG projections, and methodologies used for calculating the GHG projections.

Compared with last year's report, new information on projections has been provided by Denmark, Germany, Greece and Italy. Finland, Greece, Italy and Sweden provided either new or substantial additional information on policies and measures.

Austria

Sources of Information

Austria's third national communication under the United Nations Framework Convention on Climate Change, 2001

Quality and Transparency of Reporting

The third national communication draws on the draft Austrian climate strategy, 2010. It provides a clear list of policies and measures to reduce greenhouse gas emissions in a range of sectors. The impact of the measures has been quantified in most cases. The with measures projection includes measures implemented and adopted by 2001; the with additional measures projection includes measures planned.

The table on policies and measures follows the UNFCCC guidelines.

Two approaches are taken to develop projections of greenhouse gas emissions and to calculate the total effect of policies and measures. On the one hand, the estimated development according to the draft Austrian climate strategy, 2010, is shown, which is based on expert judgements for 2010. On the other hand, projections for the period 2000–20 have been developed based on the model calculations. Both approaches include with measures and with additional measures scenarios and show similar results.

Assessment of Policies and Measures

Table A.75 gives an overview of effects of policies and measures. The figures given for the with measures projection are for policies and measures implemented or adopted by 2001. As there is no scenario without measures, the effect of policies implemented and adopted is derived from the sum of the potentials of the individual measures, which are based on expert judgements according to the draft Austrian climate strategy, 2010.

Table A.73 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	+++	
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O, HFC, SF ₆	
Status of implementation	+++	
Implementation body specified	+++	
Quantitative assessment of implementation	+++	Estimated mitigation effect for 2010; a few measures are not quantified
Interaction with other PAMs discussed	++	In some cases

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

Note: Information on 'Type of instrument' follows largely the UNFCCC guidelines but introduces the term 'promotive', which in many cases seems to correspond with 'economic'.

Table A.74 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	With measures With additional measures	Expert judgement: Both scenarios are given for sectors partly corresponding with IPCC sectors Model calculations: Both scenarios are given for IPCC sectors and gases
Expressed relative to inventory for previous years	Yes	
Starting year	1999	
Split of projections	+++	Expert judgement: Projections split by sector partly corresponding with IPCC sectors Model calculations: Projections split by IPCC sector and gas
Presentation of results	+++	Results presented in both tabular and graphical form
Description of model (level of detail, approach and assumptions)	++	Basic description of the models and further references provided
Discussion of uncertainty	No	A few results of sensitivity analysis provided
Details of parameters and assumptions	++	Summary table for key parameters (input and output parameter are marked)

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

Table A.75 Summary of the effect of policies and measures by 2010 included in the projections (MtCO₂)

	With measures ⁽¹⁾	With additional measures ⁽²⁾
CO ₂	3.1-4.1	11.6
CH ₄	0.9	1.3
N ₂ O	nq	0.1
F-gases	nq	1.4
Energy (IPCC Sector 1)		11.8
Industry (IPCC Sector 2)		1.5
Agriculture (IPCC Sector 4)		0.1
Waste (IPCC Sector 6)		1.1
Total	4.0-5.0	14.5

⁽¹⁾ The effect of policies implemented or adopted is derived from the sum of the potentials of the individual measures, which are based on expert judgements according to the draft Austrian climate strategy, 2010.

⁽²⁾ The effect of policies planned is derived from the difference between the with measures and the with additional measures scenarios of the model calculations.

nq: not quantifiable.

The with additional measures scenario includes the effects of policies planned. The effect of policies planned is derived from the difference between the with measures and the with additional measures scenarios of the model calculations.

Table A.76 gives details of the policies and measures. The measures implemented or adopted by 2001 are included in the with measures projections. The measures planned are included in the with additional measures projections.

Table A.76 Detailed information on policies and measures (estimated mitigation effect in 2010, Mt CO₂ equivalent)

Sector	Name of policy or measure	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity/entities	Estimated effect
Energy demand	Agreement between Federation and Länder on energy-saving	Energy savings in buildings, heating installations and electricity consumption	CO ₂	Regulatory (framework legislation)	Implemented	Federation and Länder	nq
Energy demand	Minimum thermal standards for buildings	Energy savings in buildings	CO ₂	Regulatory (implementation)	Implemented/planned	Länder	0.5 Mt (0.2-0.3 implemented)
Energy demand	Housing support schemes	Energy savings in dwellings (new and renovation)	CO ₂ , HFC	Promotive	Implemented/adopted/planned	Länder	2-2.5 Mt (0.5-1.0 implemented/adopted)
Energy demand	Consumption-related heating costs calculation	Energy savings in buildings	CO ₂	Regulatory	Implemented	Federation	0.1 Mt
Energy demand	Energy efficiency in federal public buildings	Energy savings in public buildings	CO ₂	Voluntary	Implemented	Federation	0.05 Mt
Energy demand	'Contracting' for public buildings	Energy savings in public and private sector buildings	CO ₂	Economic/voluntary	Implemented/adopted/planned	Federation, Länder, municipalities	0.5 Mt (0.1 implemented/adopted)
Energy demand	Replacement of old heating systems	Energy savings in buildings by improvement of heating energy supply	CO ₂	Promotive	Implemented/adopted/planned	Länder, municipalities	2.0 Mt (0.5 implemented/adopted)
Energy demand	Harmonised energy codes for buildings	Transparent and comparable declaration of energy consumption of buildings	CO ₂	Economic/information	Planned	Federation, Länder	nq
Energy demand	Regular inspection of heating systems	Energy savings in buildings by efficiency-raising of heating systems	CO ₂	Regulatory	Implemented/adopted/planned	Länder	0.3 Mt (0.1 implemented/adopted)
Energy supply	Preferential market access for 'green electricity'	Raising share of renewable energy sources in electricity supply	CO ₂ , CH ₄	Economic (regulatory)	Implemented	Federation (framework), Länder (executing laws)	0.5 Mt
Energy supply	Public support for renewable energy projects and district heating	Raising share of heat production from renewable energy sources and CHP	CO ₂ , CH ₄	Promotive	Implemented	Federation, Länder, EU	0.7 Mt
Energy supply	Energy tax rebates for CHP	Promotion of combined heat and power production (natural gas and diesel)	CO ₂	Fiscal	Implemented	Federation	nq
Energy supply	Preferential framework conditions for CHP	Promotion of combined heat and power production by granting improved feed-in conditions or setting obligatory quota	CO ₂	Economic/regulatory/promotive	Framework law implemented; executing laws planned	Federation (framework), Länder (executing laws) EU (future targets)	0.5 Mt
Energy supply	Further development of targets for 'green electricity'	Raising share of renewable energy sources in electricity supply	CO ₂ , CH ₄	Economic (regulatory)	Planned	Federation (framework), Länder (executing laws)	0.2-0.5 Mt

Sector	Name of policy or measure	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity/entities	Estimated effect
Energy supply	Stepped-up public support for GHG mitigation projects	Promotion of heat supply from renewable energy, energy efficiency measures, etc.	CO ₂	Promotive	Planned	Federation	1.5–2 Mt
Energy supply	'Green electricity' for public buildings	Raising share of electricity production from renewables through purchase power of public entities	CO ₂	Economic	Adopted/planned	Federation, Länder, municipalities	nq
Energy supply	Voluntary agreements	Cost-efficient GHG reductions in energy industry	CO ₂	Voluntary/negotiated	Planned	Federation	nq
Waste management	Waste management act, 1990	Framework law regulating waste management — minimisation of environmental impacts	CH ₄ , CO ₂	Regulatory	Implemented	Federation (framework), Länder (executing laws)	nq
Waste management	Landfill regulation, 1996	Minimisation of waste landfilling	CH ₄	Regulatory	Implemented/adopted	Federation (framework), Länder (executing laws), municipalities	0.9 Mt
Waste management	Landfill charge act, 1989	Reduction of disposal of waste on landfills; earmarking of revenue for clean-up of contaminated land	CH ₄	Regulatory/fiscal/economic	Implemented	Federation	nq
Waste management	Expansion of waste treatment capacities other than landfilling	Banning disposal on landfills by 2004–08; expanding share of other capacities, e.g. energy-efficient incineration	CH ₄ , CO ₂	Regulatory	Planned/adopted	Länder, municipalities	1.1 Mt for this and next four measures (0.3 adopted)
Waste management	Promotion of waste recovery	Higher share of waste recycling	CH ₄ , CO ₂	Voluntary, information, education, research	Implemented/adopted/planned	Federation, Länder, municipalities	nq
Waste management	Efficient energy recovery from waste	Energy recovery from waste incineration (CHP)	CH ₄ , CO ₂	Promotive	Adopted	Federation	nq
Waste management	Other programmes to launch waste prevention and recovery	Prevention of waste; higher share of energy recovery/recycling	CH ₄ , CO ₂	Voluntary, information, research, promotive	Implemented/adopted/planned	Ministry of the Environment, Länder	nq
Waste management	Technical state of the art for mechanical–biological treatment of waste	Better investment security for operators of waste treatment sites with respect to technical standards	CH ₄	Standardisation	Planned	Federation	nq
Transport	Reduction of emissions from passenger cars	Raising market share of advanced engine technologies with low fuel consumption	CO ₂	Voluntary/information	Implemented	Federation, EU	0.5 Mt
Transport	Fuel consumption levy	Fiscal incentive for low fuel consumption vehicles	CO ₂	Fiscal	Implemented	Federation	nq
Transport	Road tolls	Internalisation of external costs for use of highways	CO ₂	Fiscal	Implemented	Federation	nq

Sector	Name of policy or measure	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity/entities	Estimated effect
Transport	Vehicle tax adaptation, 2000	Internalisation of external costs, especially for strong engines	CO ₂	Fiscal	Implemented	Federation	nq
Transport	Rail infrastructure and public transport investments	Changing modal split to the benefit of rail/public transport	CO ₂	Public investments and promotion	Implemented/adopted/planned	Federation, Länder, municipalities	0.3 Mt (0.1 implemented/adopted)
Transport	Improvement of fuel quality and promotion of 'bio-diesel'	GHG emissions reduction through fuel improvement and renewable energy sources	CO ₂	Regulatory/fiscal	Implemented/planned	Federation	0.1 Mt (0.05 implemented)
Transport	Model projects and programmes for environmentally sound mobility	Model projects with the aim to raise public awareness and to demonstrate new technologies	CO ₂	Information/education/demonstration/research	Implemented	Federation, Länder, municipalities	nq
Transport	Model projects and programmes for environmentally sound logistics	GHG emissions reductions in transport sector by logistic support and avoidance of insufficient transportation		Promotion/information/demonstration/research	Implemented	Federation	nq
Transport	Mileage-based toll for lorries	Internalisation of external costs of road transport	CO ₂	Fiscal	Adopted	Federation	0.3 Mt
Transport	Promotion of energy efficient and alternative motor concepts	Reduction of fleet fuel consumption	CO ₂	Promotive	Planned	Federation, EU	0.1 Mt
Transport	Public awareness-raising measures	Reduction of individual private traffic	CO ₂	Information, education	Adopted/planned	Federation, Länder	0.3 Mt (0.1 adopted)
Transport	Improvement of transport logistics	Avoidance of inefficient and unnecessary transportation of goods, aiming at total reduction of road transport	CO ₂	Promotive, information	Implemented/adopted/planned	Federation, Länder	0.7 Mt (0.2 implemented/adopted)
Transport	Further internalisation of costs	Internalisation of external costs of road transport/private traffic	CO ₂	Fiscal	Planned	Federation	nq
Transport	Promotion of walking and cycling	Shifting modal split, improving living conditions and safety	CO ₂	Promotive, information, education	Implemented/adopted/planned	(Federation), Länder, municipalities	0.3 Mt (0.1 implemented/adopted)
Transport	Improvement of spatial planning	Avoidance of traffic-inducing settlement structures	CO ₂	Planning/regulatory	Planned	Länder	0.3 Mt
Transport	Traffic management and speed limitation	Avoidance of congestion; promotion of economic driving	CO ₂	Information/regulatory/fiscal	Implemented/planned	Federation, Länder	0.3 Mt (implemented nq)
Industry	Promotion of energy efficiency and renewable energy	Energy savings and increasing share of renewables in industry	CO ₂	Promotive	Implemented	Federation	0.2 Mt
Industry	Implementation of the IPPC directive	Energy savings and efficiency-raising measures in industry	CO ₂	Regulatory	Implemented	Federation, (EU)	nq
Industry	Energy concepts for energy-intensive branches	Evaluation of energy-saving potential in industry	CO ₂	Conceptual, consultative	Implemented	Länder	nq
Industry	Energy efficiency programme	Promotion of economic energy-saving in industry	CO ₂	Consultative, promotive	Planned	Federation	0.5 Mt

Sector	Name of policy or measure	Objective and/or activity affected	GHG affected	Type of instrument	Status	Implementing entity/entities	Estimated effect
Industry	Promotion of energy efficiency and renewable energy	Energy savings and increasing share of renewables in industry	CO ₂	Promotive	Planned	Federation	0.3 Mt
Industry	Voluntary agreements and flexible instruments	Cost-efficient GHG reductions in industry	CO ₂	Voluntary/negotiated agreements, economic	Planned	Federation	1.0–2.0 Mt
Agriculture and forestry	Extension of ecological farming	Protection of rural environment (soil, water, natural and cultural habitats); production of high quality food	CH ₄ , N ₂ O	Promotive	Implemented	Federation, Länder, EU	nq
Agriculture and forestry	Cultivation of oil seed crops	Extension of crops for production of bio-fuels	CO ₂	Promotive, fiscal	Implemented	Federation, Länder	nq
Agriculture and forestry	Further enforcement of measures to reduce methane and N ₂ O emissions	Protection of rural environment with more specific focus on GHG mitigation	CH ₄ , N ₂ O	Promotive	Adopted	Federation, Länder, EU	nq
Agriculture and forestry	Maintenance and extension of vital forests	Maintaining biodiversity, productivity, regeneration capacity and vitality of forests	CO ₂	Research, information, regulatory	Implemented/adopted/planned	Federation, Länder	nq
Fluorinated gases	Phase-out of Montreal gases	Protection of the ozone layer	'Montreal gases'	Regulatory	Implemented	Federation	nq
Fluorinated gases	Partial phase-out of HFCs and SF ₆	Substantial reduction of emissions of gases with high GWP	HFC, SF ₆	Regulatory	Planned	Federation	0.8 Mt
Fluorinated gases	Public procurement and support measures	Substantial reduction of emissions of gases with high GWP	HFC, SF ₆	Promotive, public procurement	Implemented/adopted/planned	Federation, Länder	0.1 Mt (0.05 implemented/adopted)
Fluorinated gases	Avoidance of leakage	Substantial reduction of emissions of gases with high GWP	HFC, SF ₆	Voluntary, research	Planned	Federation	0.3
Cross-cutting PAMs	Energy-related taxes	Revenue-raising with positive side-effect of potential GHG reductions	CO ₂	Fiscal	Implemented	Federation	0.3
Cross-cutting PAMs	GHG emissions trading	Cost-effective GHG emissions reductions for large stationary emitters	CO ₂	Economic	Planned	Federation	nq

Source: Austria's third national communication, pp. 82–88.

Table A.77 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	With measures	With additional measures
CO ₂	62.1	72.5	60.9
CH ₄	11.3	8.5	7.2
N ₂ O	2.0	2.0	1.9
HFC	0.6	2.4	1.2
PFC	0.0	0.0	0.0
SF ₆	1.2	0.6	0.4
Total	77.2	86.1	71.6
Change relative to base year (%)		11.5	- 7.3

Table A.78 Summary of projections by sector in 2010 (Mt CO₂)

	Base year	With measures	Change relative to 1990 (%)	With additional measures	Change relative to 1990 (additional measures) (%)
Energy (IPCC Sector 1)	49.9	60.1	20.3	48.3	- 3.3
Industry (IPCC Sector 2)	14.7	16.4	11.6	14.9	1.6
Agriculture (IPCC Sector 4)	5.6	4.8	- 14.8	4.6	- 17.4
Waste (IPCC Sector 6)	6.2	4.8	- 22.4	3.8	- 39.7
Total	77.2	86.1	11.5	71.6	- 7.3

Table A.79 Assessment of the target

	Mt CO ₂ equivalent	Percentage of 1990 level (six gas basket) (%)
Base year (from projections)	77.2	
Commitment	67.2	- 13.0
With existing PAMs ⁽¹⁾	86.1	11.5
Gap (negative means no gap)	18.9	24.5
Effect of additional PAMs	14.5	- 7.3

Evaluation of Projections

The data in Tables A.77–79 are based on information from the third national communication.

Table A.77 shows the projections by greenhouse gas for 2010 and Table A.78 summarises the projections by sector. Energy and industry are projected to increase emissions in the with measures projections, whereas agriculture and waste reduce emissions by 2010.

The with measures projection shows that the currently implemented or adopted measures of Austria do not reduce greenhouse gas emissions by 2010. Instead, greenhouse gas emissions will be 11.5 % above the base-year level by 2010, according to the with measures projection.

Even in the with additional measures scenario, Austria is expected to exceed its commitment of a 13 % reduction in greenhouse gas emissions under the EU burden sharing agreement. Measures planned will contribute to a 7.3 % reduction in greenhouse gas emissions by 2010. However, it is mentioned in the third national communication that the remaining GHG reduction requirement of around 3–3.5 Mt CO₂ equivalent will be fulfilled by making use of the project-based flexible mechanisms of the Kyoto Protocol (JI/CDM).

Description of Modelling Approach

Emissions from the energy sector are projected with the modelling framework of the Austrian Institute for Economic Research. The framework includes the energy model, Dedalus, and the

⁽¹⁾ The existing measures include measures implemented and adopted in 2001.

Modelling parameters

Parameter	1990	1995	2000	2005	2010	2015	2020	Unit
GDP growth	+ 4.6	+ 1.5	+ 3.9	+ 2.1	+ 2.0	+ 1.9	+ 2.0	Annual average (for previous five years) (%)
Oil price, Brent			24.9	16.5	16.5	19.7	22.5	EUR (1990/bbl)
Population	7.73	8.05	8.11	8.17	8.21	8.25	8.30	Million
Electricity import/export ratio			- 2.6	+ 2.6	+ 2.0	+ 2.0	+ 2.0	Percentage
Number of dwellings	2.97		3.26	3.36	3.44	3.51	3.59	Million
Private cars	2.99	3.59	4.03	4.40	4.77	5.10	5.37	Million
Energy prices								
Fuel oil			100	78	76	79	84	Percentage of 2000
Electricity			100	92	102	103	106	Percentage of 2000
Gasoline			100	86	84	86	89	Percentage of 2000
Final energy consumption	833	880	945	1 010	1 049	1 085	1 121	PJ
Steel production activity	3 922	4 529	5 366	5 502	5 502	5 447	5 393	1 000 tonnes
Energy efficiency		+ 18			+ 10			Percentage
Cattle	2 584	2 326	2 156	2 092	2 010	1 941	1 875	1 000 head
Municipal waste deposition in landfills	4 115	3 529	3 640	3 463	2 700	2 147	1 783	1 000 tonnes

Note: Input parameters to the models are in bold.

macroeconomic multisectoral model, Multimac. Resulting figures for energy demand in the Austrian economy are split according to the subsectors of the Austrian greenhouse gas emission inventory and emissions are calculated in accordance with inventory methodology.

The structure of the energy–economy–environment (E3) modelling framework is as follows. The energy model, Dedalus, is integrated into the macroeconomic multisectoral model of the Austrian economy, Multimac III. The output of Dedalus determines the energy sector variables, which is the energy–economy link. The outcome of the macroeconomic multisectoral model (GDP, output by industries, capital stock for different energy-relevant purposes) determines, together with fully exogenous influences (energy prices, technology diffusion for renewables and district heating, transport equipment, demography, etc.), the energy use and CO₂ emissions which constitute the remaining environmental link.

Dedalus consists of an econometric model for final energy demand of 13 sectors of the Austrian economy and an input–output model of energy transformation with varying technical coefficients. This model describes the Austrian energy system in sufficient detail to derive emission paths of 13

sectors and the energy-transforming processes.

Multimac III is input–output, based at a medium aggregation level of 32 industries, and combines econometric functions for goods and factor demand, prices, wages and the labour market with the input–output accounting framework.

Emission scenarios for the agriculture, industrial processes and waste sectors are, in principle, based on the Austrian carbon balance model (ACBM). The ACBM is a model that reflects the dynamic behaviour of the carbon cycle in Austria with the aim of establishing full carbon accounting for Austria. For the current projections, the results of the ACBM scenarios had to be partially adapted according to results of the energy projections (e.g. activities in the industry sector) and to the latest expert judgements (e.g. development of livestock). The emission figures are based on emissions factors from the Austrian greenhouse gas inventory.

Country Conclusions

The main document used for this summary was the third national communication. The level of detail and clarity of the documents from Austria is very good. The details of the methodology for the projections are available and contain a reasonable

level of detail on the models and parameters. The policies and measures are summarised in a table which makes clear the potential greenhouse gas savings.

The projected increase from the base year with measures implemented and adopted is 11.5 % in the basket of six greenhouse gases by 2010. Additional policies and measures are projected to reduce GHG emissions to 7.3 % below base-year levels by 2010. This reduction

is still not enough in order to reach the 13 % reduction agreed under the burden sharing.

In the with measures scenario, emissions from energy (+ 20 %) and industry (+ 12 %) increase by 2010 with regard to the base-year level, whereas emissions from agriculture (– 15 %) and waste (– 22 %) fall. Emissions with additional measures, from industry, increase. All other sectors decrease.

Belgium

Sources of Information

- *Projections of greenhouse gas emissions and the total effect of policies and measures*, report by Belgium under Council Decision 1999/296/EC, December 2001
- *Projections of greenhouse gas emissions and the total effect of policies and measures*, report by Belgium under Council Decision 1999/296/EC, December 2000
- Belgium's third national communication under the United Nations Framework Convention on Climate Change, April 2002

Quality and Transparency of Reporting

The information on policies and measures is taken from the third national communication. Existing policies and measures are well described but their effect is not disaggregated. In the report to the monitoring

mechanism, the effects of the main existing policies for CH₄ and N₂O are separated. The ACEA agreement is specifically excluded from the 'with measures' scenario. Belgium is still developing the second national climate plan and additional measures have not yet been clearly defined. Additional technical measures for CO₂ reductions are listed in the report to the monitoring mechanism and their incorporation into the model described.

Projections with measures and with additional measures are given for CO₂. For the other gases, only a projection with measures is given. The existing policies are those implemented since 1990. The projections are to the year 2020 and are disaggregated by gas and four sectors: energy, industrial process, agriculture and waste. The energy-related emissions are further separated into energy transformation, industry, residential and service, and transport.

Table A.80 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	+++	
Which greenhouse gases?	CO ₂ (CH ₄ and N ₂ O with measures only)	
Status of implementation	++	
Implementation body specified	+++	
Quantitative assessment of implementation	+	Only aggregated
Interaction with other PAMs discussed	-	Not included

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

Table A.81 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	With measures With additional measures	
Expressed relative to inventory for previous years	Yes	
Starting year	2000	
Split of projections	+++	
Presentation of results	++	It is difficult from the tables presented to understand the overall picture.
Description of model (level of detail, approach and assumptions)	+++	
Discussion of uncertainty	-	The fact that two models (Hermes and Markal) were used for the projection period up to 2010 provides some insights on the uncertainty in projections.
Details of parameters and assumptions	+++	Good level of detail on model parameters; policies and measures have less detail (Table A.1).

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

Table A.82 Summary of the effect of additional policies and measures in relation to projections with measures (Mt CO₂ equivalents)

	With measures	With additional measures
Energy transformation		5.7
Manufacturing and construction		5.1
Transport		0.7
Residential and service		2.2
Industrial processes		0.1
Agriculture		—
Waste		—
Total		13.8

Industrial process emissions are also disaggregated.

Assessment of Policies and Measures

The effect of the policies and measures has not been quantified separately from the effect of parameter assumptions on the projections. It has been assumed here that the difference between the two scenarios is the result of the additional measures. The additional measures are directed towards reduction of energy use, the main effects are in energy

transformation and manufacturing and construction. Table A.82 summarises the effect of policies and measures. In Table A.83, details of policies and measures are given. The policies in the first part of the table are those identified as being included in the with measures projections. The second part of the table contains the details given in the third national communication. It is not clear which of the measures in Table A.81 are included explicitly in the projections.

Table A.83 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Policies and measures in the with measures projections									
Residential and service sector	Improving thermal insulation of new buildings in the housing and service sectors	To reduce energy losses by 20 %	CO ₂		Implemented	Government and regions			No
Residential and service sector	Promoting the use of energy-efficient household appliances and lighting	Reduction of energy use	CO ₂	Education and labelling	Implemented	Government and regions			In part (labelling directive)
Residential and service sector	K55 insulation level for new buildings in the residential sector		CO ₂		Implemented				
Residential and service sector	Insulation standards for the service sector		CO ₂		Implemented				No
Residential and service sector	Subsidies for highly efficient bulbs through agreement with electricity producing and distributing companies		CO ₂	Economic	Implemented				No
Energy transformation	Penetration of renewables	To give priority to renewable energy sources	CO ₂		Implemented				No
Energy transformation	Investment plan in the electricity sector		CO ₂		Implemented				No
Energy transformation	Subsidy of EUR 0.05 /kWh for electricity from renewable sources		CO ₂		Implemented				No
Energy transformation	New STAG power plants are built in 1995 and 2000		CO ₂		Implemented				No
Energy transformation	No new nuclear power stations and maximum lifetime for existing nuclear power stations of 40 years		CO ₂		Implemented				No
Energy use	Fuel taxes		CO ₂	Fiscal	Implemented				No
Waste	Measures to reduce landfilling of organic waste and recovery of landfill gas		CH ₄		Implemented				Yes (landfill directive)
Energy transformation (fugitive emissions from distribution)	Measures to reduce leaks		CH ₄		Implemented				No
Agriculture	Reduction of fertiliser use		NO ₂		Implemented				?
Fluorinated gases	Measures to reduce emissions		HFC		Implemented	Flemish region			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Policies and measures from the third national communication									
Energy	E1 — Purchase at a guaranteed price of electricity produced from RES	Promotion of RES	CO ₂	Financial	Adopted	Federal State Ministry of Economic Affairs (energy administration)			No
	E2 — Green certificates	Promotion of electricity derived from RES or from CHP	CO ₂	Regulation	Adopted	Federal State Ministry of Economic Affairs (energy administration)			No
					Implemented	Ministry of Flemish Community (energy administration)			
					Adopted	Walloon Region General Directorate of Technology, Research and Energy			
					Adopted	Brussels-Capital Region IBGE/BIM			
					Adopted	Federal State Ministry of Economic Affairs (energy administration)			No
					Adopted	Ministry of the Flemish Community (energy administration)			
Energy	E3 — Eligibility of producers and consumers of green electricity	Promotion of electricity derived from RES or from CHP	CO ₂	Regulation	Adopted	Federal State Ministry of Economic Affairs (energy administration)			No
					Adopted	Ministry of the Flemish Community (energy administration)			
					Adopted	Walloon Region General Directorate of Technology, Research and Energy			
					Adopted	Brussels-Capital Region IBGE/BIM			
					Adopted	Ministry of Flemish Community (energy administration)			No
					Adopted	Walloon Region General Directorate of Technology, Research and Energy			
					Adopted	Brussels-Capital Region IBGE/BIM			
Energy	E4 — Priority access to the network for green electricity	Promotion of electricity derived from RES or from CHP	CO ₂	Regulation	Adopted	Ministry of Flemish Community (energy administration)			No
					Adopted	Walloon Region General Directorate of Technology, Research and Energy			
Energy	E5 — Obligations of public service in the area of energy efficiency	Energy efficiency	CO ₂	Regulation	Adopted	Ministry of the Flemish Community (energy administration)			No
					Adopted	Walloon Region General Directorate of Technology, Research and Energy			
Energy	E6 — Tax reductions on investments (industrial sector)	Improvements in energy efficiency (industry)	CO ₂	Financial	Implemented	Federal State Ministry of Finance			No
	Energy	E7 — Tax reductions on investments (residential sector)	Improvements in energy efficiency (residential)	Financial	Implemented	Federal State Ministry of Finance			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Energy	E8- Financing CHP installations	Promotion of CHP	CO ₂	Financial	Adopted	Federal State Ministry of Economic Affairs (energy administration)			No
Energy	E9 — Subsidies to companies for investments in energy economy	Improved energy efficiency and promotion of RES	CO ₂	Financial	Implemented	Ministry of the Flemish Community (energy administration)			No
Energy	E10 — Subsidies for the installation of photovoltaic panels	Promotion of solar energy(photovoltaic)	CO ₂	Financial	Implemented	Ministry of Flemish Community (energy administration)			No
Energy	E11 — Subsidies for CHP installations	Promotion of CHP systems	CO ₂	Financial	Implemented	Ministry of the Flemish Community (energy administration)			No
Energy	E12 — Subsidies to households for improving their energy efficiency	Improvement of energy efficiency	CO ₂	Financial	Implemented	Walloon Region General Directorate of Technology, Research and Energy			No
Energy	E13 — Subsidies to municipalities, schools and hospitals for investments leading to energy economy	Improvement of energy efficiency and promotion of RES	CO ₂	Financial	Implemented	Walloon Region General Directorate of Technology, Research and Energy			No
Energy	E14 — Subsidies to federations of companies for investments leading to energy efficiency	Improvement of energy efficiency	CO ₂	Financial	Implemented	Walloon Region General Directorate of Technology, Research and Energy			No
Energy	E15 — Promotion of the Soltherm solar water heater	Promotion of solar water heaters	CO ₂	Educational/financial	Implemented	Walloon Region General Directorate of Technology, Research and Energy			No
Energy	E16 — Subsidies for investments leading to energy efficiency	Improvement of energy efficiency	CO ₂	Financial	Implemented	Brussels- Capital Region IBGE/BIM			No
Energy	E17 — Subsidies for investments in solar water heaters	Promotion of solar water heaters	CO ₂	Educational/financial	Implemented	Brussels-Capital Region IBGE/BIM			No
Energy	E18 — Free energy pre-audits	Energy efficiency	CO ₂	Educational/financial	Implemented	Ministry of the Flemish Community (energy administration)			No
Energy	E19 — Grant towards the cost of an energy audit	Energy efficiency, promotion of RES	CO ₂	Educational/financial	Implemented	Walloon Region General Directorate of Technology, Research and Energy			No
Energy	E20 — Free consultation service for SMEs	Energy efficiency, promotion of RUE	CO ₂	Educational/financial	Implemented	Walloon Region General Directorate of Technology, Research and Energy			No
Energy	E21 — Subsidies for energy audits	Energy efficiency	CO ₂	Educational/financial	Implemented	Brussels-Capital Region IBGE/BIM			No
Energy	E22 — Reductions in tariff for the clients of CHP installations	Promotion of CHP	CO ₂	Financial	Implemented	Federal State Ministry of Economic Affairs (energy administration)			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Energy	E23 — RUE/electricity fund	Improvement of energy efficiency, promotion of the RES and the RUE	CO ₂	Financial	Implemented	Federal State Ministry of Economic Affairs (energy administration)			No
Energy	E24 — Measures to encourage energy efficiency (gas industry)	Energy efficiency	CO ₂	Financial	Implemented	Federal State Ministry of Economic Affairs (energy administration)			No
Energy	E25 — Financial support for the production of electricity from RES	Promotion of RES	CO ₂	Financial	Implemented	Federal State Ministry of Economic Affairs (energy administration)			No
Energy	E26 — Energy certification of buildings	Energy efficiency of buildings	CO ₂	Regulation	Adopted	Energy administration (Federal and regional)			No
Energy	E27 — Introduction of energy performance standards	Energy efficiency of buildings	CO ₂	Regulation	Flemish Region — implemented: other regions: planned	Energy administration (regions)			No
Energy	E28 — Standards of energy efficiency for boilers and water heaters	Improvement of the energy efficiency of boilers and water heaters	CO ₂	Regulation	Implemented	Federal State Ministry of Social Affairs, Public Health and Environmental Health			No
Energy	E29 — Energy efficiency labels	Improvement of the energy efficiency of domestic appliances	CO ₂	Regulation	Implemented	Federal State Ministry of Social Affairs, Public Health and Environmental Health			Yes?
Energy	E30 — Benchmarking agreements (Flemish Region)	Energy efficiency in the industrial sector	CO ₂	Voluntary	Implemented	Ministry of the Flemish Community (energy administration)			No
Energy	E31 — Voluntary agreements with industry (Walloon Region)	Energy efficiency in the industrial sector	CO ₂	Voluntary	Implemented	Walloon Region General Directorate of Technology, Research and Energy			No
Energy	E32 — 'Eco-dynamic company' label (Brussels-Capital Region)	Improving energy efficiency in companies	CO ₂	Voluntary	Implemented	Brussels-Capital Region IBGE/BJM			No
Energy	E33 — Ampere Commission	Analysis aimed at planning energy policy	CO ₂	Planning	Implemented	Federal State Ministry of Economic Affairs (energy administration)			No
Energy	E34 — New infrastructure projects	New infrastructure (wind, photovoltaic)	CO ₂	Planning	Adopted	Ministry of the Flemish Community (energy administration)			No
Energy	E35 — Demonstration projects (Flemish Region)	Information and public awareness (energy efficiency and RES)	CO ₂	Education	Implemented	Energy administration (regions)			No
Energy	E36 — Code of good behaviour for the gas distribution sector	Analysis and prevention of CH ₄ leaks	CH ₄	Voluntary	Planned	Ministry of the Flemish Community (environment administration)			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Industry	I1 — Adaptation of the Viareggio regulations (N ₂ O) catalysts	Limitations of N ₂ O emissions released by the production of nitric acid	N ₂ O	Regulation	Planned	Flemish Region			No
Industry	I2 — Regulations aiming to limit the use of fluorinated greenhouse gases	Reduced emissions of fluorinated greenhouse gases	HFCs, PFCs, SF ₆	Regulation	Implemented/Adopted	Flemish Region			No
Industry	I3 — 'Best available technologies' (Flemish Region)	Implementation of the IPPC directive	All	Regulation	Adopted	Flemish Region			Yes
Industry	I4 — Sector agreements (Walloon region)	Reduction of GHG emissions (chemistry, paper, mining industries, cement)	All	Voluntary	Adopted/planned	Walloon Region			No
Industry	I5 — 'Best available technologies' (Walloon Region)	Implementation of the IPPC directive	All	Regulation	Adopted	Walloon Region			Yes
Agriculture and forestry	A1 — Manure action plan 2	Reduction of agricultural inputs	N ₂ O, CH ₄	Regulation	Adopted	Flemish Region VLM — manure bank			No
Agriculture and forestry	A2 — Reduction in pork rearing	Reduction of agricultural inputs	N ₂ O, CH ₄	Financial	Implemented	Flemish Region ALT (agricultural and horticultural administration)			No
Agriculture and forestry	A3 — Ammonia reduction plan	Reduction in NH ₃ emissions	N ₂ O	Regulation	Adopted	Flemish Region			No
Agriculture and forestry	A4 — 'Organic agriculture' action plan	10 % of farmed land to be 'organic' by 2010	N ₂ O, CH ₄	Financial/educational	Planned	Flemish Region ALT (agricultural and horticultural administration)			No
Agriculture and forestry	A5 — Flanders rural development programme	Improvement of agricultural practices	N ₂ O, CH ₄	Financial/educational	Adopted/planned	Flemish Region			No
Agriculture and forestry	A6 — Rural development plan (RDP)	Improvement of agricultural policies	CO ₂ , N ₂ O, CH ₄	Financial/educational	Adopted/planned	Walloon Region			No
Agriculture and forestry	A7 — Agri-environmental measures	Improvement of agricultural practices	N ₂ O,	Regulation	Adopted/planned	Walloon Region			No
Agriculture and forestry	A8 — Storage, treatment, spreading of farmyard manure	Optimisation of fertilisation	N ₂ O, CH ₄	Financial/voluntary	Planned	Walloon Region			No
Agriculture and forestry	A9 — Reduced input of mineral nitrogen	Reduction of added nitrogen	N ₂ O,	Regulation	Planned	Walloon Region			No
Agriculture and forestry	A10 — Measure to support reforestation	Reforestation	CO ₂	Financial	Implemented (end-2000)	Federal State Min of Agriculture			No
Agriculture and forestry	A11 — Reconversion of ground (Flemish Region)	Reforestation	CO ₂	Financial	Implemented	Flemish Region Department of Woods and Countryside			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Agriculture and forestry	A12 — Prohibition of deforestation	Preservation of wooded land	CO ₂	Regulation	Implemented	Flemish Region Department of Woods and Countryside			No
Agriculture and forestry	A13 — Preservation of the ecological stability of forests	Forest conservation	CO ₂	Financial	Adopted	Walloon Region			No
Agriculture and forestry	A14 — Wood energy plan	Recovery of energy from wood	CO ₂	Educational	Adopted	Walloon Region			No
Agriculture and forestry	A15 — Investigation of carbon sequestration	Improved knowledge of carbon sinks	CO ₂	R & D	Implemented	Walloon Region			No
Waste	W1 — Moratorium on dumping waste	Closure of biologically active landfill sites	CH ₄	Regulation	Implemented	Flemish Region OVAM			Yes?
Waste	W2 — Modifications to the Vlareem legislation	Elimination and recovery of discharged gases	CH ₄	Regulation	Planned	Flemish Region Aminor			No
Waste	W3 — Introduction of specific channels of waste management	Optimised management and recovery of industrial waste	CO ₂ / CH ₄	VOL	Planned	Walloon Region			No
Waste	W4 — Ban on dumping biodegradable organic waste	To stop waste going to landfill sites	CH ₄	Regulation	Planned	Walloon Region			Yes
Waste	W5 — Remedial treatment of old landfill sites	Recovery of discharged gas	CH ₄	Regulation	Implemented	Walloon Region			No
Waste	W6 — Modifications of waste incineration installations	To improve the environmental performance of incinerators	CO ₂ / CH ₄	Regulation	Implemented	Brussels-Capital Region			No
Waste	W7 — Reduction of waste at source	To reduce the quantity and harmfulness of waste at source	CO ₂ , CH ₄	Educational	Implemented	Brussels-Capital Region			No
Waste	W8 — Recovery of waste	Waste recovery, prevention	CO ₂ , CH ₄	Mixed	Implemented	Brussels-Capital Region			No
Transport	T1 — Improvements to public transport (Flemish Region)	Increase the provision and improve the quality of public transport	CO ₂ , N ₂ O, ozone	Mixed	Adopted	Flemish Region mobility cell			No
Transport	T2 — Improvements to public transport (Walloon Region)	Increase the provision and improve the quality of public transport	CO ₂ , N ₂ O, ozone	Mixed	Implemented	Walloon Region (MET(DG3), SRWT,TEC) + SNCB/ NMBS)			No
Transport	T3 — Improvements to public transport (Brussels-Capital Region)	Increase the provision and improve the quality of public transport	CO ₂ , N ₂ O, ozone	Mixed	Implemented	Brussels-Capital Region AED+STIB/MVIB(Brussels public transport company) plus Federal State			No
Transport	T4 — Federal Government's rail investment plan	Increase the provision and improve the quality of public transport	CO ₂ , N ₂ O, ozone	Planned	Adopted	Federal State (Ministry of Communications and Infrastructure) plus agr cooperation for State/Region			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Transport	T5 – Tax exemption for employers' contribution to the price of public transport season tickets and car pooling	Use of public transport and car pooling for home/work journeys	CO ₂ , N ₂ O, ozone	Financial	Adopted	Federal State Ministry of Finance			No
Transport	T6 – Journey expenses become tax deductible	Use of alternative means of transport for home/work journeys	CO ₂ , N ₂ O, ozone	Financial	Adopted	Federal State Ministry of Finance			No
Transport	T7 – Agreed employers' expenses for operating collective transport for members of staff becomes tax deductible	Collective transport of company personnel	CO ₂ , N ₂ O, ozone	Financial	Adopted	Federal State Ministry of Finance			No
Transport	T8 – Implementation of local transport plans (schools and companies)	Collective transport (school children and company personnel)	CO ₂ , N ₂ O, ozone	Voluntary	Implemented	Flemish Region mobility cell			No
Transport	T9 – Pricing policy in favour of public transport	Promotion of the use of public transport	CO ₂ , N ₂ O, ozone	Financial	Implemented	Flemish Region mobility cell, De Lijn company			No
Transport	T10 – Promotion of company staff transport plans	Collective transport of company personnel	CO ₂ , N ₂ O, ozone	Voluntary	Planned	Walloon Region			No
Transport	T11 – Promotion of the use of bicycles for daily home-school journeys	Use of bicycles for home-school journeys	CO ₂ , N ₂ O, ozone	Educational	Adopted	Walloon Region municipalities			No
Transport	T12 – Plans for transporting company personnel	Use of alternative means of transport for home-work journeys	CO ₂ , N ₂ O, ozone	Voluntary	Implemented	Brussels Region MCI plus IBGE/BIM plus AED			No
Transport	T13 – Improvement of infrastructure for cyclists and pedestrians	Use of bicycles and walking for short journeys	CO ₂ , N ₂ O, ozone	Infrastructure	Adopted	Flemish Region mobility cell			No
Transport	T14 – Improvement of infrastructure for cyclists	Promotion of use of bicycles in towns and cities	CO ₂ , N ₂ O, ozone	Mixed	Implemented/adopted	Brussels Region AED plus municipalities			No
Transport	T15 – Improvement of transport infrastructure around the port of Antwerp	Use of different modes of transport	CO ₂ , N ₂ O, ozone	Infrastructure	Implemented	Federal State plus SNCB/NMBS			No
Transport	T16 – Improvement of the quality of transport by navigable waterway (Flemish Region)	Increase of proportion of goods transported by navigable waterways	CO ₂ , N ₂ O, ozone	Infrastructure	Adopted	Flemish Region: mobility cell			No
Transport	T17 – Improvement of systems to promote the use of alternative modes of transport	Changing between modes of transport	CO ₂ , N ₂ O, ozone	Infrastructure	Planned	Flemish Region: mobility cell			No
Transport	T18 – Improvement of the quality of navigable waterways	Increased proportion of goods transported by navigable waterways	CO ₂ , N ₂ O, ozone	Infrastructure	Adopted	Walloon Region			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂ e)		CCPM
							2010	2020	
Transport	T19 — Creation of multimodal platforms (hubs) (Walloon Region)	Changing between modes of transport	CO ₂ , N ₂ O, ozone	Infrastructure	Adopted	Walloon Region			No
Transport	T20 — Rationalisation of traffic flow and parking for heavy loads in cities	Freeing up city traffic	CO ₂ , N ₂ O, ozone	Regulation	Planned	Brussels Region Police plus AED			No
Transport	T21 — Creation of multimodal platforms (hubs) (Brussels Region)	Changing between modes of transport	CO ₂ , N ₂ O, ozone	Infrastructure	Adopted	Brussels Region port of Brussels plus SNCB/NMBS plus SDRB			No
Transport	T22 — Modulation of the size of the European road tax	Promotion of less polluting vehicles	CO ₂ , N ₂ O, ozone	Financial	Implemented	Federal State Ministry of Finance			No
Transport	T23 — LPG allowance	Promotion of less polluting vehicles	CO ₂ , N ₂ O, ozone	Financial	Implemented	Federal State Ministry of the Environment			No
Transport	T24 — Reduction of tax for bringing LPG vehicles onto the road	Promotion of less polluting vehicles	CO ₂ , N ₂ O, ozone	Financial	Adopted	Regions (cooperation agreement)			No
Transport	T25 — Reduction of tax for bringing 'Euro 4' cars onto the road	Promotion of less polluting vehicles	CO ₂ , N ₂ O, ozone	Financial	Adopted	Regions (cooperation agreement)			No
Transport	T26 — Revision of tax for bringing second-hand vehicles onto the road	Promotion of less polluting vehicles	CO ₂ , N ₂ O, ozone	Financial	Adopted	Regions (cooperation agreement)			No
Transport	T27 — Modulation of tax for getting vehicle on the road depending on polluting emissions	Promotion of less polluting vehicles	CO ₂ , N ₂ O, ozone	Financial	Adopted	Regions (cooperation agreement)			No
Transport	T28 — Promotion of 'clean' vehicles	Changing behaviour patterns of consumption	CO ₂ , N ₂ O, ozone	Educational	Implemented	Flemish Region: Aminabel air section			No
Transport	T29 — Traffic regulation	To reduce polluting emissions due to car traffic	CO ₂ , N ₂ O, ozone	Planned	Implemented	Flemish Region mobility cell			No
Transport	T30 — Training of mobility advisors	To strengthen the authority of mobility organisations	CO ₂ , N ₂ O, ozone	Educational	Implemented	Walloon Region MET(DG1, DG2, DG3) plus DGRNE plus DGATLP)			No
Transport	T31,T32 — Mobility observatory	Monitoring and evaluation of policies	CO ₂ , N ₂ O, ozone	Planned	Adopted	Walloon Region			No
Transport	T33 — Campaigns promoting use of bicycles in the city	Promotion of use of bicycles in the city	CO ₂ , N ₂ O, ozone	Educational	Implemented	Brussels Region AED Brussels Region AED plus municipalities			No

Table A.84 Summary of projections by gas in 2010 (Mt CO₂ equivalent)

	Base year	With measures	With additional measures
CO ₂	118.3	140	126.2
CH ₄	14.1	10.5	10.5
N ₂ O	12.1	14.3	14.3
HFC, PFC, SF ₆	0.5 ⁽¹⁾	2.6	2.6
Total without sinks	145	167.4	153.6
Sinks	- 2.1	- 2	- 2
Total with sinks	142.9	165.4	151.6

(¹) This figure is the inventory for fluorinated gases in 1995.

Table A.85 Summary of projections by sector in 2010 (Mt CO₂ equivalent)

	1990	2010 – with measures	Relative to 1990 (%)	2010 – with additional measures	Relative to 1990 (%)
Energy transformation sector	32.4	32.8	1	27.1	- 16
Manufacturing and construction	32	29.8	- 7	24.7	- 23
Transport sector	20.2	29.7	47	29	44
Residential and services	25.4	33.7	33	31.5	24
Industrial processes	13.3	20.7	56	20.6	55
Agriculture	15.4	14.3	- 7	14.3	- 7
Waste	5	2.1	- 58	2.1	- 58
Other	0.9	1.6	78	1.6	78
Fluorinated gas		2.6	0	2.6	0
Sinks	- 2.1	- 2		- 2	

Table A.86 Assessment of target

	Mt CO ₂ equivalent	Percentage of 1990 level (six gas basket)
Base year (from projections)	145	
Commitment	134.1	- 7.5
With existing PAMs	167.4	24.8
Gap (negative means no gap)	33.3	22.9
Effect of additional PAMs	13.8	9.5

Evaluation of Projections

Table A.84 shows the projections by greenhouse gas for 2010 and Table A.85 summarises the projections by sector. Both the with measures and with additional measures scenarios give an increase in emissions compared to the base year. Methane is the only gas that is projected to decrease by 2010, due to changes in agriculture and waste. Emissions from these sectors and manufacturing and construction are projected to decrease, but all other sectors are projected to have increasing emissions.

An assessment of the position relative to the target is given in Table A.86. Belgium's commitment under the burden sharing agreement is -7.5 %

of the 1990 six gas basket. Based on the total without sinks, this gives a commitment to reduce emissions by an equivalent of 10.9 Mt CO₂. The projection with measures is for an increase of an equivalent of 22.4 Mt CO₂, giving a gap of 33.3 Mt CO₂ equivalent or 23 % of the 1990 total. Additional policies and measures totalling 13.8 Mt CO₂ equivalent have been identified. The draft second national climate plan proposed that Kyoto mechanisms be used to achieve half of the reductions needed. However, additional domestic measures will still be needed to meet the commitment if the Kyoto mechanisms are limited to 50 % of reductions.

Description of Modelling Approach

Background

Projections are produced for the medium term (2010) and the long term (2020).

Medium-term projections. These are produced using a combination of the Hermes and EPM models. For the scenario with measures, the results are emissions of the three main greenhouse gases from all sectors. The results of the scenario with additional measures are only for energy-related emissions.

Long-term projections. A combination of the GEM-E3 and Markal models is used to estimate emissions for the long term. The three main greenhouse gases are covered but only energy-related emissions.

Model descriptions

EPM

The EPM model (energy/emissions projection model) ⁽¹⁾ is a techno-economic bottom-up simulation model. The model explains the consumption of energy and corresponding greenhouse gas emissions by looking at activity variables in physical units. It contains a detailed representation of emission sources and of the main factors that determine the evolution in demand. Expected technological developments are taken into account and the model can simulate technical options. Non-energy-related emissions can also be determined.

EPM distinguishes between 90 industrial activities within the energy-intensive industry sectors, 14 different building types in the residential sector and 30 subsectors in the commercial sector.

Hermes

Hermes is a macro-sectoral econometric top-down simulation model ⁽²⁾. It is a

dynamic and annual model that allows for simulations to be performed of the impacts of macroeconomic and sectoral policies, multinational economic policies, energy policies and new technologies. The model is oriented towards the demand side, which is modelled in some detail, but also includes the supply side. The demand for energy is estimated through econometric analysis.

The exogenous variables for the model are the detailed prices for energy products, monetary policy variables (interest rates, exchange rates), fiscal and budgetary variables, European policy and demographic variables. The output of the model consists of input/output tables for nine sectors, the demand for production factors, the accounts of economic agents, the detailed consumption structure for households and the equilibrium between supply and demand for eight energy products.

In the most recent version of Hermes, the environmental component was further developed. This allowed the analysis to be extended to the evolution in CO₂ emissions per sector and the effect of fiscal and other measures.

To calculate the joint effect of non-fiscal and fiscal measures, the bottom-up estimates of non-fiscal measures from EPM have been integrated into the top-down model, Hermes.

Markal

Markal is a long-term multi-period energy technology optimisation model ⁽³⁾ ⁽⁴⁾. It contains a technology description of the main energy transformation and energy use processes in Belgium. Each potentially available energy technology is described by its technological characteristics, its costs and its current installed capacity. The model chooses energy production

⁽¹⁾ Econotec, 'Application du modèle EPM au développement de scénarios d'émissions de CO₂ à l'horizon 2010 pour la Belgique — rapport d'avancement', study made for the Federal services of scientific, technical and cultural affairs, 2001.

⁽²⁾ 'A description of the Hermes II model for Belgium', Working paper No 05-00 of the Federal Planning Bureau 2000. <http://www.plan.be/en/pub/wp/wplist.stm>

⁽³⁾ *Markal, a model to support greenhouse gas reduction policies*, 2001, DWTC/SSTC — Final report CES-KU Leuven, VITO.

⁽⁴⁾ *How to achieve the Kyoto target in Belgium — modelling methodology and some results*, Working paper series No 2000-09, KU Leuven-CES.

Table A.87 Parameters for the projections

Parameter	2000–05	2005–10	Unit
Population			
GDP ⁽¹⁾	2.7	2.4	Annual average growth rate
Oil (international price)	4.5	4.5	Price growth rate (USD 90/bl)
Gas (international price)	4.2	4.2	Price growth rate (USD 90/boe)
Coal (international price)	0	0.3	Price growth rate
Transport passenger growth			Annual average growth rate
Freight growth			Annual average growth rate

Source: Third national communication and questionnaire.

(¹) GDP growth rates are from 2001–06 and 2007–12.

Table A.88 Production of electricity (TWh)

	2000	2012
Water and wind energy	0.4	3.1
Nuclear energy	47.3	48.2
Thermal energy	35.4	51.8
<i>Petroleum products</i>	0.6	0.9
<i>Steel oven and coke gases</i>	2.6	2.1
<i>Natural gas</i>	17.3	43.2
<i>Biomass and waste</i>	1.5	1.5
<i>Other combustibles</i>	0.5	0.5
<i>Coal</i>	12.9	3.5
Total	83.1	103.1

Source: Third national communication.

and consumption options that maximise the net total welfare of energy users, given exogenous bounds on availability of energy sources or technologies or on total emissions.

GEM-E3 model

The GEM-E3 model is an applied general equilibrium model, representing the EU Member States individually linked through trade ⁽⁵⁾ ⁽⁶⁾. It aims at covering the interactions between the economy, the energy system and the environment. The model computes simultaneously the different market equilibrium under the Walras law, and within the macroeconomic equilibrium it determines the optimum balance for energy demand/supply and emission/abatement. The projected energy demand derived from the GEM-E3 model is used as an input into the Markal model, which subsequently

determines the cheapest way to satisfy the demand.

Macroeconomic assumptions

The assumptions about the Belgian macroeconomic development are based on predictions from the European Commission and the OECD for the period up to 2006. For 2007–12, no external information was available so the hypothesis was based on the growth trends over the last 20 years. Parameters for the modelling are shown in Table A.87. The structure of the electricity supply for 2000 and 2012 is given in Table A.88. The estimates for wind and water energy are consistent with other sources but do not necessarily correspond to the EU or Belgian targets.

⁽⁵⁾ P. Capros, T. Geogakopoulos, D. Van Regermorter, S. Proost, T. F. N. Schmidt and K. Conrad, 'European Union: the GEM-E3 general equilibrium model', *Economic and financial modelling*, special double issue Vol. 4, No 2 and 3 pp. 51–160, 1997.

⁽⁶⁾ 'GEM-E3: the GEM-E3 model: Reference manual (detailed technical documentation of the model)', Capros et al., 1997, available at: <http://gem-e3.zew.de>

Country Conclusions

The main documents used for this summary were the document provided under the monitoring mechanism and the third national communication. The level of detail in the documents is good but quantification of the effect of policies and measures is weak. The details of the methodology for the projections are available and contain a reasonable level of detail on the models and parameters. Additional policies and measures are only for CO₂.

The projections with measures are for an increase of 15 % compared with 1990. The Belgian burden sharing agreement is a reduction of 7.5 %, giving a gap of 33MtCO₂ equivalent (23 %). Additional policies and measures are identified to give savings of 13.8 Mt CO₂ equivalent. The Kyoto mechanisms will be used to fill half of the gap, but additional

domestic measures will also be required to meet the commitment.

There is an active programme of policies and measures in all sectors. The Federal nature of Belgium means that policies may be implemented in some regions but not in others. In the energy sector, most of the policies and measures have been implemented, but in other sectors more of the policies are at the adoption or planning stage. Details of policies and measures are given in the third national communication but there is no clear indication as to which have been included in the with measures projection. The model used is an econometric model. Its projections are based upon historical activity and emissions data, which include the effects of all measures taken up to 2000.

Denmark

Sources of Information

The following communications have been made available for this study.

- Follow-up on Energy 21 — Status of energy planning, Danish Energy Agency, June 1999.
- Projections of emissions of greenhouse gases, ozone precursors and sulphur dioxide from Danish sources until 2012, prepared by Risoe National Laboratory, Danish Energy Agency, December 1999.
- Proposal for regulating the potent industrial greenhouse gases, HFCs, PFCs and SF₆, January 2000.
- Note on new projections of emissions of HFCs, PFCs and SF₆, January 2000.
- Climate 2012 — Status and perspectives for Denmark's climate policy, Ministry of the Environment and Energy, March 2000.
- Energy Policy Review 2001, Statement by the Minister for Environment and Energy pursuant to the Act on Energy Policy Measures, April 2001.
- Proposal for Parliamentary Resolution on ratification of the Kyoto Protocol to the UNFCCC, unofficial translation, Danish Energy Agency, April 2001.
- Denmark's GHG projections until 2012, prepared by Risoe National Laboratory, Danish Energy Agency, April 2001.
- Denmark's GHG inventories and projections 1990–2012, Danish Energy Agency, June 2001.
- Preliminary data from the Danish database on initiatives/PAMs, Danish Energy Agency, June 2001.
- Workshop on energy-related national and EU-wide projections of GHG emissions, 27, 28 February 2002.
- Denmark's national greenhouse gas inventory 1990–2000, National Environmental Research Institute, March 2002.
- Proposal for Parliamentary resolution on ratification of the Kyoto Protocol to the UNFCCC, unofficial translation, Danish Environmental Protection Agency, April 2002.
- Statutory Order regulating certain industrial greenhouse gases, unofficial translation, Danish Environmental Protection Agency, July 2002.
- Denmark's greenhouse gas projections until 2012, an update including a preliminary projection until 2017, Danish Environmental Protection Agency, 2003.

In addition, a meeting was held between AEAT and the Danish Energy Agency during April 2000 at which the projection procedures and contents of Climate 2012 were discussed.

Quality and Transparency of Reporting

The national forecasts are based on econometric modelling techniques and have been described in the second national communication, although updates to the methodology are now in place. There are no English translations of the model updates.

Table A.89 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	Yes	
Objectives of policies	Yes	These are covered in the narrative
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O + F-gases	
Status of implementation	++	Mainly associated with existing historic measures
Implementation body specified	++	Activities in some areas are well advanced
Quantitative assessment of implementation	+++	Quantitative assessments made of Energy 21 programme implementation in June 1999
Interaction with other PAMs discussed	-	Not examined

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

Table A.90 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	Not discussed in latest communication	Information is given on PAMs included in the with measures scenario.
Expressed relative to inventory for previous years	Yes	
Starting year	Yes	
Split of projections	+	Shown for all gases
Presentation of results	+++	Good. Projections are presented in CRF
Description of model (level of detail, approach and assumptions)	++	Discussion with DEA indicates different models for different sectors. Description and level of detail good.
Discussion of uncertainty	-	
Details of parameters and assumptions	++	Discussion of parameters and assumptions provided

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

Table A.91 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures	With additional measures
Cross-sector		1
Energy		
Transport		0.9
Agriculture		
Trade and industry		
Households		
Waste		
Total		1.9

Assessment of Policies and Measures

A without measures reference scenario has not been provided and thus the effect of policies and measures under the 'with measures scenario' cannot be calculated. Some disaggregation of savings are provided though this is not adequate to give the effect of policies and measures on a sector by sector basis.

Existing policies and measures will only go some way to covering the likely gap between the current forecast and the commitment of -21 %. The following table summarises both existing and additional measures.

Table A.92 Detailed information on policies and measures (1)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Policies and measures in the with measures projections									
Cross-sector	Target to stabilise emissions in 2005 at 1998 level	Not given	Not given	Not given	Not given				No
Energy supply	Existing biogas action plan	Expansion of wind power and biomass	mainly CO ₂	Fiscal (R & D subsidy)	Given	Given	3	Not given	Yes
Energy supply	Wave energy programme	Develop wave energy	CO ₂	Fiscal (R & D subsidy)	Implemented	Government	Not given	Not given	Yes
Energy supply	Power generation – existing measures plus quotas	Lower level of electricity generation	mainly CO ₂	Economic, regulation		Given	13	Not given	No
Energy supply	Benchmarking in heat supply sector	Ensure ongoing cost-effectiveness of heat supply	CO ₂	Information, other	Planned	Government	Not given	Not given	No
Transport	Energy labelling of new cars	Reduce demand	CO ₂	Information, regulation	Implemented	Government	Included in transport initiative	Not given	Yes
Domestic	Energy labelling	Label domestic appliances	CO ₂	Regulation, information	Implemented	Government	Not given	Not given	Yes
Domestic	Domestic sector economic instruments	Reduce additional demand	Mainly CO ₂	Fiscal (tax and subsidy), information, regulation	Not given – Parliamentary debate	Given	0.4 gas deregulation. 1.6 green tax subsidy schemes	Not given	No
Commercial/residential/public	Energy management in large buildings	Reduction of energy consumption	CO ₂	Regulatory (labelling)	Implemented	Government	Not given	Not given	Yes
Commercial/residential/public	Electrical appliances	Development and use of more energy-efficient appliances	CO ₂	Agreement and information	Implemented	Energy saving trust	Not given	Not given	No
Commercial/residential/public	Subsidies for conversion of electrically heated dwellings	Reduction of energy consumption	CO ₂	Fiscal (subsidy)	Implemented	Danish electricity saving trust	Not given	Not given	No
Commercial/residential/public	Subsidies for condensing boilers	Reduction of energy consumption	CO ₂	Fiscal (subsidy)	Implemented	DEA	Not given	Not given	No
Public	Energy supply in public sector	Reduction of demand in public sector	CO ₂	Information	Implemented	DEA	Not given	Not given	No

(1) The policies and measures listed relate to the April 2001 GHG projection. Due to the change of government in Denmark this list is under revision and new 'with measures' and 'with additional measures' projections are expected to be finalised by mid-2003.

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Industry	Industry efficiency improvements	Additional demand reduction	Mainly CO ₂ , ² also F-gases	Voluntary agreement, fiscal (tax), regulation	Not given — Parliamentary debate, F-gases: both tax and regulation implemented ⁽²⁾	Government	0.6 green tax package 0.7–0.8 limiting industrial gases	No	
Agriculture	Agriculture — existing measures	Non-CO ₂ reduction	CH ₄ and N ₂ O	Fiscal (subsidy) and regulation	Given	Water environment plan II	20 % emissions reduction in agriculture	No	
Waste	Waste incineration	Use in CHP and district heating	Mainly CO ₂	Fiscal (waste levy and subsidy)	Not given	Given	0.6	Yes	
Policies and measures in the with additional measures projection									
Cross-sector	Energy saving measures	Reduce demand	CO ₂		Agreed	DEA and government	1	Not given	No
Transport	Transport initiatives	Demand reduction	Mainly CO ₂	Information, fiscal (tax)	Existing measures assessed. New priority initiatives to be assessed, 2001	Given	0.9	Not given	Yes

⁽²⁾ The expected effect of taxes, which entered into force in 2001, was included in the April 2001 projection. The regulation was adopted in July 2002. The combined effect will, together with a change in methodology, be included in new 'with measures' projections to be finalised in 2003.

Table A.93 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	With measures	With additional measures
CO ₂ with removals by sinks since 1990	52.6	65.6	63.7
CO ₂ without removals by sinks since 1990	52.6	66.8	64.9
CH ₄	5.8	5.0	5.0
N ₂ O	10.8	8.7	8.7
Fluorinated gases ⁽¹⁾	0.3	0.7	0.7
Total with removals by sinks since 1990	69.5	80.0	78.1
Total without removals by sinks since 1990	69.5	81.2	79.3
Change relative to base year with sink (%)		15.1	12.4
Change relative to base year without sink (%)		16.8	14.1

⁽¹⁾ Fluorinated gases, base year 1995 (all other gases have 1990 base year).

Table A.94 Summary of projections by sector in 2010 (Mt CO₂) ⁽¹⁾

	Base year	With measures	Change relative to 1990 (%)	With additional measures	Change relative 1990 (additional measures) (%)
Energy (including fugitive)	26.6	36.9	39		
Manufacturing industry	6.2	7.2	17		
Transport	10.8	14.4	33		
Other (including residential, services, agriculture)	8.9	7.9	- 12		
Industrial processes	1.4	2.2	60		
Solvent use	0.1	0.1	- 31		
Agriculture	14.1	10.7	- 24		
LUCF	0.0	- 1.2			
Waste	1.3	0.9	- 30		
Total (with sink removals)	69.5	79.1	14		

⁽¹⁾ The sector projections are for all GHGs (CO₂, CH₄, N₂O, F-gases).

Table A.95 Assessment of the target

	Mt CO ₂ equivalent	1990 level (six gas basket) (%)
Base year (from projections)	69.5	
Commitment	54.9	- 21
With existing PAMs ⁽¹⁾ ⁽²⁾	80.0	15.1
Gap (negative means no gap)	25.1	36.1
Effect of additional PAMs	1.90	2.7

⁽¹⁾ The emission projections include removals by carbon sinks since 1990.

⁽²⁾ The former Danish government planned these additional measures. Due to the change of government in Denmark, the list of existing and additional policies and measures is under revision.

Evaluation of Projections

The latest projections, published in 2003, show a total greenhouse gases increase of 15 % (including sinks) between 1990 and 2010 when the Corinair emissions are used for the base year. This compares with Denmark's commitment under the EU burden sharing agreement of - 21 %. The saving from additional measures ⁽³⁾ brings the 2008–12

projection to increase by 14 % relative to the base year without removals from sinks and 12 % if sinks are included.

In the latest projection, the industrial processes are projected to have the largest increase in GHG emissions relative to 1990, followed by energy and transport, even with the existing measures and additional measures

⁽³⁾ The former Danish government planned these additional measures. Due to the change of government in Denmark, the list of existing and additional policies and measures is under revision.

planned. A decrease in sector emissions is projected for solvent use, waste agriculture and 'other combustion'.

Based on the new projections, Denmark's GHG emissions are predicted to increase and thus the gap between the projection for 2010 and the target is 36 % of base year emissions if all existing and additional measures are implemented and effective. The additional measures will only reduce the emissions gap to 33 % of the base year.

Description of Modelling Approach

Energy demand forecasts are based on econometric regression techniques, although in the case of households, a more bottom-up approach is used based on housing changes and electrical appliance demands. Industrial projections are made using EMMA, a top-down econometric model, where fuel consumption is based on economic activity, efficiency and relative energy prices. Transport is modelled separately by the Ministry of Transport based on ad hoc bottom-up calculations.

The Risoe National Laboratory combined activity data projections and emission factors and calculated future GHG emissions in a spreadsheet model. They also modelled non-energy sources. Agriculture, which is responsible for around 22 % of GHG emissions, relies on estimates of animal numbers and farming practices.

A technical model was used to forecast electricity and heating activity, based on future household demand. Over the period 2000–12, the final energy consumption of households was predicted to decrease by 0.4 %.

Energy production forecasting uses detailed bottom-up simulation modelling (Ramses) relying on knowledge of individual power stations and heat producing plants. Modelling of future production is shown in the Climate 2012 summary document indicating variable year-on-year savings from the energy sector. Electricity export peaked in 1996 and then fell up to 2000 because of the new quota system (see previous discussion in Table A.92). After 2000, exports were forecast to rise even with penalties under the quota system. At 2002, a new CCGT plant was expected to come on stream, but because of a gradual growth in electricity prices, exports will increase again until the commitment period, where significant CO₂ reductions will need to be made or permits purchased. It is forecast that compared with 1990, greenhouse gas emissions from the energy sector will be 36 % lower.

Modelling parameters used in the projections are given below.

Country Conclusions

Since 1990, Denmark has had in place a climate change strategy (the Energy 2000 plan) which was updated in 1996 (the Energy 21 plan) with the national CO₂ target confirmed. The national target for reducing CO₂ emissions set in 1990 is still 20 % by 2005 compared with 1988 levels. The additional target for the transport sector (CO₂ emissions at 2005 would be the same as at 1988 which implied that other CO₂ emissions must fall by 25 % by 2005 compared with 1988) was revised in April 2001. According to the new transport action plan, the new initiatives will contribute with additional measures reductions in

Modelling parameters

Parameter	2000	2010	Unit
Population	5.34	5.44	Millions
GDP	2.4	1.5	Growth/year (%)
Oil (international price, IEA)	28.4	21	USD (2000)/bbl
Coal (international price, IEA)	32.8	46.5	USD (2000)/tonne
Transport passenger growth	79 366	87 169	Passenger km – millions
Freight growth	14 300	16 524	Tonne km – millions

Source: Questionnaire.

the range of 0.8–1.0 Mt CO₂ equivalent, in comparison with the with measures projection.

The latest projections of greenhouse gas emissions carried out in 2003, show that compared with the burden-sharing target, the total GHG emissions gap will be 36 % (including removals from sinks). This is significantly higher than the gap of 3 % based on the 2001 projections. The increase is largely due to recalculation of the base year and projections to exclude corrections for net-electricity imports and exports. New measures were identified by the former government but they only go a small way to closing this gap and proposals have been brought forward by this government in 2001, including proposals within the transport sector mentioned above.

The information provided on policy objectives and quantification of the effect is good, but cost data are not available.

The information on projections is also good, giving details of emission factors and activity used in the projections. The projections are also presented in the IPCC/CRF format making it compatible with the inventories. In general, the reporting is clear and comprehensive.

Due to the change of government in Denmark this list of climate change policies and measures is under revision. It is expected that new projections with additional measures will be finalised by mid-2003.

A new 'Proposal for a climate strategy for Denmark' was adopted by the Danish parliament on 13 March 2003. Proposals for filling the 25 Mt CO₂ gap are based largely on the flexible mechanisms due to their cost-effectiveness; domestic measures such as heat pumps and reduction in electricity production may also be implemented.

Finland

Sources of Information

- Reporting of implemented policies and measures by Finland under the monitoring mechanism of Community CO₂ and other greenhouse gas emissions, December 2002
- Reporting of implemented policies and measures by Finland under the monitoring mechanism of Community CO₂ and other greenhouse gas emissions (Council Decision 1999/296/EC), December 2001
- Finland's third national communication under the United Nations Framework Convention on Climate Change, 2001
- Information provided in a questionnaire as part of the monitoring mechanism, 2001

Quality and Transparency of Reporting

Finland's third national communication provides reasonably comprehensive information about both existing and planned policies and measures and the information is summarised in tabular form. The main area where information is lacking is in the quantitative assessment of policies and measures. There is some quantitative assessment of the combined effect of policies and measures in the additional measures scenario, but not of individual measures. There is no quantification of policies and measures in the with measures scenario. Policies and measures no longer in place are noted.

Individual policies and measures are not costed, however there is a discussion of government expenditure on the energy economy, under a number of broad headings including research and development, promotion of energy conservation and investment aid for renewables.

The latest report under the monitoring mechanism, largely takes selected information from the 3NC. The scoring in the tables below relates to the information in the 3NC.

Information on projections is presented for a base scenario (taken from Finland's first national communication), a with measures scenario and a with additional measures scenario. The policies and measures in the with measures and with additional measures scenarios are clearly identified.

The projections are disaggregated by gas (carbon dioxide, methane, nitrous oxide and fluorinated gases) and by sector and presented in both graphical and detailed tabular form. The sectoral disaggregation does not conform to the UNFCCC CRF as all energy-related emissions, with the exception of transport, are reported together. No breakdown for energy supply, domestic, industry, services, etc. is available.

Assessment of Policies and Measures

Information on policies and measures is clearly presented. Quantification of the effect of policies and measures is only given for the planned measures that are contained in the with additional measures projection. Table A.98 shows the effect of these measures.

Table A.99 provides a detailed breakdown of both implemented and planned policies and measures.

Table A.96 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	++	
Which greenhouse gases?	All	
Status of implementation	+++	Clear distinction between existing and planned policies and measures
Implementation body specified	+++	
Quantitative assessment of implementation	+	Information only given on the combined effects of policies and measures in the with additional measures scenario
Interaction with other PAMs discussed	++	Some discussion on other policies and measures that affect GHG

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

Table A.97 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	Base, with measures, with additional measures	
Expressed relative to inventory for previous years	Yes	
Starting year	2000	
Split of projections	++	No sectoral breakdown for energy-related emissions
Presentation of results	+++	Detailed tables provided by sector
Description of model (level of detail, approach and assumptions)	++	Good description of various modelling approaches
Discussion of uncertainty	++	There is a qualitative discussion of the sensitivity of the results to input assumptions
Details of parameters and assumptions	+	Most parameters are described only qualitatively

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

Table A.98 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures	With additional measures
Energy		
Energy conservation		3-4
Promotion of renewable sources of energy		4-5
Action concerning electricity production		6-10
Other sectors		
Measures concerning other greenhouse gases		>1
Total		14

Table A.99 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Policies and measures in the with measures projections									
Energy	Electricity market act	Increase competition	CO ₂	Regulatory	Implemented 1995 and modified in 1997	Ministry of Trade and Industry			Yes
Energy	Energy taxation	Reduce energy consumption and improve competitiveness of renewables	CO ₂	Fiscal	Implemented — latest change in 1998, further changes under preparation	Ministry of Finance			No
Energy	Energy conservation programme	Reduce energy consumption	CO ₂	Technical, regulatory, economic, information, education	Implemented 1995	Ministry of Trade and Industry, Motiva Oy			No
Energy	Voluntary agreement on energy conservation and energy auditing	Agreements on monitoring, conservation plans, energy audits, energy investment, new technology	CO ₂	Voluntary agreement	Implemented 1997 — extended agreements planned, some already implemented	Ministry of Trade and Industry, Motiva Oy, industry, municipalities			No
Energy	Action plan for renewable energy sources	Reduce CO ₂ and non-GHG emissions	CO ₂	Fiscal, technical, information, education, economic	Implemented	Ministry of Trade and Industry			Yes
Transport	Voluntary agreement with European, Japanese and Korean car industries	Reduction of CO ₂ emissions from passenger cars	CO ₂	Voluntary agreement	Implemented	EU with car industry			Yes
Transport	Differentiation of vehicle taxation	Promoting purchase and use of energy-efficient vehicles	CO ₂	Fiscal	Planned	National government			No
Transport	Promotion of public and non-motorised transport	Increasing share of public and non-motorised transport	CO ₂ , N ₂ O	Economic, education, information, voluntary agreement	Implemented, new measures taken in 2001	National government in cooperation with local authorities			No
Transport	Eco-driving	Adoption of eco-efficient driving skills and habits	CO ₂	Information, education, economic	Implemented	National government in cooperation with local driving schools			No
Transport	Information on the fuel consumption and CO ₂ emission levels of new cars	Increased consumer awareness, promotion of fuel-efficient vehicles	CO ₂ , N ₂ O	Regulatory, information	Implemented	National government			No
Transport	Energy saving	Adoption of energy saving agreements between administration and transport operators	CO ₂	Voluntary agreement	Implemented, new arrangements in preparation	National government in cooperation with transport operators			No
Waste Management	Government decisions on landfills	Reduce CH ₄ emissions	CH ₄	Regulatory	Implemented	Ministry of the Environment			Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Waste Management	Waste minimisation, collection and recovery of waste paper and other waste fractions	Reduce CH ₄ emissions	CH ₄	Regulatory	Implemented	Ministry of the Environment			No
Waste Management	Waste tax	Reduce CH ₄ emissions	CH ₄	Fiscal	Implemented	Ministry of Finance			No
Agriculture	Nitrate statute	Reduce N ₂ O emissions	N ₂ O	Regulatory	Implemented	Ministry of Agriculture and Forestry			No
Agriculture	Agenda 2000, including agri-environmental measures	Reduce GHG	CO ₂ , CH ₄ , N ₂ O	Economic	Implemented	Ministry of Agriculture and Forestry			No
Policies and measures in the with additional measures projections									
Energy	Revised energy conservation programme	Reduce energy consumption	CO ₂	Technical, information, education, fiscal, regulatory	Under revision	Ministry of Trade and Industry, Motiva Oy, Ministry of Finance, Ministry of the Environment			No
Energy	New action plan for renewable energy sources	Reduce CO ₂ and non-GHG emissions	CO ₂	Fiscal, technical, information, education, economic	Under revision	Ministry of Trade and Industry			Yes
Energy	Supply of electricity	Reduce CO ₂ emissions	CO ₂	Regulatory, economic	Planned; decision made to build new nuclear power reactor	Ministry of Trade and Industry			Yes
Energy	Decree on thermal insulation in buildings, decree on indoor climate and ventilation	Reduce energy consumption in new buildings	CO ₂	Regulatory	Adopted in October 2002, shall enter into force in October 2003	Ministry of the Environment			No
Energy	Voluntary agreement on energy conservation in residential buildings	Reduce energy and water consumption	CO ₂	Voluntary agreement	Adopted in November 2002	Ministry of the Environment, Ministry of Trade and Industry, Housing and Construction Association (ASRA)			No
Transport	Increase of fuel taxation	Reduce traffic volume and GHG emissions	CO ₂	Fiscal	Planned	Ministry of Finance			No
Transport	Public transport strategy, 2001	Promote public transport	CO ₂	Information, education, economic	Planned	Government in cooperation with local authorities			No
Transport	Broader energy savings agreements	Broaden the scope and effectiveness of energy saving agreements	CO ₂	Voluntary agreement	Planned	Ministry of Transport and Communications			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Transport	Land use and building act, 2000	Prevention of urban sprawl	CO ₂	Information, education, economic	Implemented	Government in cooperation with regional and local authorities			No
Waste management	Landfill gas recovery	Reduce CH ₄ emissions	CH ₄	Regulatory, fiscal	Implemented	Ministry of the Environment, Ministry of Finance			No
Waste management	Further waste minimisation and increased utilisation of source-separated waste fractions as material and energy	Reduce CH ₄ emissions	CH ₄	Regulatory, fiscal	Planned	Ministry of the Environment, Ministry of Finance			No
Waste management	Biowaste strategy	Reduce CH ₄ emissions	CH ₄	Regulatory, economic, technical, information, education	Planned for 2003	Ministry of the Environment			No
Waste management	Development of waste taxation	Reduce CH ₄ emissions	CH ₄	Regulatory, fiscal	Planned	Ministry of Finance			No
Kyoto mechanisms	Pilot programme for JI and CDM activities	Gain experience with mechanisms and generate emission credits	CO ₂	International cooperation	Launched in 2000, projects identified, practical implementation begun 2002	Ministry of Foreign Affairs, Finnish Environment Institute			No

Table A.100 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	With measures	With additional measures ⁽¹⁾
CO ₂	62.5	76.4	64.7
CH ₄	6.1	3.5	2.8
N ₂ O	8.4	8.3	8.4
HFCs and PFCs	0.0	1.7	0.9
SF ₆	0.1		
Total	77.2	89.9	76.8
Percentage change relative to 1990		16.5	- 0.5

⁽¹⁾ The base year (1990) figures have recently been revised. Therefore, the target figure for 2010 (76.8MtCO₂) differs from the revised 1990 emissions (77.2 Mt CO₂).

Table A.101 Summary of projections by sector in 2010 (Mt CO₂)

	Base year	With measures	Change relative to 1990 (%)	With additional measures ⁽¹⁾	Change relative to 1990 (additional measures) (%)
Energy	47.1	62.3	32.3	51.3	8.9
Transport	12.5	13.9	11.2	13.7	9.6
Industrial processes	2.9	4.5	55.2	3.5	20.1
Solvents	0.1	0.1	0.0	0.1	0.0
Agriculture	10.1	6.8	- 32.7	6.7	-
Waste management	3.9	1.6	- 57.9	0.8	- 79.5
Other	0.6	0.7	16.7	0.7	16.7
Total	77.2	89.9	16.5	76.8	- 0.5

⁽¹⁾ The base year (1990) figures have recently been revised. Therefore, the target figure for 2010 (75.8Mt CO₂) differs from the revised 1990 emissions (77.1 Mt CO₂).

Table A.102 Assessment of the target

	Mt CO ₂ equivalent	Percentage of 1990 level (six gas basket)
Base year (from inventory)	77.2	100.0
Commitment	77.2	100.0
With existing PAMs	89.9	116.5
Gap (negative means no gap)	12.7	16.5
Effect of additional PAMs	13.1	17.0

Evaluation of Projections

Tables A.100 to 102 summarise the latest emissions projections and compare them with Finland's target under the EU burden sharing agreement. The with measures projection shows that without additional policies and measures, Finland's emissions will increase by 16.5 % in 2010 compared with 1990 levels. However, if the effect of the planned measures are taken into account, then the with additional measures projection shows that Finland is expected to meet its target.

Description of Modelling Approach

In order to study the effects of the climate strategy, two major research

projects were launched as early as in the beginning of 1999. The Government Institute for Economic Research (VATT) studied the effects in collaboration with the Technical Research Centre of Finland (VTT), and in the other project, the Research Institute of the Finnish Economy (ETLA) and the VTT produced joint estimates of the effects. The ETLA and the VTT have developed a computable general equilibrium model that combines a top-down approach of economic behaviour with a bottom-up description on energy and paper industries. The model facilitates a simultaneous analysis of both economic and technological choices.

Economic top-down models do not usually define production processes in great detail, relying instead on production functions to catch the usage of inputs, including energy. The interdependencies of various sectors as well as economic choices are modelled much more meticulously. Engineering models, on the other hand, tend to take a partial equilibrium approach and contain detailed descriptions of production technologies and processes, but leave the economic environment exogenous. The model developed by the ETLA and the VTT combines these two approaches.

In the VATT/VTT project two large models were used in an iterative manner. The energy sector calculations are carried out by means of the EFOM model, managed by VTT Energy. The economic evaluation is largely based on calculations with KESSU, which is owned by the Ministry of Finance but deployed in VATT. EFOM is an optimisation energy model. Its original design is rooted in an initiative of the European Commission to obtain a model standard for energy system modelling throughout Europe. The Finnish version has been extended and tuned to the Finnish circumstances, e.g. concerning the abundant use of district heat and the significance of the pulp and

paper industry. Parameters used in the modelling are given below.

Country Conclusions

Finland has provided up-to-date and detailed information about policies and measures to reduce greenhouse gas emissions and projections. Both the third national communication and the latest monitoring report provide a good level of description of the policies and measures, although the quantification for individual policies and measures is mostly absent. The policies and measures included in both the with measures and with additional measures projections are clearly identified.

The projections are clearly presented in both graphical and tabular form and are disaggregated by individual greenhouse gas. The sectoral breakdown is less comprehensive with all energy-related emissions, except transport, reported together.

With existing measures the projections show a 17 % gap to Finland's burden sharing target. Additional policies and measures are identified which the projections indicate will fill this gap and enable Finland to meet its target through domestic measures alone.

Modelling parameters

Parameter	2000	2010	Units
Population	5.17	5.23	Millions
GDP	520	690	Billion FIM

Source: Questionnaire.

France

Sources of information

The information in this appendix is based on the following.

- Troisième communication nationale à la convention cadre des nations unies sur les changements climatiques, novembre 2001 ⁽¹⁾
- Second national communication of France under the Framework Convention on Climate Change, November 1997
- Rensbergen, J.v., Michaelis L., Ghai A., Hadj-Sadok T., In-depth review of the second national communication under the UN Convention on Climate Change, FCCC/IDR.1/FRAU, 17 February 1998 (www.unfccc.int)
- Projections of greenhouse gas emissions established in the frame of the national programme for tackling climate change (communication by M. Mousel, Mission interministérielle de l'effet de serre, to Environment DG, 13 March 2000)
- Mission interministérielle de l'effet de serre (www.effet-de-serre.gouv.fr), Programme national de lutte contre le changement climatique

(PNLCC, <http://www.premier-ministre.gouv.fr/fr/p.cfm?ref=23020>)

- Laverne, R., 'Perspectives énergétiques pour la France à l'horizon 2010–20', *Energies et matières premières*, No 6, 3ème trimestre 1998
- Discours et bilans de la conférence nationale du programme national de lutte contre le changement climatique (<http://www.effet-de-serre.gouv.fr/fr/actualites/actualite/index.cfm?fuseaction=Article&NumActualite=53&NumLangue=1&NumRubrik=1>)

Quality and transparency of reporting

The French national programme for tackling climate change and the third communication provide a quite comprehensive view of many important aspects related to French climate change policy. In particular, it details in a very structured manner the proposed additional measures according to the sector, the greenhouse gas and the estimated impact of the measure.

The current status of implementation of the policies and measures is not altogether clear and it was not always possible to separate proposed

Table A.103 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	Policies are distinguished by unique keys and short names.
Objectives of policies	+++	In most cases a good description of the objectives.
Which greenhouse gases?	++	CO ₂ , CH ₄ , N ₂ O and three fluorinated gases. These are covered by inventories, projections and measures. No separate details about HFC, PFC and SF ₆ .
Status of implementation	++	The third national communication distinguishes between PAMs which are in force, ongoing, committed, adopted, applied, started or suspended. The implementation categories used are not consistent with the categories of the guidelines.
Implementation body specified	++	The ministries and other bodies in charge are mentioned.
Quantitative assessment of implementation	+	Details about existing measures in the energy, buildings and transports sector: no actual emission data by measure, but mostly estimations for 2000 until 2020 in five-year steps. Additional measures: only 2010 estimations for some measures.
Interaction with other PAMs discussed	+	Partly addressed.

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

⁽¹⁾ Including an erratum dated March 2002 and a supplement dated February 2002.

Table A.104 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	+++	Distinction is made between the following scenarios: 1. without measures (including only measures adopted before 31 December 1989) 2. with existing measures (measures that have been decided upon and started (at least partially) before 2000) 3. with additional measures (measures decided, but not implemented before 2000; new measures of the PNLCCC; other measures decided since 2000).
Expressed relative to inventory for previous years	++	No percentage values, but absolute figures.
Starting year	+++	1999, following the definition that existing measures are those implemented by 31 December 1999.
Split of projections	++	Projections according to the scenarios without measures, with existing measures and with additional measures are provided for the following sectors: • energy • industrial processes • agriculture • waste • others. for the years 1990, 1999, 2010 and 2020. Distinction is made between the following groups of gases: CO ₂ , CH ₄ , N ₂ O and overall fluorinated gases.
Presentation of results	++	Presentation in tabular but not in graphical form.
Description of model (level of detail, approach and assumptions)	++	The use of the different models is described in principle. No clear description for the methodology used for non-CO ₂ greenhouse gases.
Discussion of uncertainty		No discussion uncertainty.
Details of parameters and assumptions	++	The main assumptions are stated in the third national communication.

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

Table A.105 Summary of the effect of policies and measures included in the 2010 projections (Mt CO₂)

Sector	With measures ⁽²⁾	With additional measures ⁽³⁾
Energy ⁽⁴⁾	- 38.7	- 68.1
Industrial processes ⁽⁵⁾	- 43.7	- 69.9
Waste	- 28.3	- 28.3
Agriculture	0.0	- 2.7
Others ⁽⁶⁾	0.0	0.0
Total ⁽⁷⁾	- 110.7	- 169.0

Source: Third national communication.

'additional measures' without concrete steps and time schedules from additional measures which are already at a more concrete step of implementation. Also, it could be clearer whether model assumptions or experience from PAMs which have been implemented have been used for the projections.

Costs of the measures to be undertaken are not given in detail. Only estimates

for overall costs to the French economy of stabilisation of greenhouse gases is available from top-down general or partial equilibrium models.

Assessment of policies and measures

Table A.105 gives an overview of national policies. The figures given for the with measures projection are for the policies and measures introduced since Kyoto and before 2000. Other existing

⁽²⁾ Measures that have been decided upon and started (at least partially) before 2000.

⁽³⁾ Measures decided, but not implemented before 2000; new measures of the PNLCCC; other measures decided since 2000.

⁽⁴⁾ Including energy use in industry, etc.

⁽⁵⁾ Only GHG emissions from industrial processes and F-gas emissions, without GHG emissions from fossil fuel combustion.

⁽⁶⁾ Including emissions from use of solvents.

⁽⁷⁾ Without biomass, land-use, land-use change and forestry.

policies and measures have not been quantified separately.

Policies implemented or continued

The third national communication refers to PAMs implemented or continued during the 1990s. Though they are described in detail, their quantitative impact is only specified as an overall effect: without the measures of the with measures projection, total GHG emissions would be 110.7 Mt CO₂ equivalent higher (without measures projection).

New measures

France categorises in its national programme for tackling climate change (PNLCC) the new measures into the following three categories contributing about 59 Mt CO₂ equivalent to close

the gap, all of which can be classified as proposed measures, though the first category reinforces existing measures.

- New measures reinforcing and extending existing measures (category 1 measures) are expected to contribute 25.8 Mt CO₂ equivalent to close the gap.
- Taxation measures (category 2 measures) are expected to contribute 24.6 Mt CO₂ equivalent to close the gap.
- Long-term structural action on the supply side (including most actions with effects on transportation and on renewable energy sources, category 3 measures) are expected to contribute 9.2 Mt CO₂ equivalent to close the gap.

Table A.106 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Policies and measures in the with measures projections									
Energy (1.A.1.a)	E-0.1 Nuclear investment	Energetic substitution	CO ₂	Economic	Implemented	EDF	46.00	46.00	No
Energy (1.A.1.a)	E-0.2.1 Development of cogeneration	Energetic substitution, with a target of 4 GW in 2010	CO ₂	Regulation	Implemented	EDF	3.70	4.40	Yes
Energy (1.A.1.a)	E-0.3 Cutting the peak load	Energetic substitution, demand side management, through the diffusion of the tariff 'tempo' and an agreement Ademe/ EDF	CO ₂	Regulation, economic	Implemented	Ademe, EDF	1.80 to 2.90		No
Energy (1.A.1.a)	E-0.5, E-0.6 Reduction of counterproductive effects by the adjustment of electricity rates	Energetic substitution, demand side management Corsica, the overseas departments and certain rural regions	CO ₂	Economic	Implemented	EDF			Yes
Energy (1.A.1.a)	E-1.1 Leakages in the natural gas net	Reduction of the fugitive methane emissions	CH ₄	Economic	Implemented	GDF	0.64	0.64	No
Energy (1.A.1.a)	E-0.2.2, E-4.1 Development of wind energy	Energetic substitution (wind energy programme, 2005)	CO ₂	Regulation	Implemented	Minefi	0.70		Yes
Energy (1.A.1.a)	A-0.2.3, RT-4.1.1, RT-4.1.2, E-4.2.1 Wood energy	Energetic substitution (wood energy plan and local development)	CO ₂	Economic	Implemented	Map-METL	0.20	0.20	Yes
Energy (1.A.1.a)	A-1.4 Partly biofuels	Energetic substitution by development of production of agricultural biomass for energetic use	CO ₂	Economic, fiscal	Implemented	Map			Yes
Energy (1.A.1.a)	E-0.4 Growth of incineration capacities	Energetic substitution	CO ₂	Economic, regulation	Implemented	Mate			Yes
Energy (1.A.4.a and b)	RT-0.1 Thermal regulation	Improvement of energy efficiency of buildings (applies for new service buildings as well)	CO ₂	Regulation	Implemented	METL	1.50	2.40	Yes
Energy (1.A.4.a and b)	RT-0.10 Display of buildings' energy consumption	Value improvements of buildings' energy efficiency	CO ₂	Regulation	Planned	METL			Yes
Energy (1.A.4.a and b)	RT-0.2, RT-0.5, RT-0.6, RT-0.7 Financial and fiscal incentives for improvements in existing buildings	Encourage works in energy management, tax reduction, allowances for improvement of housing conditions	CO ₂	Economic	Adopted	METL, Minefi	3.70	6.60	Yes
Energy (1.A.4.a and b)	RT-0.9, RT-3.1 Actions concerning State buildings	Improvement of energy efficiency	CO ₂	Regulation	Implemented		0.70	0.70	Yes
Energy (1.A.4.a and b)	A-2.4 Development of wood use in construction	Carbon storage outside of forests, reduction of fossil CO ₂ emissions	CO ₂	Regulation, other	Implemented	Mate	2.60		Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Energy (1.A.4.a and b)	RT-0.3 VAT reductions for works on existing flats	Encourage works on existing flats, VAT reduction for flats aged more than two years	CO ₂	Fiscal		Minefi			No
Energy (1.A.4.a and b)	RT-0.8 Classification of heat networks	Improvement of energy efficiency: all new buildings must be connected to heat network	CO ₂	Regulation	Planned	METL, Minefi			No
Energy (1.A.4.a and b)	RT 0.11 Renewal of building stock	Improvement of building stock	CO ₂	Economic	Implemented	METL			No
Transport (1.A.3)	T-0.2.1, T-3.2.2 Institutional actions concerning freight transport	Re-establish best competition conditions in freight transport by regulation, driving time control and sanctions. 'Contrat de progrès de la profession'	CO ₂	Regulation	Implemented	METL			No
Transport (1.A.3)	T-0.1.1, T-3.2.3 Catch up tax rates on gas oil and raise minimum tax on fuels	Reduce tax gap between gas oil and petrol to average European level and evolution of European fuel taxation	CO ₂	Fiscal	Implemented	Minefi			Yes
Transport (1.A.3)	Technical measures concerning lorries	Reduction of specific emissions by MOT and obligation for technical improvements	CO ₂	Regulation	Implemented	METL	1.50	1.50	No
Transport (1.A.3)	T-0.2.2, T-3.1.4, T-4.3 Development of 'intermodal' freight transport	Development of 'intermodal' transport different from road transport through public aid and technical actions (financed by the FITTVN)	CO ₂	Economic, regulation	Implemented	METL	3.30	5.90	Yes
Transport (1.A.3)	T-0.3.1, T-1.1.1, T-1.1.2 ACEA agreement	Emission reduction in private transport	CO ₂	Voluntary	Implemented	European Commission, METL, Mate			Yes
Transport (1.A.3)	T-0.3.2 MOT of light-duty vehicles	Reduction of polluting emissions by repairing obligation	CO ₂	Regulation	Implemented	METL	3.10	2.90	No
Transport (1.A.3)	Renewal of car park	Encourage renewal of car park by paying a premium for the withdrawal of cars older than 10 years	CO ₂	Economic	Implemented	METL			No
Transport (1.A.3)	T-0.3.3, T-1.4 Alternative vehicles	Develop alternative vehicles	CO ₂	Fiscal, other	Implemented	METL	1.10	1.80	Yes
Transport (1.A.3)	T-0.1.6, T-3.1.1, T-3.1.2, T-4.2, T-4.4 Urban transport	Optimise urban transport via PDUs (urban transport and mobility master plans) and local activities	CO ₂	Regulation	Implemented	METL, local authorities	2.60	4.00	Yes
Transport (1.A.3)	T-0.3.6 High-speed trains	Offer alternatives to road or air transport	CO ₂	Economic	Implemented	METL, SNCF	0.60	0.80	Yes
Transport (1.A.3)	T-0.3.5 Regional express transport	Improve conditions for commuting	CO ₂	Economic	Implemented	METL, SNCF			Yes
Transport (1.A.3)	T-0.3.8 Speed control of light-duty vehicles	Road security and energy consumption	CO ₂	Regulation, other	Implemented	METL			Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Transport (1.A.3)	T-0.3.7 Specific emission reduction of air transport	Improve air navigation in Europe	CO ₂	Regulation, economic	Implemented	METL, Eurocontrol		Yes	
Industry (1.A.2. and 2)	I-0.2 Voluntary engagements	Emission reductions	CO ₂	Voluntary	Implemented	Mate	4.40	No	
Industry (1.A.2)	I-0.1, I-0.3, I-1, RT-0.4 Supporting measures	Energetic efficiency, Ademe-Frac aids, boiler regulations, etc.	CO ₂	Economic, fiscal, regulation	Implemented	Minefi, Ademe	0.40	No	
Industry (2)	I-0.3 Industrial N ₂ O emission regulation	Reduce N ₂ O emissions in industry	N ₂ O	Regulation	Implemented	Prefectures	22.90	No	
Industry (2)	I-0.4, I-4.2 Tax on nitrous oxide emissions	Pollution control	N ₂ O	Fiscal	Implemented			No	
Agriculture (4)	A-0.1, A-1.2 Management of nitrogenous fertilising	Indirect reduction of N ₂ O emissions	N ₂ O	Regulation, other	Implemented	Map		No	
Forest (5)	A-0.2.1 Afforestation of agricultural grounds	Increase carbon sinks (afforestation policy: 30 000 hectares of agricultural ground per year)	CO ₂	Economic		Map	2.50	No	
Waste (6)	E-0.4, DE-3 Energetic use of waste	Energetic substitution (double incineration capacity of household waste)	CO ₂	Regulation	Implemented	Mate	1.30	No	
Waste (6)	Suppression of dumping non-recyclable rubbish	Reduction of CH ₄ emissions	CH ₄	Regulation	Implemented	Mate	12.20	Yes	
Waste (6)	DE-4 Salvage of methane in landfill sites	Reduction of CH ₄ emissions	CH ₄	Regulation	Implemented	Mate		No	
Policies and measures in the with additional measures projections									
Industry (1.A.2., 2., 3)	I-1.1 Help for Ademe (Frac) funding decisions	Relaunch of incentive to limit emissions	All	Economic	Adopted	Ademe	0.45	No	
Industry (1.A.2., 2., 3)	I-1.2 Research and development, FRF 20 million per year	Support for research and development of emission limiting technologies and processes	All	Economic, other	Planned	Ademe, MENRT		No	
Industry (1.A.2., 2., 3)	I-1.3 Technological demonstration, FRF 30 million per year	Support for exemplary technological demonstration projects	All	Economic, other	Planned	Ademe, MENRT		No	
Industry (1.A.2., 2., 3)	I-1.4 New financing methods	Favour financing emission limiting projects by banks	All	Economic	Adopted	Ademe, Mate, Minefi		No	
Industry (1.A.2., 2., 3)	I-1.5 Uniqueness of Ademe (Frac) procedures	Improve the efficiency of support measures	All	Other	Implemented	Ademe, industry		No	

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Industry (2)	I-2.1 Reinforcement of the requirements of installations classified to protect the environment	Additional reduction of industrial N ₂ O emissions	N ₂ O	Regulation	Adopted	Mate	1.80		No
Industry (2)	I-2.2-I-2.7	Regulation for HFC, PFC, SF ₆	HFC, PFC, SF ₆	Regulation, voluntary	Implemented	Mate	1.80		Yes
Industry (1.A.2)	I-3 Energy taxation		CO ₂	Fiscal	Suspended	Mate, Minefi	7.30		Yes
Industry (2)	I-4.2 N ₂ O (raising of the general tax on polluting activities)	Additional reduction of N ₂ O emissions	N ₂ O	Fiscal	Adopted	Mate, Minefi	1.00		No
Industry (1.A.2., 2., 3)	I-5.1 Labels and standardisation	Evolution of standards and practices concerning greenhouse effect	All	Other	Planned	Industry, Ademe			Yes
Industry (1.A.2., 2., 3)	T-5.2 Information of enterprises	Evolution of standards and practices concerning greenhouse effect	All	Other	Adopted	Ademe			No
Industry (1.A.2., 2., 3)	T-5.3 Training and qualification	Development of energy audits for industry	All	Education	Adopted	Ademe, industry			No
Industry (2)	F-3.1 Reinforcement of controlling	Additional reduction of HFC emissions	HFC	Regulation	Planned	Mate	0.70		No
Industry (2)	F-3.2 Control of air-conditioning equipment in cars	Reduction of refrigerant gas emissions linked to car use	HFC	Education, regulation	Adopted	Mate, METL	0.70		No
Industry (2)	F-3.3 Standardisation	Leakage limitation of refrigerant gases	HFC	Other	Implemented	Mate	1.10		No
Industry (2)	F-3.4 Reprocessing of fluids	Development of a reprocessing routine of refrigerant gases used in cars	HFC	Economic	Adopted	Mate	0.70		No
Industry (2)	F-3.5 Training and qualification of enterprises	Reinforcement of qualification	HFC	Education	Implemented	Mate	0.60		No
Industry (2)	F-3.6 Study on fiscal measures	Encouragement to substitutions	HFC	Other	Implemented	Mate, Minefi	1.40		No
Industry (2)	F-3.7 Research and development	Improve knowledge on emissions, equipment, possible evolutions towards other processes and methods of reprocessing	HFC	Other	Adopted	Mate, Ademe			No
Transport (1.A.3)	T-1.1.1 Follow-up of agreements and future reinforcements	Verify application of ACEA agreement in France	CO ₂	Regulation	Planned	METL, Ademe			Yes
Transport (1.A.3)	T-1.1.2 Extension of voluntary agreements to light commercial vehicles and to two-wheeled vehicles	Reduce emissions of all vehicles concerned	CO ₂	Voluntary	Adopted	METL, Mate			Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Transport (1.A.3)	T-1.1.3 Incentive for renewal of light vehicles	Incentive for replacement by more efficient vehicles	CO ₂	Economic	Planned	METL, Minefi, Mate		No	
Transport (1.A.3)	T-1.1.4 Other incentive measures for evolution of the car park	Labelling of vehicles, tax credits for 'alternative' vehicles	CO ₂	Economic	Planned	METL, Minefi, Mate		Yes	
Transport (1.A.3)	T-1.2 Alternatives to air-conditioning and new cycle	Limit growth of motor CO ₂ emissions and air-conditioning HFC emissions	CO ₂ , HFC	Other, regulation	Implemented	Mate, METL	0.20	No	
Transport (1.A.3)	T-1.4 Electric and alternative vehicles	Preparation of decisions of public authorities for development of clean cars	CO ₂	Other	Adopted	Mate, Minefi, METL, Ademe	0.40	Yes	
Transport (1.A.3)	T-1.5 Specific emissions of rail transport	Reinforcement of share of electric traction, renewal of diesel engines	CO ₂	Economic	Implemented	METL	0.40	No	
Transport (1.A.3)	T-1.6 N ₂ O emissions of catalytic converters	Improvement of knowledge of these emissions and of ways to reduce them	N ₂ O	Other	Planned	Mate, METL		Yes	
Transport (1.A.3)	T-1.7 Speed limitation of light vehicles	Speed limitation by construction: avoid too big differences between possible and allowed driving speed	CO ₂	Regulation	Implemented	METL, Mate		No	
Transport (1.A.3)	T-2.1.1 Speed control of heavy lorries	Reinforcement of speed controls and promotion of electric speed measuring devices	CO ₂	Regulation	Adopted	METL, Ministries of the Interior and Defence	0.80	No	
Transport (1.A.3)	T-2.1.2 MOT at the roadside	Good technical adjustments	CO ₂	Regulation	Adopted	METL, Ministries of the Interior and Defence		No	
Transport (1.A.3)	T-2.1.3 Speed limitation of light commercial vehicles	Study on the feasibility and impact of a speed limitation for light commercial vehicles	CO ₂	Other	Implemented	METL, Mate		No	
Transport (1.A.3)	T-2.2.1 Energy consumption of airport platforms	Reduction of rolling time by better signalling and an improvement of the energy distribution	CO ₂	Other	Implemented	METL	0.20	No	
Transport (1.A.3)	T-2.2.2 Improvement of conditions to change from public to air transport	Improvement of coach service to airports by public transport	CO ₂	Economic	Implemented	METL		No	
Transport (1.A.3)	T-2.2.3 Transport to and from airport by express trains	Development of agreements between air and railway companies	CO ₂	Voluntary	Planned	METL		No	
Transport (1.A.3)	T-2.3.1 Management of the great interurban main roads	Evaluation in terms of CO ₂	CO ₂	Other	Planned	METL	0.04	Yes	

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Transport (1.A.3)	T-2.3.2 Regulation of traffic lights and moderating progressive signal systems	Penalisation of the highest speeds in order to achieve a 10 % average speed reduction	CO ₂	Regulation, other	Planned	METL	0.30	No	
Transport (1.A.3)	T-2.3.3 Right of way to public transport	Encourage use of public transport by increasing their commercial speed and reducing their fuel consumption	CO ₂	Economic	Planned	METL	0.07	No	
Transport (1.A.3)	T-2.3.4 Regulation of urban fast lanes	Speed optimisation on fast lanes	CO ₂	Regulation	Planned		0.20	No	
Transport (1.A.3)	T-2.3.5 User information	Information systems and development of data-processing tools	CO ₂	Other	Implemented	METL		No	
Transport (1.A.3)	T-2.4 Facilitation of maritime coastal traffic	Development of transport ways that consume less energy per transported tonne and km	CO ₂	Economic	Implemented	METL		No	
Transport (1.A.3)	T-3.1.1 Control the evolution of urban space	Improve methods to help territorial communities to organise their infrastructure projects into a hierarchy in accordance with the generated traffic	CO ₂	Other, economic	Adopted	METL, Mate (D4E)	1.50	No	
Transport (1.A.3)	T-3.1.2 Documents of town planning and localisation of activities	Take into account the impact on transport	CO ₂	Other	Adopted	METL, Mate (D4E)		No	
Transport (1.A.3)	T-3.1.3 Impact of the waste management system	Optimisation of trajectories and less polluting transport ways	CO ₂	Other	Adopted	METL, Mate (D4E)		No	
Transport (1.A.3)	T-3.1.4 Combined transport and associate transporting firms	Structuring of demand for combined transport	CO ₂	Other	Adopted	METL, Ademe		No	
Transport (1.A.3)	T-3.2.1 Taxation of jet fuel	Installation of a European tax or fee system	CO ₂ , O ₃	Fiscal	Planned	METL, Minefi, Mate	0.40	Yes	
Transport (1.A.3)	T-3.2.2 Respect of work regulation in the road professions (follow-up of T-0.2.1)	Respect of social standards and European harmonisation in this field	CO ₂	Regulation	Adopted	METL	0.50	No	
Transport (1.A.3)	T-3.2.3 Catching up gas oil tax	Progressively align tax on gas oil with petrol tax	CO ₂	Fiscal	Implemented	Minefi	2.70	Yes	
Transport (1.A.3)	T-3.2.4 Taxation of public transport fuel	Extend the partial pay-back of gas oil taxes to public transport	CO ₂	Fiscal	Implemented	Minefi, METL		Yes	
Transport (1.A.3)	T-3.3.1 Internalisation of carbon costs	Take into account carbon costs in fuel taxation	CO ₂	Fiscal	Implemented	METL, Minefi, Mate	3.70	Yes	
Transport (1.A.3)	T-3.3.2 Control of urban transport (reinforcement of T-0.1.5)	Follow-up and widening of fees for use of road infrastructure	CO ₂	Fiscal	Suspended	METL		Yes	

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Transport (1.A.3)	T-4.1 Organisation of community space	Take into account transport emissions	CO ₂	Other	Implemented	METL, Mate	3.67		No
Transport (1.A.3)	T-4.2 Offer of interurban infrastructure – other aspects	Measures in context of service outlines	CO ₂	Other	Implemented	METL	3.70		No
Transport (1.A.3)	T-4.3 Installations for means of transport change for combined transport	Organisation of combined transport	CO ₂	Other	Adopted	METL, Ademe	0.70		No
Transport (1.A.3)	T-4.4 Common transport and alternative urban transport	Speeding up implementation of programmes in this context	CO ₂	Other	Planned	METL, Ademe, Mate	0.55		Yes
Transport (1.A.3)	T-5.1 Training of professional drivers	Reinforcement experiences of initial and permanent training	CO ₂	Education	Adopted	METL			No
Transport (1.A.3)	T-5.2 Training for driving licence	Sensitise drivers for energy saving	CO ₂	Education	Implemented	METL			No
Transport (1.A.3)	T-5.3 Responsibilities of enterprises	Take into account greenhouse effect in environmental planning and reviews	CO ₂	Other	Adopted	Ademe, METL			No
Energy (1.A.4.a and b)	RT-1.1 Reinforcement of thermal regulation (new buildings)	Reinforcement of thermal regulation adopted in 2000	CO ₂	Regulation	Adopted	METL	1.10		Yes
Energy (1.A.4.a and b)	RT-1.2 Standardisation and technical regulation of components	Emission reducing standards for glass	CO ₂	Regulation	Adopted	Minefi, METL	0.85		Yes
Energy (1.A.4.a and b)	RT-1.3, RT-1.4 Reinforcement of controlling measures for existing buildings	Development and good implementation of standardising instruments to measure building's energy efficiency	CO ₂	Regulation	Implemented	METL			Yes
Energy (1.A.4.a and b)	RT-2 Voluntary agreements	Agreements on materials to be used	CO ₂	Voluntary	Adopted	METL			No
Energy (1.A.4.a and b)	RT-3.2 Action on pilot sector buildings	Partnership agreements	CO ₂	Other	Implemented	METL, Ademe			No
Energy (1.A.4.a and b)	RT-4.2 Thermal solar energy	Encourage use of solar heated water for individual and collective sanitary use and heating	CO ₂	Economic	Implemented	Ademe, Minefi	0.04		Yes
Energy (1.A.4.a and b)	RT-4.3 Geothermal energy	Measures encouraging use of geothermal energy	CO ₂	Economic	Planned	Ademe, METL, Minefi	0.07		Yes
Energy (1.A.4.a and b)	RT-4.4 Heat networks	Optimisation of extension of heat networks	CO ₂	Economic	Implemented	Ademe, METL, Minefi			Yes
Energy (1.A.4.a and b)	RT-5.1, RT-5.2 Rented flat sector	Taking energy efficiency into account for calculation of rents and heat charges	CO ₂	Regulation	Planned	METL, Ademe			Yes
Energy (1.A.4.a and b)	RT-6.1 Programmed operations for the thermal improvement of buildings	Operations of local initiative, the client being the commune or the competent public intercommunity institution	CO ₂	Voluntary	Adopted	Ademe, METL			Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Energy (1.A.4.a and b)	RT-6.2 Conditions of granting of assistance	Development of labels conditioning grants	CO ₂	Regulation	Implemented	METL		No	
Energy (1.A.4.a and b)	RT-6.3 System of assistance for service buildings	Extensions of existing assistance for housing to service sector	CO ₂	Economic	Planned	Ademe, METL		No	
Energy (1.A.4.a and b)	RT-6.4 Assistance for condensation boilers for collective use	Subvention for this type of boilers	CO ₂	Economic	Adopted	Ademe, METL	0.14	No	
Energy (1.A.4.a and b)	RT-6.5 Support for policy of labels	Incentives of certain categories of clients	CO ₂	Economic	Implemented	METL, Ademe		Yes	
Energy (1.A.4.a and b)	RT-7.2 Reduced VAT rate for sale of heat produced by renewable energy	Achieve a modification from the European Commission in the annex H of the sixth VAT directive. Reduce this VAT rate to 5.5 % in order to improve competitiveness of wood energy		Fiscal	Planned	Minefi		Yes	
Energy (1.A.4.a and b)	RT-7.3 Reduced VAT rate for energy saving products and services	Extend measure already existing with a strong orientation towards the saving of energy	CO ₂	Fiscal	Planned	Minefi		Yes	
Energy (1.A.4.a and b)	RT-8.1 Labels and information for the public	Concerning HPE labels for new construction and also product quality (e.g. wood heating devices) and certification of professionals	CO ₂ , HFC	Other	Implemented	Ademe, METL		Yes	
Energy (1.A.4.a and b)	RT-8.2 Environmental quality of construction products	Training, information of professionals	CO ₂ , HFC	Education	Implemented	METL		Yes	
Energy (1.A.4.a and b)	RT-9 'High environmental quality' action	Action to integrate environmental concerns in building sector	CO ₂ , HFC	Other	Implemented	Ademe, METL, CSTB		No	
Energy (1.A.4.a and b)	B.2.1 Effect of the anti-pollutant tax on the service sector		CO ₂	Fiscal	Suspended	Minefi	1.40	Yes	
Energy (1.A.4.a and b)	B.2.2 Effect of the anti-pollutant tax on housing		CO ₂	Fiscal	Suspended	Minefi	2.20	Yes	
Agriculture (4)	A-1.1 CH ₄ emissions in cattle breeding (and N ₂ O emissions)	Map preparations for recommendations on how to reduce emissions	CH ₄ , N ₂ O	Other	Implemented	Map	0.90	No	
Agriculture (4)	A-1.2 N ₂ O emissions from land	Reduction of emissions from nitrous manure spreading	CO ₂	Fiscal	Implemented	Map, Mate	1.30	No	
Agriculture (4)	A-1.3 Integration of the greenhouse effect in agricultural policy	Development of national action plan to support cattle breeding	All	Economic	Implemented	Map		No	

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Agriculture (4)	A-1.4 Actions to improve knowledge	Reinforcement of efforts in research and development as well as in quality of statistical data	All	Other		Map, Mate, MENRT			No
Agriculture (4)	A-2.1 Afforestation of agricultural land	Incentives for an afforestation of 30 000 hectare per year	CO ₂	Economic	Adopted	Map	0.55		No
Agriculture (4)	A-2.2 Studies, research and experimentation	Reinforcement in research and development in specific subjects	All	Other	Implemented	Map, MENRT			No
Waste (6)	DE-1 Control of waste production		CO ₂ , CH ₄	Regulation	Adopted		4.00		Yes
Waste (6)	DE-2 Valorisation reinforcement of organic material		CO ₂ , CH ₄	Regulation	Adopted				Yes
Waste (6)	DE-3 Spread the recuperation of heat in incinerators		CO ₂	Regulation	Adopted				Yes
Waste (6)	DE-4 Efficiency of gas collecting systems in landfill sites		CH ₄	Regulation	Adopted				No
Waste (6)	DE-5 Biological inhibitor pre-treatment for the period of exploitation		CH ₄	Regulation	Implemented				No
Waste (6)	DE-6 Analysis and control of biochemical reactions in landfill sites		CH ₄	Regulation	Implemented				Yes
Waste (6)	DE-7 Valorisation of organic waste		CO ₂ , CH ₄	Regulation	Adopted				Yes
Energy (1.A.1.a)	E-1.2.1 Consumption of the nuclear fuel cycle	Energetic efficiency	CO ₂	Other	Adopted	Minefi, electricity service			No
Energy (1.A.1.a)	E-1.2.2 Losses in the electrical network	Reduction of losses in electrical network	CO ₂	Other	Adopted	Minefi, electricity service			Yes
Energy (1.A.1.a)	E-2.1 Promotion of a European regulation for the improvement of sold electric devices	Evaluation of European regulation	CO ₂	Regulation	Adopted	Minefi, Serure	1.30		Yes
Energy (1.A.1.a)	E-2.2 Promotion of efficient devices	Save energy	CO ₂	Other	Adopted	Ademe			Yes
Energy (1.A.1.a)	E-2.3 Specific thermal and electricity regulation	Regulation in domain of heat and pumps	CO ₂	Regulation	Adopted	METL			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Energy (1.A.1.a)	E-2.6 VAT reduction on products and services	Encourage works to prevent the greenhouse effect in existing buildings	CO ₂	Fiscal	Adopted	Minefi	0.90		No
Energy (1.A.1.a)	E-3 Substitution of classic thermal energy production	Replace oil- and coal-fired power plants by gas-fired plants	CO ₂	Other	Adopted	Minefi, electricity service	5.00		No
Energy (1.A.1.a)	E-4.1 Production of wind energy	Encourage wind energy production by fixing a minimum purchase tariff to be paid by the electricity distributor (reinforcement of an existing measure)	CO ₂	Regulation	Implemented	Minefi	2.60		Yes
Energy (1.A.1.a)	E-4.2.1 Heat production: wood, electric heating, tariff 'Tempo'	Encourage development of wood heating instead of electric heating in rural regions with a small density of population	CO ₂	Economic	Adopted	Minefi (and Ademe, METL)			Yes
Energy (1.A.1.a)	RT-4.1.1 Wood energy in collective use and heat networks	Follow the wood energy plan, with a growth of 50 000 TOE in 2000	CO ₂	Economic, fiscal	Implemented	Ademe, Minefi	1.10		Yes
Energy (1.A.1.a)	RT-4.1.2 Wood energy in individual housing	Actions concerning heating devices and combustible	CO ₂	Economic, other, fiscal	Adopted	Ademe, Minefi	0.30		Yes
Energy (1.A.1.a)	E-4.2.2 Electricity production with wood	Invitation to tender by EDF for energy supply based on biomass for a capacity of 10 MW in order to realise one or two experimental plants	CO ₂	Other	Adopted	Ademe, Minefi			Yes
Energy (1.A.1.a)	E-6 'DOM-TOM' and Corsica programme	Replacement of diesel generators by renewable energies	CO ₂	Economic	Implemented	Ademe	0.45		Yes

Source: Third national communication.

Table A.107 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	With measures	With additional measures
CO ₂	385.4	444.6	415.4
CH ₄	63.3	46.7	46.6
N ₂ O	88.7	77.0	62.9
HFC, PFC, SF ₆	7.6	26.0	11.1
Total	545.0	594.3	536.0
Change relative to base year (%)		9.0	- 1.7

Source: Third national communication.

Table A.108 Summary of projections by sector in 2010 (Mt CO₂)

	Base year	With measures ⁽⁸⁾	Change relative to 1990 (%)	With additional measures ⁽⁹⁾	Change relative to 1990 (additional measures) (%)
Energy ⁽¹⁰⁾	374.1	439.2	17.4	409.8	9.5
Industrial processes ⁽¹¹⁾	56.7	57.4	1.2	31.2	- 45.0
Waste	20.8	10.5	- 49.5	10.5	- 49.5
Agriculture	90.4	85.0	- 6.0	82.3	- 9.0
Others ⁽¹²⁾	3.0	2.2	- 26.7	2.2	- 26.7
Total ⁽¹³⁾	545.0	594.3	9.0	536.0	- 1.7

Source: Third national communication.

Table A.109 Assessment of the target

	Mt CO ₂ equivalent	Percentage of 1990 level (six gas basket) ⁽¹⁴⁾
Base year (from projections)	545.0	100.0
Commitment	545.0	100.0
With existing PAMs ⁽¹⁵⁾	594.3	109.0
Gap (negative means no gap)	49.3	9.0
Effect of additional PAMs	58.3	10.6

Source: Third national communication.

Evaluation of projections

The data in Tables A.107–109 are based on information from the third national communication.

Table A.107 shows the projections by greenhouse gas for 2010 and Table A.108 summarises the projections by sector. Total greenhouse gas emissions are projected to increase by 49.3 Mt CO₂ equivalent (+ 9.0%) in the with measures projection (Table A.108).

The with measures projections show that France is expected to exceed

its commitment of greenhouse gas stabilisation under the EU burden sharing agreement by 9% (Table A.109).

Additional quantified PAMs are identified which reduce the six gas basket by another 10.6%. In case all identified measures are to be implemented, France might comply with its commitment as total greenhouse emissions would be 1.7% below its base year emission.

⁽⁸⁾ Measures decided upon and started (at least partially) before 2000.

⁽⁹⁾ Measures decided, but not implemented before 2000; new measures of the PNLCC; other measures decided since 2000.

⁽¹⁰⁾ Including energy use in industry, etc.

⁽¹¹⁾ Only GHG emissions from industrial processes and F-gas emissions, without GHG emissions from fossil fuel combustion.

⁽¹²⁾ Including emissions from use of solvents.

⁽¹³⁾ Without biomass, land-use, land-use change and forestry.

⁽¹⁴⁾ Without biomass, land-use, land-use change and forestry.

⁽¹⁵⁾ The existing measures include ones introduced since Kyoto.

Description of model approach

The third national communication gives only some general explanations on the model approach applied. For a more detailed description, the third national communication refers to the national programme for tackling climate change (PNLCC).

The PNLCC provides little information on the projection methodology used; it only mentions the use of two top-down models to simulate the economic impact of the Kyoto agreement (p. 38), especially of the carbon tax mentioned in the national programme which contributes a large fraction of the greenhouse gas savings:

1. Gemini-E3, a general equilibrium model developed by METL and CEA;
2. POLES, a partial equilibrium model developed by IEPE

However, the data of the national programme are based with some modifications on the second national communication to the UNFCCC which provides the following details on the methodology for the forecasts, apparently mainly for CO₂ emissions (p. 90).

- France launches periodically, around every five years, a major prospective study on the energy sector. This study is conducted under the leadership of the CGP (Commissariat général au plan) of the DGEMP (Direction générale de l'énergie et des matières premières) and its purpose is to confront all opinions expressed by the ministries, the major energy operators, NGOs and energy experts. The administrative departments rely to a large extent on the conclusions of these prospective groups to draft their own energy provisions, which are a prerequisite for generating forecasts of CO₂ emissions. The data reported in the second national communication and in the national PNLCC are based on the work of the prospective group, 'Energy 2010–20'.

- The 'Energy 2010–20' group is using a 'hybrid' strategy, based on French energy sector models as well as on precise sectoral information in combination with expert opinions. More specifically, the group's thinking is based on simulations carried out with the following models:

- the DIVA model which for a given growth rate of the French economy gives a coherent vision of the allocation of growth by activity sector at a rather precise level;
- the projections of energy-related CO₂ emissions are based on energy demand projections differentiated by several sectors which are derived from the model, Médée-ME of the CGP and strategic studies on energy efficiency by Ademe. Médée-ME is a long-term non-deterministic techno-economic projection model;
- the MIDAS model, based on the partial equilibrium of the energy sector;
- more specific models such as that of the IFP (Institut français du pétrole) describing the European refinery sector, or the EDF model describing the French electricity sector.

The methodology for greenhouse gases other than CO₂ seems not to be specified explicitly, but is most likely based on bottom-up estimates from projections of activity levels and forecast of changes in technologies.

The results of the projections have been discussed in sectoral groups of independent experts from different organisations, including industry, NGOs and civil society. The parameters used in the projections are given in the table below.

Country conclusions

The reporting procedure of the French national programme for tackling climate change with respect to both projections and policy measures is very

Table A.110 Modelling parameters

Parameter	2000	2010	Unit
Population	59.4	61.7	Million
GDP growth	3.2	2.3	%/year
Oil (international price) ⁽¹⁶⁾	28.3	17.0	USD (1999)/barrel
Gas price (import to France)	2.4	2.2	USD/Mbtu
Coal price (import to France)	34.2	30.0	USD/t
Average specific consumption of new light-duty vehicles	100	99	1997 = 100
Average specific consumption of truck park	100	100	1997 = 100
Transport freight growth	79	87	%
Growth of inland air traffic	5.0	4.1	%/year
Construction of new housing units	240	240	1 000/year

Source: Third national communication.

comprehensive (sectors and greenhouse gases covered, quantification of impacts) and presented in a very clear manner, though some improvement is possible with respect to the presentation of the quantitative impact of existing measures, their uncertainties, the status of measure implementation and clarity in the methodology used for non-CO₂ gases.

The PAMs summarised under the with additional measures projection should ensure that France reaches its reduction target (stabilisation at the 1990 level) by 2010. Since the national programme (PNLCC) seems to imply that all measures will be realised within the national boundaries, France should be on the safe side to reach its target if it makes additional use of flexible mechanisms, in particular if the economy grows faster than the 2.3 % per annum assumed for the third national communication.

France is facing the fact that total GHG emissions in 1999 have returned to the 1990 level after having been lower in the previous years since 1990, although the emissions for 1999 were lower than the emissions of 1998 due to a mild winter. This is in spite of the fact that a considerable share of the measures belonging to the existing measures were already implemented by the end of 1999 (N₂O reduction in industrial processes and putting into service of the last nuclear power plants commissioned).

Also, the economic depression which at the beginning of the decade, reduced emissions, had disappeared by the end of the decade, which increases pressure on greenhouse gas emissions. In comparison with the preceding year, CO₂ emissions decreased by 1.2 % in 2000, and by 3.0 % in 1999, after an increase of 5.3 % in 1998. While 1999 was characterised by a large contribution of hydropower, 2000 was a year of high oil prices which made emissions even from the transport sector decrease. Another contributing factor was the last nuclear power plant of Chooz to be put into service. The level calculated for CO₂ emissions for 2000 exceeds, therefore, the stabilisation goal with respect to 1990 by 2.0 %.

Hence, France will certainly have to resort to measures included in the national programme for tackling climate change (PNLCC) in order to comply with its goal. This concerns in particular the economic measures (e.g. energy tax) which are expected to contribute close to 42 % to the closure of the gap. France had opted, as a first step, to introduce economic measures for greenhouse gases, for the extension of the general tax on polluting activities in the industrial sector to fossil energy carriers and to electricity. However, only industry and the tertiary sector should be taxed with many possibilities to be exempted or to have a tax rebate. So the impact of the energy tax was only one third of the total expected effect

⁽¹⁶⁾ Exchange rate: USD 1 = EUR 0.9.

of the economic measures announced in the climate change programme. However, the fate of the economic measures is more than uncertain after Decision No 2000-441 DC of 28 December 2000 of the Constitutional Council which declared Article 37 of the 'Loi de finances rectificative pour 2000' to not conform with the French constitution. The main arguments of the Constitutional Council were:

- that companies were not treated equally by the law: a less polluting company could in fact be taxed higher than a more polluting one;
- that electricity was taxed though its generation contributes quite little to the greenhouse effect (mainly due to nuclear energy); and
- that these differences are not in relation to the objective of the legislator of combating climate change.

The first argument appears understandable and can be considered the direct consequence of the many exemptions which lead to unequal treatment of companies. The second argument of the Council is more difficult to understand, given that other countries such as Germany have explicitly opted for an energy tax in order not to exempt electricity produced by nuclear energy from taxation. It appears that the linkage of the economic measures to the existing tax on polluting activities was at the origin of the failure. This is easier to realise but puts additional constraints on the design of the measures. Currently, a new implementation scheme for economic measures is under study and might be part of a future law of finance.

Particular attention has to be given to the success of measures aiming at the transport sector. This sector is the main source for future emission increases, in particular as the energy sector is an unusually small emitter of CO₂ due to the large share of nuclear energy. The implementation and success of the measures proposed for this sector will therefore need a more particular

attention than in the past and should be at the focus of further analysis.

It appears that in the future, taxation of energy products might play a more reduced though still important role in a mix of taxation (normative or negotiated), reduction standards, and the larger use of Kyoto flexibility mechanisms not only in the case of higher economic growth but also that which is at the basis of the national programme.

Nevertheless, the French government was also able to put into practice, in 2000–01, a variety of policies and measures aimed at reducing greenhouse gases, though their role is not important enough to compensate for the preliminary failure of the fiscal law (see first evaluation of the national programme to tackle climate change, '1er bilan annuel du programme national de lutte contre le changement climatique').

These measures comprise the following.

Strategic considerations, for example, concerning:

- renewables (Stratégie et moyens de développement de l'efficacité énergétique et des sources d'énergie renouvelables en France, rapport au Premier ministre de M. Cochet);
- energy efficiency (Programme national d'amélioration de l'efficacité énergétique (PNAEE), presented by the Prime Minister Lionel Jospin on 6 December 2000). The programme proposes to act on the transport sector by accelerating the introduction of urban planning, by encouraging the purchase of clean vehicles and by developing rail freight. The quality of the new stock is to be improved, and improvements in the existing stock are to be financed by subsidies. The programme foresees further to accelerate the introduction of renewables by increasing feedback tariffs. This corresponds to a European directive, which fixes for France an objective to increase

renewables from 15 to 21 %.
For companies, the programme envisages financial instruments (Fonds d'investissement de l'environnement et de la maîtrise de l'énergie — Fideme).

Concrete actions

- Buildings
 - Thermal building code 2000 published in November 2000, entering into force, 1 June 2001:
 - 15 % for new residential buildings, – 40 % for the tertiary sector; integration of electricity consumption (pumps and ventilation, lighting for tertiary sector); integration of air conditioning starting from 2003; stricter control of compliance; three successive steps of building codes up to 2020.
 - Reduced VAT tax (5.5 % instead of 19.6 %) for all renovation work (including for energy efficiency) on buildings older than two years.
 - Tax credit of 15 % for heating appliances and for renewable energy systems.
 - Energy labels for buildings of the residential and tertiary sector.
- Industry
 - The fund for the guarantee of investments into energy efficiency, Fogime (Fonds de garantie d'investissement de maîtrise de l'énergie), in existence since November 2000. Allows the guarantee of loans which SMEs and small institutions contract at their banks for energy efficiency.
- The intervention fund for the environment and energy efficiency, Fideme (Fonds d'intervention pour l'environnement et la maîtrise de l'énergie), contributes to the financing of economic projects to combat climate change with quasi-own funds which would not benefit from financing by banks otherwise.
- Various mandatory standards in preparation: magnesium foundries, electric equipment, HFC in foams, etc.).
- Energy sector
 - Substitution of classical thermal power plants by co-generation and CCGT (4 000 MW installed, progression: 700 MW per year since 1997, – 5.5 Mt CO₂ eq./year in 2010 on a technical potential of 14.7 Mt CO₂ eq./year).
 - Objective of 3 000 MW installed wind capacity by 2010 reinforced to 5 000 MW (announcement of the Prime Minister in May 2001). This objective could be further enforced in light of the European directive on renewables. The feedback tariffs for wind energy are fixed at EUR 8.5/kWh to insure rapid development of this sector.
 - Measures to develop biomass for heating purposes in the residential and tertiary sector, as well as for electricity generation.

Germany

Environment Ministry; authors: DIW, FZJ, Fraunhofer-ISI, Öko-Institut, submitted by German Environmental Agency.

Sources of Information

This report is based on the German monitoring report, 2002:

- 'Bericht 2002 der Bundesrepublik Deutschland über ein System zur Beobachtung der Emissionen von CO₂ und anderen Treibhausgasen –entsprechend der Ratsentscheidung 1999/296/EG', submitted to the European Commission on 31 January 2003.

The monitoring report, 2002, has not been submitted in English. Therefore, the German version was analysed.

With regard to policies and measures, the monitoring report, 2002, includes recent policy developments such as those in the coalition agreement of the new government after elections for the German Bundestag in September 2002.

However, the greenhouse gas projections have been taken from a study submitted by the German Environmental Agency that is still under way. It is updating Germany's GHG projections taking into account the effects of recent policies and measures, and is entitled:

- preliminary draft 'Endbericht zum Forschungsvorhaben Politikszenerarien für den Klimaschutz – Langfristszenarien und Handlungsempfehlungen ab 2012 (Politikszenerarien III)', study commissioned by the Federal

These results are preliminary and have still not been adopted by the German government. However, because of Germany's large contribution to EU total greenhouse gas emissions, the Commission urged and Germany allowed the replacement of Germany's projections reported in the monitoring report, 2002, as they are outdated. But it must be mentioned that the data available now are not in compliance with the reporting guidelines of the monitoring mechanism concerning their split by sectors and by gases.

Additional sources of information have also been used mainly to complete descriptions of the reported policies and measures:

- third report by the government of the Federal Republic of Germany in accordance with the framework convention of the United Nations.

Quality and Transparency of Reporting

The monitoring report, 2002 (abbreviated MR2002 in this report), and Germany's third national communication (abbreviated 3NC) are the basis for the initial analysis in this section.

In the monitoring report, 2002, inventory data for all six Kyoto greenhouse gases are presented for the years between 1990 and 2001. The data

Table A.111 Information provided on policies and measures
(from MR2001 and CPP 2000)

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	+	Not always stated in MR2002, additional information taken from 3NC
Which greenhouse gases?	+++	CO ₂ , CH ₄ , N ₂ O, HFC, PFC, SF ₆
Status of implementation	++	In most cases stated in MR2002, additional information taken from 3NC
Implementation body specified	+	Not specified in MR2002, fully taken from 3NC
Quantitative assessment of implementation	++	In most cases stated
Interaction with other PAMs discussed	+	Only in very few cases stated

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

Table A.112 Information provided on projections
(from MR2002)

Category of information	Level of information provided	Comments
Scenarios considered	+	With measures (for references see above, section on sources of information) With additional measures: none
Expressed relative to inventory for previous years	+	It is given in the preliminary update (for references see above, section on sources of information) relative to 1990 emissions.
Starting year	1990	
Split of projections		No sectorial split
Presentation of results	+	Draft study report with updated projections available
Description of model (level of detail, approach and assumptions)		Not given in MR2002; but can be taken from the series of 'Politik-Szenarien' studies as Germany has explained in previous years.
Discussion of uncertainty		
Details of parameters and assumptions	+	For the time being, not available as the report of 'Politikszenerarien III' is still being drafted.

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

for 1999 to 2001 are preliminary. As announced in the monitoring report, 2002, Germany had delivered updates of emission inventory data to the Commission (and subsequently to the EEA and the ETC/ACC) by the end of March 2003. As emission inventories are of minor importance in this analysis, the updates of inventory data are not included in the figures below.

Projections for the six greenhouse gases are presented for 2005 and 2010. Projections for 2020 are not given.

Assessment of Policies and Measures
Germany's monitoring report, 2002, includes policies and measures (i) taken in the 1990s, (ii) being implemented following the national climate protection programme (CPP) published in Autumn 2000, and (iii) regarding recent policy developments such as those in the coalition agreement of the new government after elections were held for the German Bundestag in September 2002. Major political decisions have been taken in the time period 1998 to 2002 — namely ecological tax reform, the renewable energy sources act and financial support programmes for renewable energy investments. Furthermore, some of them are now in their later stages of increased effectiveness or were added by

subsequent regulations. The monitoring report, 2002, refers to all policies and measures which came into force or, at least, had already been decided by December 2002. Some policies and measures in the MR2002 were updated in their quantitative effects compared with the MR2001. However, the projections given in the MR2002 do not fully include these recent policies and measures. The MR2002 notes that the projections are currently under revision (see section on evaluation of projections, below).

The MR2002 splits policies and measures into the following sectors: industry, residential, transport, energy transformation, agriculture, waste and cross-sectoral issues. That reporting structure is different from the IPCC guidelines on emission inventories making further analyses difficult. To achieve as much consistency with the greenhouse gas source and sink categories of the IPCC guidelines as possible, the attempt has been made in this Member State's analysis to identify the sectors reported in the MR2002 as GHG source and sink categories and some policies and measures have been moved between sectors/categories. In Table A.114, policies and measures are given under the sectors where they are reported in the MR2002 and — if a shift

Table A.113 Summary of the effect of policies and measures (Mt CO₂ equivalent) (only those quantified in the MR2002, see Table A.4) allocated roughly to IPCC source categories

	With measures	With additional measures
Energy supply (roughly 1.A.1)	89.0–97.0	Not given
Industry — energy use (roughly 1.A.2)	27.0	Not given
Transport (roughly 1.A.3)	38.5– 41.5	0.2
Residential (roughly 1.A.4)	19.0–21.0	Not estimated
Industrial processes (roughly 2)	34.3–38.7	12.8
Agriculture (roughly 4)	2.1	Not given
Waste management (roughly 6)	31.3	7.0
Total	241.2– 258.6	20.0

seemed appropriate — also under the IPCC category. The allocation of policies and measures to a certain sector/ IPCC category has been attempted by following the description of the policies and measures given in the MR2002.

Only a few policies and measures have been reallocated, in particular, all those reported under 'cross-sectoral', and those under the industry sector have been split into energy use in industry and industrial processes.

Additionally, in Table A.114 it has been noted whether policies and measures are presented:

- new in MR2002;
- still reported (no indication);
- from last year's report, and no longer reported in MR2002.

For the summary of effects in Table A.113 only IPCC categories are given and policies and measures are counted only once in their respective IPCC category as noted in Table A.114.

The MR2002 refers only in very few cases — ecological tax reform, nitrate directive — to common and coordinated policies and measures (CCPM) of the European Union. Therefore, the link to the CCPM had to be estimated. A list of CCPMs referred to in Table A.114 is given in the annex.

It should be mentioned here that because of double counting of policies and measures in the last year's Member State analysis for Germany, the total for with measures was about 30 Mt CO₂ equivalent higher than for this analysis.

Table A.114 Detailed information on policies and measures

Existing policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
Cross-sectoral (new in MR2002)	Market introduction programme renewable resources	Promotion of biogenic resources, for example, biogenic fuels and lubricants (extension to other product areas planned)	CO ₂	E	Existing		Not given		
Cross-sectoral (accounted under energy supply)	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 (accounted under residential)	Promotion of the use of 'contracting'	Increasing the use of contracting	CO ₂	D	Ongoing project		5.0		
Cross-sectoral (accounted under energy supply)	Renewable energy sources act (Erneuerbare-Energien-Gesetz — EEG) (fixed feed in grid 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 (accounted under energy supply)	'100 000 roofs' PV programme	300 MW new PV capacity within six years	CO ₂	E	Existing (since January 1999)	Federal Government, Kreditanstalt fuer Wiederaufbau (KfW)	0.2		Yes (H, K)
Cross-sectoral (accounted under energy supply)	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)
Cross-sectoral (accounted under transport)	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)		
Energy supply (new in MR2002)	Energy-related tax adaptation	Ecological adaptation of taxation on the use of natural gas	CO ₂	E	In force 1 Jan. 2003	Federal Government	Not given		
Energy supply	CHP law on maintenance, modernisation and expansion of heat and power cogeneration and introduction of fuel cells on the market	Supplement to the climate protection agreement in 2000 between the Federal Government and the industry, aiming at energy efficiency improvement in electricity and heat production by, as much as possible, utilisation of energy contents in used fuels	CO ₂	R	In force April 2002	Federal Government	20.0–23.0		Yes (I)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
Energy supply	Construction of more gas-fired combined cycle power plants	Modernisation of power plants; aiming at increase of efficiency of electricity production by use of low carbon fuels and most efficient turbine technology	CO ₂	V	Ongoing project	Industry	15.0-20.0		Yes (I)
Energy supply (reported as 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)
Energy supply (reported as cross-sectoral)	Renewable energy sources act (EEG) (fixed feed in grid 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)
Energy supply (reported as cross-sectoral)	'100 000 roofs' PV programme	300 MW new PV capacity within six years	CO ₂	E	Existing (since January 1999)	Federal Government, Kreditanstalt fuer Wiederaufbau (KfW)	0.2		Yes (H, K)
Energy supply (reported as 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)
Energy supply	Use of pit gas from hard coal mining	Increasing use of pit gas as energy source from 70 to 78 %, aiming at avoidance of CH ₄ emissions, substitution of fossil fuels	CH ₄	V	Existing	Industry	11.7		No
Energy supply	Renewable energy sources act (EEG)	Economic incentives for the construction of bio gas supply utilities in waste sector	CH ₄	E	Existing	Federal Government	Not given		
Energy supply	Renewable energy sources act (EEG) in agriculture	Economic incentives for the construction of bio gas supply utilities in agriculture	CH ₄	E	Existing	Federal Government	1.1		
Industry — energy use (new in MR2002)	Reduction of exemptions of ecological tax	Reduction of initially lower tax rates for energy intensive production branches to enforce energy efficiency efforts	CO ₂	E	In force 1 Jan. 2003	Federal Government	Not given		
Industry — energy use	Continuation and improvement of voluntary commitments by industries	28 % CO ₂ reduction per output unit by 2005; 35 % reduction of all six 'Kyoto gases' together 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 equivalent		No
Industry — energy use	Promoting 'contracting' as management tool	Support for development of financing and operator concepts. Aim: to enhance energy efficiency in facility management	CO ₂	D	Review	Federal Government, possibly also other entities	1.0 (by 2005)		
Industry — energy use	Improvement of ERP, DTA and KfW credit programmes	Strengthening economic incentives with regard to energy efficiency	CO ₂	E	Under evaluation	Federal Government together with public financial institutions such as KfW	Not given		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
Industry — energy use	Training in energy saving and efficiency for SMEs	Increase in energy efficiency	CO ₂	ET	Encouragement to the economy	Small and middle sized enterprises	Not given		
Industry — energy use	Energy savings ordinance (Energie-einspar-verordnung)	Combines and tightens existing requirements from the thermal insulation ordinance (Wärmeschutzverordnung) and the heating systems ordinance (Heizungsanlagenverordnung). Aims: to reduce energy requirements in new buildings by 30 %, and to develop economically reasonable potential for improving energy efficiency of existing buildings	CO ₂	R	Existing, in force February 2002	Federal Government	6.0 (by 2005, both in industry and trade and services)		
Industry — energy use	Working group, 'Emission trading to combat the greenhouse effect'	Cooperation of government, industry entities and NGOs during the configuration phase of the emission trading system to regard interests and assure acceptance	CO ₂	V	Implemented since 2000		Not given		Yes (O)
Transport (new in MR2002)	Change of petroleum tax law	Exemption of biogenous fuels from petroleum tax to offer an incentive to substitute fossil fuels and reduce carbon intensity	CO ₂	R	Implemented	Federal Government	Not given		
Transport (new in MR2002)	Promotion of cars powered by natural gas	Extension up to 2020 of tax reduction on cars powered by natural gas to shift to less carbon-intensive fuels	CO ₂	E	In force 1 Jan. 2003	Federal Government	Not given		
Transport	Voluntary commitment of German automobile industry (Selbstverpflichtung der deutschen Automobilindustrie)	Reduction of new car's fuel consumption until 2005 by 25 % compared with 1990, after 2005 — by 30 % compared with 1990	CO ₂	V	Existing	Automobile industry associations	10.0		Yes (A)
Transport	Distance-based motorway tolls for heavy duty vehicles (Schwerlast- abgabe)	Shift in the modes of goods transport from street to railway and waterway	CO ₂	E	Adopted, implementation 2003	Federal Government	5.0 (by 2005)		Yes (C)
Transport	Information campaign on driving and maintenance behaviour		CO ₂	I		Federal Government	5.0 (by 2005)		No
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	Government decision	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	Request directed at industry	Federal Government	1.1.00		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
Transport	Air traffic: Emission-based levies at Germany's airports	Introduction of emission-based take-off and landing fees at German airports. Aim: to enhance energy efficiency in air transports	CO ₂	F, E	Government decision	Federal Government	1.0 (by 2005)		Yes (B)
Transport	Improving intermodal transport	Telematics, logistics management and fleet management; avoidance of dead heads, and congestions to increase fuel efficiency in goods transport	CO ₂	E	Planned as of 2003	Industry	3.5 (by 2005)		
Transport (reported under cross-sectoral)	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)		
Transport (from last year's report, no more reported in MR2002)	Additional budgetary means for investments in the infrastructure of the German railways	Total of DEM 6 000 million for the next three years (future investment programme)	CO ₂	E	Existing	Federal Government in connection with Deutsche Bahn AG	Not quantifiable		Yes (C)
Residential	Voluntary commitment of Federal Government to reduce CO ₂ emissions in federal ministries by 25 % in 2005 and by 30 % in 2010 (Selbstverpflichtung der Bundesregierung im eigenen Geschäftsbereich)	In order to provide a clear signal for the public, the Federal Government plans to reduce CO ₂ emissions from its own real estates by 25 % by 2005 and by 30 % by 2010. Aim: to enhance energy efficiency in buildings and structures, in equipment and devices and in transport	CO ₂	V	Existing	Federal Government	Not given		
Residential	CO ₂ reduction programme of the reconstruction loan corporation (Kreditanstalt fuer Wiederaufbau (KfW))	Aims to promote heat insulation and modernisation of heating facilities in existing houses especially in the new Federal Länder	CO ₂	E	Existing	Federal Government, Kreditanstalt fuer Wiederaufbau (KfW)	5.0-7.0 (by 2005)		Yes (M)
Residential	Energy savings ordinance (Energieeinsparverordnung)	Combines existing requirements from the thermal insulation ordinance (Wärmeschutzverordnung) and the heating systems ordinance (Heizungsanlagenverordnung). Aims at reduction of energy requirements in new buildings by 30 %, and development of economically reasonable potential for improving energy efficiency of existing buildings	CO ₂	R	In force, February 2002	Federal Government	4.0 (by 2005)		Yes (E, M)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
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 (reported under cross-sectoral)	Promotion of use of 'contracting'	Increasing use of contracting	CO ₂	D	Ongoing project		5.0		
Industry — processes (new in MR2002)	Regulation of limitations of N ₂ O emission in nitric acid production	Limit value of 800 mg N ₂ O per m ₃ to be implemented by 2007	N ₂ O	R	In force, October 2002		Approx. 0.2–4.7		
Industry — processes	Technical measures for adipic acid production	Agreement of Federal Government with adipic acid manufacturers 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 — processes	XPS-rigid foam (XPS-Hartschäume)	Replacement of HFC with CO ₂ and ethyl alcohol by half of the production, starting in 2000	HFC	V	Existing	Industry	1.3		
Industry — processes (increasing amount of assessed effect compared with MR2001)	Declaration of German primary aluminium industry	Voluntary commitment to reduce CF ₄ /CF ₆ emissions by 50 % by the year 2005 compared with 1987 level	PFC	V	Existing	Industry together with Federal Government	1.25		No
Industry — processes	Provision for the scrapping of electronic utilities (Vorsorge bei der Verschrottung elektronischer Betriebsmittel)	Emission avoidance and recycling	SF ₆	V	Existing		1.2		
Industry — processes	Voluntary abandonment of filling tyres with SF ₆ by vehicle industry	Substitution of SF ₆ by air	SF ₆	I	Proposed		2.3		
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 (No)

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
Waste	Technical instruction on waste from human settlements and waste placement ordinance (Technische Anleitung Siedlungsabfall und Abfallablagerversordnung)	Avoiding the development of gas in new landfills; energetic use of gas from old landfills	CH ₄	R	Existing	Federal Government	31.0		
Waste	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	Federal Government	0.3		

Additional policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
Transport (new in MR2002)	Value added tax (VAT) on fuel for the domestic share of international flight routes	Abolition of the exemption of value added tax on all fuel used for international flights; VAT on fuel used for the domestic share of international flight routes	CO ₂	E	Under governmental legislation process	Federal Government	0.2 (by 2005)		
Residential (new in MR2002)	Subsidy on ecological construction (Eigenheimzulage)	Extension and adjustment of subsidies on ecological construction of new buildings and also in the building stock	CO ₂	E	Under governmental legislation drafting process	Federal Government	Not given		
Industry – processes	Semi-conductor production (Halbleiterfertigung)	Improving flue gas cleaning by 2000, replacement of old plants by highly efficient plants by 2009	HFC	V	Proposed	Industry	0.1		
Industry – processes	Air conditioning in buildings (Kälte-stationäre Klimatechnik)	As of 2003, mandates maintenance requirements for systems with fill amounts of at least 1 kg; to reduce leak rates	HFC	R	Proposed	Federal Government	3.6		Yes (No)
Industry – processes	Air conditioning in cars (Mobile Klimatechnik)	As of 2007, motor vehicle HFC air conditioners are to be supplanted by CO ₂ systems; substitution of HFC by CO ₂	HFC		Proposed	Federal Government, industry	1.0		
Industry – processes	PU foam for construction (PU-Montageschäume)	Substitution of HFC by propane or butane	HFC	R, E, V	Proposed	Federal Government	2.6		

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ equivalent)		CCPM
							2010	2020	
Industry — processes	PU foam products (PU-Schaumprodukte)	Substitution of HFC by pentane or cyclopentane	HFC	V	Proposed	Industry	0.2		
Industry — processes	XPS-rigid foam (XPS-Hartschäume)	Substitution of HFC by CO ₂ or ethyl alcohol through all producers	HFC	V	Proposed	Industry	1.0		
Industry — processes	Aerosol (Dosieraerosole)	Substitution of aerosols by powder inhaler through market initiatives	HFC	V	Proposed	Industry	0.5		
Industry — processes (increasing amount of assessed effect compared with MR2001)	Production of aluminium	Provides for additional modernisation measures and process optimisation	PFC	V	Proposed	Industry	0.84		
Industry — processes	Semi-conductor production (Halbleiterherstellung)	Provides for use of a new process for cleaning plasma chambers; use of NF ₃ as a substitute for PFCs in etching	PFC	V	Proposed	Industry	1.3		
Industry — processes	Prohibition of SF ₆ in noise insulation windows (Verwendungsverbot bei Schallschutzscheiben)	By 2005, SF ₆ is to be phased out in new soundproof windows. Aiming at the use of alternative window technologies that do not require SF ₆	SF ₆	R	Proposed	Federal Government	1.0		
Industry — processes	Prohibition of filling tyres with SF ₆ (Verwendungsverbot)	Prohibition of filling tyres with SF ₆	SF ₆	R	Proposed	Federal Government	0.7		
Waste (new in MR2002)	Improvement of energy use in waste combustion	Promotion of waste combustion for electricity and heat production and extension of waste as co-fuel in other combustion processes	CO ₂	E, R	Suggestion and examination	Federal Government, industry	7.0		

Table A.115 Summary of projections by gas in 2010 (Mt CO₂ equivalent)

Greenhouse gases	Base year (¹)	With measures	With additional measures
CO ₂	1 014.4	861.7	Not given
CH ₄	Not given	Not given	Not given
N ₂ O	Not given	Not given	Not given
HFC	Not given	Not given	Not given
PFC	Not given	Not given	Not given
SF ₆	Not given	Not given	Not given
Total without (LUCF)	1 218.2	977.8	Not given
Change relative to base year (%)		- 19.7	

Table A.116 Summary of projections by sector in 2010 (Mt CO₂ equivalent)

Sectors/IPCC source and sinks categories	Base year (²)	With measures	Change rel base year (%)	With additional measures	Change rel base year (additional measures) (%)
1. Energy	Not given	Not given	Not given	Not given	Not given
1.A. Fuel combustion	Not given	Not given	Not given	Not given	Not given
1.A.1. Energy industries	Not given	Not given	Not given	Not given	Not given
1.A.2. Manufacturing industries and construction	Not given	Not given	Not given	Not given	Not given
1.A.3. Transport	Not given	Not given	Not given	Not given	Not given
1.A.4. Other sectors	Not given	Not given	Not given	Not given	Not given
1.A.5. Other (military)	Not given	Not given	Not given	Not given	Not given
1.B. Fugitive emissions from fuels	Not given	Not given	Not given	Not given	Not given
2. Industrial processes	Not given	Not given	Not given	46.48	- 28
3. Solvents and other product use	Not given	Not given	Not given	Not given	Not given
4. Agriculture	Not given	Not given	Not given	Not given	Not given
5. Land-use change and forestry	Not given	Not given	Not given	Not given	Not given
6. Waste	Not given	Not given	Not given	Not given	Not given
Total (without LUCF)	1 218.2	977.8	- 19.7		

Evaluation of Projections

The projections given in the MR2002 do not fully include the recent policies and measures developments. The MR2002 notes that the projections are currently under revision.

Updated projections were submitted by Germany's Federal Environmental Agency at the end of May, as had been announced by Germany's Environment Ministry in the monitoring mechanism committee meeting of 31 March 2003.

Therefore, the figures in Tables A.115 and 116 show the updated data taken from the draft 'Politikszenerarien III' report (see above sources of information), Table 3.12-2.

The projections data are not in compliance with reporting guidelines of the monitoring mechanism. No split of greenhouse gases according to the Kyoto basket is available. Only total greenhouse gases and CO₂ emissions are reported.

There is no sectoral split of greenhouse gas emission projections provided.

Description of Modelling Approach

A new description of the modelling approach is not given in the 2002 monitoring report. Therefore, the following description is the same as in the previous year's Member State analysis.

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

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

Table A.117 Assessment of the target

	Total GHG (Mt CO₂ equivalent)	Change rel base year (%)
Base year (from projections)	1 218.2	
Commitment	962.4	- 21
With existing PAMs	977.8	- 19.7
Gap - over-delivery + shortfall	- 15.4	+ 1.3
Effect of additional PAMs	Not given	

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	1 000 million passenger times km
Freight growth	413	723	1 000 million tonnes times km
Housing units	36		Million units
Households	36.9		Million households
Living space/capacity	36.8		m ² /cap.
Share of renewables		2 ¹ / 4 ²	Percentage of primary energy supply
Discount rate	5 %	5 %	Real prices over all sectors
Liberalisation considered?			Yes, according to DIW

Source: Member State analysis, 2002.

The CO₂ projection used in the monitoring report is the latest projection and is based on the study, 'Politikszenerarien III', that is still under way. It 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 boundary conditions of the economic system, limitations of resources, 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 and 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 updated projections cannot be given for the time being. In the table below, parameters that have been used for the old projections' assessment in the MR2002 are shown

to gain a preliminary impression of Germany's boundary conditions.

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:

- (i) consistent model-based analysis of the national energy system, including emissions and costs;
- (ii) identification of cost-efficient technologies;
- (iii) 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:

- (i) only 'soft' link to the economic model (MIS);
- (ii) restricted to the analysis of energy-related emissions or CO₂;
- (iii) the optimisation model (by itself) does not simulate or predict the influence of policies on human behaviour.

Incorporation of estimated effects of PAMs 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 PAMs.

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 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.

The methodology used is described in 'Policy scenarios for climate protection, Volume 4: Methodological guideline for assessing the impact of measures for emission mitigation', a study commissioned by the Federal Environment Ministry; authors: DIW, FZJ, Fraunhofer-ISI, Öko-Institut, 1998.

Country Conclusions

Germany's monitoring report, 2002, was submitted in January 2003. It took into account most recent policies and measures which came into force until the end of 2002 or were decided in the coalition agreement of the new government after elections for the

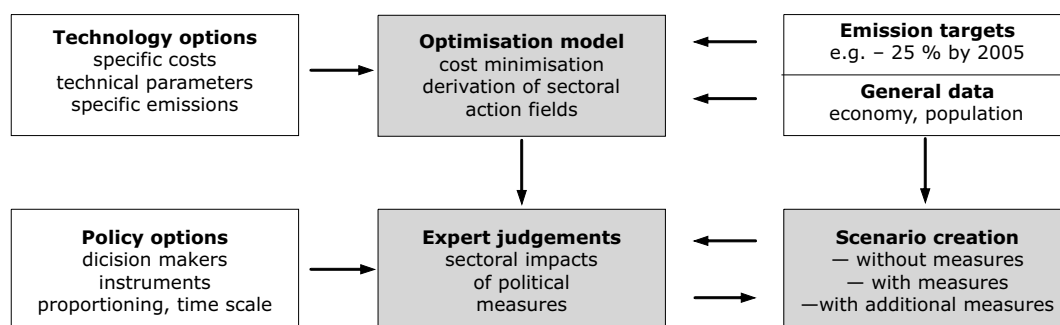
German Bundestag in September 2002. However, the effect of most of the new policies and measures has been not estimated in that report yet. Preliminary updates of Germany's GHG projections were delivered at the end of May 2003 to a very limited extent.

Germany's GHG emissions are projected preliminarily to be reduced to about 978 Mt CO₂ equivalent in 2010 (see Table A.117). This means a shortfall of about 15 Mt CO₂ equivalent in 2010 relative to the burden sharing commitment (- 21 % until 2010 for all six 'Kyoto gases' relative to base year emissions), i.e. the 'with measures' projections are about 1.3 percentage points above the target. For that estimate the recent policy developments until the end of 2002 are assumed. All policies and measures (PAMs) in place are taken into account. Their originally expected effect in the German climate change programme adopted by the government in 2000 has been revised according to recent developments. The revision of projections replaces the previous year's reported over-delivery of 144 Mt CO₂ equivalent or 12 % below the target by a shortfall of 15 Mt CO₂ equivalent, i.e. 1.3 % above the target.

No with additional measures projection is given for the time-being.

The MR2002 contains detailed policies and measures that aim to fulfil Germany's Kyoto commitments. The description of policies and measures has been improved compared with the MR2001. Further improvements could be made with information for each policy or measure whether it is connected to EU-wide common and coordinated policies and measures (CCPMs) as the monitoring mechanism guidelines request, or not. The authors of this report attempted to allocate national policies and measures to CCPMs.

The sectoral split of the policies and measures reported in the MR2002 are different compared with the projections and therefore, also different

Combined approach for deriving policy scenarios

to the IPCC source categories. A reallocation of policies and measures to IPCC categories was attempted and documented in Table A.114 by the

authors of this report and the savings from policies and measures were estimated by IPCC categories (see Table A.113).

Annex I

List of common and coordinated 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

Coordinated 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 cooperation and coordinated 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

Greece

the information provided in the third national communication.

Sources of information

The information in this appendix is based on:

- Third national communication to the UNFCCC

The 3NC presents information for both a with measures and with additional measures projection. Most detail is provided for the with measures projection.

Quality and Transparency of Reporting

The evaluation of the quality and transparency of reporting is based on

Assessment of policies and measures

Annex II of the 3NC provides details of the effects of both implemented/adopted and planned policies and measures.

Table A.118 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	Yes	
Objectives of policies	Yes	
Which greenhouse gases?	All	
Status of implementation	+++	Policies clearly identified as implemented, adopted or planned
Implementation body specified	+++	
Quantitative assessment of implementation	++	The effect of most policies is quantified
Interaction with other PAMs discussed	-	No information on interaction with other policies

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

Table A.119 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	+++	With measures and with additional measures projections are presented
Expressed relative to inventory for previous years	Not stated	
Starting year	2000	First year for which projections are given
Split of projections	+++ (WM) ++ (WAM)	More detail given for with measures projection
Presentation of results	+++	Results are clearly presented
Description of model (level of detail, approach and assumptions)	++	Good overview of model used for energy sector, including strengths and weaknesses. Less detail for other sectors.
Discussion of uncertainty	-	No discussion of uncertainty
Details of parameters and assumptions	++	Parameters and assumptions provided for with measures scenario

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

Table A.120 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures	With additional measures ⁽¹⁾
Energy supply	18.9	7.5
Industry		
Domestic and tertiary	0.01	
Transport	0.4	
Industrial processes		4.7
Waste	5.9	0.01
Agriculture		0.01
Total	25.2	12.3

⁽¹⁾ The figures presented here for the effect of additional policies and measures are those implied by the projections. The numbers differ from the sum of planned policies and measures presented in Table A.4.

Table A.121 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Policies and measures in the with measures projections									
Energy supply	Promotion of natural gas								
	Operational programme for energy (OPE)	Support for natural gas power plants	CO ₂	Economic	Implemented	PPC	15.2		No
	Law 2773/99	Liberalisation of electricity market	CO ₂	Economic	Adopted	PPC	4.3		Yes
	OPE and Development Law 2601/98	Industry	CO ₂	Economic	Implemented	MD	4.4		No
	Law 2364/95	Tax exemptions for natural gas systems in residential/tertiary sectors					1.2		No
	Athens Urban Transport Association	Purchase of CNG buses	CO ₂	Economic (public investments)	Implemented	MTT	0.006		No
Energy supply	Improvements in the conventional power generation system						0.552		
	Promotion of combined heat and power systems	Setting up district heating system in northern Greece	CO ₂	Economic (PPC investments)	Implemented	PPC	0.025		No
	Limitation of distribution losses	Includes replacement of normal loss distribution transformers	CO ₂	Economic (PPC investments)	Implemented	PPC	0.108		No
	Efficiency improvements in existing lignite power stations	Enhanced operation of cooling towers, lignite mills, turbines etc.	CO ₂	Economic (PPC investments)	Implemented	PPC	0.419		No
Energy supply	Promotion of renewable energy sources						3.1		
	OPE and Development Law, plus Law 2244/93 (favourable by back tariffs for RE)	18 wind projects	CO ₂	Economic, regulatory	Implemented	RAE/MD/Private	0.9		No
	OPE and Development Law, plus Law 2244/93 (favourable by back tariffs for RE)	23 small hydro projects	CO ₂	Economic	Implemented	RAE/MD/Private	0.203		No
	OPE and Development Law, plus Law 2244/93 (favourable by back tariffs for RE)	Large hydro	CO ₂	Economic (PPC investments)	Implemented	RAE/MD/Private	0.731		No
	OPE and Development Law, plus Law 2244/93 (favourable by back tariffs for RE)	32 PV projects	CO ₂	Economic	Implemented	RAE/MD/Private	0.001		No
	OPE and Development Law, plus Law 2244/93 (favourable by back tariffs for RE)	13 biomass projects	CO ₂	Economic, regulatory	Implemented	RAE/MD/Private	0.276		No
	OPE and Development Law, plus Law 2244/93 (favourable by back tariffs for RE)	Solar energy in residential sector	CO ₂	Economic	Implemented	MEPPPW	1.011		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
	OPE and Development Law, plus Law 224/93 (favourable by back tariffs for RE)	Solar energy in tertiary and energy sectors	CO ₂	Economic	Implemented	MEPPPW	0.004		No
Residential and tertiary sectors	Energy conservation						0.012		
	Presidential Decrees 335/1993 and 178/1998	Minimum standards for non-industrial boilers and refrigerators/freezers	CO ₂	Regulation	Implemented				Yes
	Presidential Decree 180/1994	Energy labelling	CO ₂	Information	Implemented				Yes
	Promotion of CFLs	Replacement of incandescent lamps	CO ₂	Economic	Implemented	MD	0.012		No
Transport	Interventions in vehicles						0.364		
	ACEA agreement	Improve fuel efficiency of new cars	CO ₂	Voluntary agreement	Implemented	MTT	0.364		Yes
	Law establishing private centres for technical control	Regular vehicle inspections	CO ₂	Regulation	Implemented				No
	Exhaust control card	Exhaust emission inspections	CO ₂	Regulation	Implemented				No
	Law 1682/99	Differentiated vehicle taxation according to pollution control technology	CO ₂	Regulation	Implemented				No
Transport	Interventions in transport system	Enhancement of infrastructure	CO ₂						No
Transport	Interventions in public transport	New metro lines, improved efficiency of buses, priority lanes for buses	CO ₂						No
Waste	Waste management	Landfill directive	CH ₄	Regulatory	Adopted	MEPPPW	5.876		Yes
With additional proposed measures – not included in projections									
Energy supply	Further promotion of natural gas	Operation of gas plants as baseload, expansion of natural gas use in demand sectors	CO ₂	Economic, regulatory	Planned	MD/RAE/PPC/MEPWPP/MTT	3.9		No
	Further promotion of renewable energy sources	Includes additional 800 MW wind, 250 MW small hydro, plus expansion of other renewables	CO ₂	Economic, regulatory	Planned	MD/RAE/private/MTT/MEPWPP	6.4		No
Industry	Energy conservation	Both thermal and electricity	CO ₂	Economic, regulatory	Planned	MD	0.2		No
Residential/tertiary	Energy conservation	Thermal improvements in buildings. Promotion of RES. Promotion of energy efficiency appliances. Further penetration of gas. Other energy conservation	CO ₂	Economic, regulatory	Planned	MEWPP/MD	2.3		No
Transport	Various	Energy efficiency improvements (by 2 %) in vehicles. Fuel switching. Transport management including improvements in public transport	CO ₂	Regulatory, economic (public investments)	Planned	MTT	0.6		No
Waste	Waste management	Flaring of landfill gas	CH ₄	Regulatory, economic (public investments)	Planned	MEPWPP	0.1		No
Industrial processes	Various	Restructure chemical industry and recover f-gases from discarded equipment	HFCS	Regulatory, economic (public investments)	Planned	MD	4.7		No
Agriculture	New practices	Manure management systems and organic farming	CH ₄ , N ₂ O	Economic, regulatory	Planned	MA	0.1		No

Table A.122 Summary of projections by gas in 2010 (Mt CO₂)

	Base year (¹)	With measures	With additional measures
Carbon dioxide	85.6	120.8	
Carbon dioxide (excluding sinks)	84.2	118.8	
Methane	8.7	7.9	
Nitrous oxide	10.6	11.1	
HFCs	3.4	7.2	
PFCs	0.1	0.1	
SF ₆	0.0	0.0	
Total (excluding sinks)	107.0	145.2	132.9
Total (including sinks)	108.4	147.2	134.9
Change relative to base year (excluding sinks) (%)		35.7	24.2
Change relative to base year (including sinks) (%)		35.8	24.5

(¹) Base year for F-gases is 1995.

Table A.123 Assessment of the target

	Excluding sinks		Including sinks	
	Mt CO ₂ equivalent	1990 level (six gas basket) (%)	Mt CO ₂ equivalent	1990 level (six gas basket) (%)
Base year (from projections)	107.0	100.0	108.4	100.0
Commitment	133.8	125.0	135.5	125.0
With existing PAMs	145.2	135.7	147.2	135.8
Gap (negative means no gap)	11.4	10.7	11.7	10.8
Effect of additional PAMs	12.3	11.5	12.3	11.3

Evaluation of Projections

With currently implemented and adopted policies and measures, the with measures scenario shows that greenhouse emissions' increase will be almost 36 % above base year levels in 2010. The effect of planned policies is to limit this increase to just less than 25 %, which is the commitment of Greece under the EU burden sharing agreement.

Description of Modelling Approach

The energy sector in Greece is modelled using the energy and power evaluation programme (ENPEP), developed by Argonne National Laboratory. The model contains a set of analytical tools for use in integrated energy/electricity system planning and the quantification of environmental burdens. Its basic module (Balance) is used to trace the flow of energy throughout the entire energy system from resource extraction, through processing and conversion, to meet demands for useful energy (e.g. heating, transportation, electrical appliances) and employs a market-based

simulation approach to project future energy supply/demand balances.

The ENPEP model uses a non-linear, equilibrium approach to determine the energy supply demand balance. A fundamental assumption of the model is that producers and consumers both respond to changes in price. For all energy supply forms and energy uses, the ENPEP finds a set of equilibria (given by a set of prices and quantities) that satisfy all relevant equations and restrictions.

The data that are necessary to calibrate the model for a base year as well as to project the future energy needs are:

- macro-economic data that correspond to demographic national accounts, sectoral activity and income variables;
- structure of energy consumption in the base year and structure of activity variables (production, dwellings, passenger-kilometres, etc.);

- technical economic data for technologies and sub-sectors (e.g. capital cost, unit efficiency, variable costs, lifetime, etc.).

The Greek energy system is presented in the ENPEP model by sub-systems and sectors, which cover the main economic and energy activities; including energy supply, energy conversion and final demand.

The strength of the approach is that it allows for a comprehensive assessment of the various interactions between the different sectors of the energy system. The market-based equilibrium together with the detailed technical description of the energy sectors and uses enables the realistic representation of the energy system as well as the modelling of different policy instruments. However, the solution obtained is closely related to the level of detail of the developed energy network. The main limitations of the model are that useful energy demand is not endogenously adjusted to changes of prices and market simulation parameters are set exogenously.

Greenhouse gas emissions in the non-energy sectors are calculated using simplified spreadsheet models that calculate emissions based on activity data, emission factors and sector specific assumptions about the growth of activities and the degree of emissions control.

In estimating the growth factor, time-series analysis and/or regression analysis using an appropriate determinant parameter of the available activity data is used. Potential determinant parameters include population; value added, product output, etc. The control factor accounts for changes in emission factors. In determining the future year emission factor, three basic parameters must be quantified: regulation control, rule effectiveness, and rule penetration. Regulation control is the level of reduction expected by assuming a fully complied measure. Rule effectiveness accounts for the level of expected

compliance with the regulation. Rule penetration indicates the fraction of emissions within a source category, which are subject to the regulation, accounting for possible exemptions. These parameters are quantified by experts' assessments in close consultation with the responsible governmental departments.

The main drawback of this analysis is that the models do not take into account any overlaps or synergies between sectors or policy areas. In addition, the extrapolation of historical relationships overlooks the effects of faster technological advance.

Parameters used in the with measures scenario are given in the table below.

Country Conclusions

The third national communication of Greece has provided comprehensive information in most of the areas necessary for evaluation under the monitoring mechanism. The information is clearly set out, with good use of tables and represents a significant improvement over earlier reporting. One area that could be improved further is in the reporting of the with additional measures projection, for which no breakdown by gas is presented. Neither is it clear how the savings from the planned policies and measures relate to this scenario. The total savings from planned policies and measures in the energy sector given in Annex II are significantly higher than the difference in 2010 between emissions in the with measures and with additional measures scenarios.

The new projections show that with existing policies and measures, emissions will be over 35 % higher in 2010 than in the base year, compared with the target of a 25 % increase. While planned policies and measures have been identified to meet the gap, it will be important for both the existing and new policies to deliver the expected savings if Greece is to meet its commitment under the EU burden sharing agreement.

Modelling parameters

Parameter	1990	1995	2000	2000-05	2005-10
Population (M)	10.16	10.53	10.87	0.50 %	0.40 %
Household size	3.21	3.14	3.06	2.97	2.87
GDP (billion euro, 2000)	96.6	102.8	121	4.40 %	3.40 %
International fuel prices					
Coal (USD 90/t)	51.3	40.6	28.5	31.2	31.2
Oil (USD 90/bbl)	22.2	17.2	22.8	- 7.70 %	0 %
Natural gas (USD 90/toe)	119.1	92.5	90.1	- 7.70 %	0.00 %
Transport activity					
Passenger transport (billion pkm)	96.5	124.3	151.4	3.30 %	2.30 %
Goods transport (billion tkm)	84.8	94.3	106	2.60 %	2.30 %

Ireland

Sources of Information

The primary source of information for this chapter is the national climate change strategy. Previous and additional sources of information are also listed below.

The information in this appendix is therefore based on:

- a study on the limitation and reduction of CO₂ and other greenhouse gas emissions in Ireland (work carried out by Environmental Resources Management (ERM), in association with Bryne O Cleirigh and the Economic and Social Research Institute, Dublin) – report dated April 1998;
- Ireland's national climate change strategy (2000);
- Progress report: Implementation of the national climate change strategy (April 2002).

For the purposes of this chapter, the national strategy is used as the basis of information relating to projections and policies and measures, and supersedes previous information. Additional information from the progress report is included where relevant.

Quality and transparency of reporting

The national climate change strategy has been used as the basis for the reporting of Ireland's strategy within this report. The strategy document outlines the measures that will need to

be implemented in order that a target of 60.74 Mt CO₂ can be met during the commitment period 2008–10.

This strategy outlines the different policies and measures for each sector that are going to be used as part of the overall strategy to reduce greenhouse gases. Each policy and measure is quantified in terms of its reduction potential.

The strategy document also includes projections for 2010, based on a scenario in which no strategy measures have been implemented. An overall projection is also made which uses a scenario in which all policies and measures are taken into account in reducing overall greenhouse gases.

The table below provides an indication as to what level of information is provided in the climate change strategy document.

In the climate change strategy, a significant amount of information is provided at the sector level for each greenhouse gas in terms of the without strategy measures projection. The other projection made is based on potential reductions through policies and measures outlined in the strategy document. The potential reductions are outlined in each sector chapter.

Model approaches are not described in any detail.

Table A.124 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	++	The climate change strategy particularly focuses on policy options. Some specific technology measures are also identified.
Objectives of policies	+++	These are well covered in the narrative.
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O ⁽¹⁾	
Status of implementation	++	Associated with existing historic measures but also some new initiatives.
Implementation body specified	++	
Quantitative assessment of implementation	-	A quantitative assessment is made.
Interaction with other PAMs discussed	-	Not examined.

⁽¹⁾ Industrial gases are addressed in the context of voluntary agreements.

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

Table A.125 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	Scenarios are based on 'business as usual/without strategy measures' basis and on a 'with strategy measures' basis	
Expressed relative to inventory for previous years	+	Not clear.
Starting year	1990	
Split of projections	++	Shown for all gases.
Presentation of results	++	
Description of model (level of detail, approach and assumptions)	+	Growth assumptions discussed. Wide set of forecasts depends upon growth assumptions.
Discussion of uncertainty	+	Uncertainty discussion limited.
Details of parameters and assumptions	+	Assumptions reported.

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

Table A.126 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures	With additional measures
Energy supply		5.65
Industry, commercial and services		2.175
Built environment and residential		0.9
Transport		2.67
Agriculture		2.41
Waste		0.85
Sinks		0.76
Total without sink		14 655
Total with sink		15 415

Assessment of policies and measures

The information provided by the climate change strategy is based on before strategy measures and with strategy measures. Before strategy measures is a business as usual scenario while the with strategy measures takes into account the measures proposed in the climate change strategy.

Energy supply is projected to have the largest saving from the additional measures, with a reduction of 5.65 Mt CO₂ equivalent. Policies and measures for industry, transport and agriculture are also forecast to have significant effects on cutting GHG emissions.

Policies and measures are described in detail in the following table.

Table A.127 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Policies and measures in the with additional measures projections									
Cross-sector	Carbon taxes	Demand reduction at least cost	Mainly CO ₂	Fiscal	Planned	Not given	Not given	No	No
Cross-sector (business/firms and utilities)	Tradable permits	Least cost market approach	Mainly CO ₂	Economic	Planned	Not given	Not given	Yes	Yes
Energy supply	Fuel switching to gas	Lower CO ₂ of electricity generation	Mainly CO ₂	Other	Ongoing	Not given	4.15	No	No
Energy supply	Renewables	Expansion of systems	Mainly CO ₂	Other	Approved	Not given	1 (1)	Yes	Yes
Energy supply	CHP	Expansion of systems	Mainly CO ₂	Fiscal (CHP grant)	Ongoing	Not given	0.25	No	No
Energy supply	Improving efficiencies and DSM	Demand reduction	Mainly CO ₂				0.25	No	No
Industry	Industrial energy efficiency	Demand reduction	Mainly CO ₂	Negotiated agreement	Planned	Irish Energy Centre	1	No	No
Industry	Process substitution for cement	Emission reduction	Mainly CO ₂	Negotiated agreement	Planned	Government and cement industry	0.5	No	No
Industry	Industrial gases	Emission reduction	HFC, PFC, SF6	Negotiated agreement	Planned	Government and industry	0.5	No	No
Business and residential	Commercial and residential energy efficiency	Demand reduction	Mainly CO ₂	Set of economic instruments	Planned/implemented	Irish Energy Centre	0.175	No	No
Transport	Transport efficiency improvements	Demand reduction	Mainly CO ₂	Voluntary agreement and fiscal (taxation)	Not given	Not given	0.77	Yes	Yes
Transport	Alternative transport fuels	Reduced emissions	Mainly CO ₂		Not given	Not given	0.9	Yes	Yes
Transport	Public transport measures	Switching modes	Mainly CO ₂	Fiscal (investment)	Adopted/implemented		0.15	Yes	Yes
Transport	Freight	Switch to rail and increase road haulage efficiency	Mainly CO ₂	Education, fiscal (taxation) and negotiated agreement	Not given	Irish energy centre and Department of Public Enterprise	0.05	Yes	Yes
Transport	VRT, taxes	Encourage more efficient car purchase	Mainly CO ₂	Fiscal (taxation)	Not given	Not given	0.5	Yes	Yes
Transport	Traffic management	Reduced congestion and emissions	Mainly CO ₂	Fiscal (taxation and investment)	Implemented	Government	0.2	No	No
Transport	Labelling	Improve fuel efficiency of car fleet	Mainly CO ₂	Voluntary agreement/regulatory	Implemented	Car manufacturers, government	0.1	Yes	Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Residential	Residential building standards and fuel switching	Demand reduction	Mainly CO ₂	Regulatory	Adopted	Government and Irish energy centre	0.9 ^(?)		Yes
Agriculture	Reduction of CH ₄ from herd	Reduced emissions	CH ₄	Fiscal (subsidies) and regulatory	Implemented and adopted	Government and the agriculture sector	1.2		Yes
Agriculture	Farm forestry sequestration	Reduced emissions	Mainly CO ₂	Fiscal (subsidies)	Implemented	Government, forest service and the agriculture sector	0.25		No
Agriculture	Fertiliser use	Reduced emissions	N ₂ O	Regulatory	Planned	Government	0.9		Yes
Agriculture	Manure management	Reduced emissions	CH ₄	Not given	Not given	Not given	0.06		Yes
Agriculture	Biogas	Fuel substitution	CH ₄	Regulatory (IPC licensing)	Not given	Not given	Not given		Yes
Waste (check)	Energy recovery from landfill and thermal treatment	Switching fuels	Mainly CO ₂	Fiscal (investment)	Not given	Local authorities	0.85		Yes
Sinks	Additional sequestration	Carbon sink	CO ₂	Fiscal (grant) and research	Implemented	Not given	0.76		No

(¹) The new total for renewables is 2.1 Mt CO₂ equivalent (approved wind farm to save 1.1 Mt PA in addition to the 500 MW renewables target to save 1MT).

(²) The contribution to this reduction from revised building regulations has increased from 0.25 Mt to 0.3 Mt per annum for 2012. The progress report summarises the recent developments of policies set out in the national climate change strategy. The policies reported on are based on those set out in the strategy. During 2001, no policies were reported in addition to the strategy. All policies and measures are taken to be additional measures and thus there are no policies and measures in the with measures projections.

Table A.128 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	With measures	With additional measures
CO ₂	31.6	51.4	40.3
CH ₄	12.8	12.2	10.1
N ₂ O	9.1	9.7	8.8
HFC, PFC, SF ₆ (low) ⁽¹⁾	0.3	0.7	0.2
HFC, PFC, SF ₆ (high) ⁽²⁾	0.3	1.9	1.4
Total (low) without sinks	53.8	74.0	59.3
Total (high) without sinks	53.8	75.2	60.6
Change relative to base year (low) (%)		38	10
Change relative to base year (high) (%)		40	13
Total (low) with sinks ⁽³⁾	53.8	72.6	58.6
Total (high) with sinks	53.8	73.8	59.8

⁽¹⁾ The low projection uses the 'actual' emissions approach where only amounts of substances released in Ireland are included in the net total emissions and removals.

⁽²⁾ The high projection emissions are allocated against the national limitation target using the 'potential' emissions approach, where all amounts of substances used in Ireland are included in the net total emissions and removals.

⁽³⁾ The sink saving under with measures assumes a 50 % planting rate. The sink saving under with additional measures is the extra saving gained from 100 % planting rate.

Table A.129 Summary of projections by sector in 2010 (Mt CO₂)

	Base year	With measures	Change relative to 1990 (%)	With additional measures	Change relative to 1990 (additional measures) (%)
Energy	11.6	18.8	62	13.0	12
Industry	4.3	6.0	40	4.3	0
Process	3.0	5.0	68	4.4	47
Transport	5.1	14.2	178	11.4	123
Commercial/Institutional	2.4	4.1	68	3.6	48
Residential	7.0	6.8	- 4	6.2	- 11
Agriculture	18.6	19.2	3	16.6	- 11
Waste	1.8	1.1	- 36	1.1	- 39
Total (high, without sinks)	53.8	75.2	40	60.6	13

Evaluation of Projections

The latest projections ⁽¹⁾ show total greenhouse gases increasing by 38–40 % between 1990 and 2010. This compares to Ireland's commitment under the EU burden sharing agreement of + 13 %. This increase is higher than the range identified in previous reports. With the additional measures, the increase is reduced to between 10 and 13 %.

According to the climate change strategy, the largest percentage increase is projected for the halogenated gases although these are still a small fraction of the total. Methane emissions are projected to reduce by a small amount and N₂O emissions to grow by a small amount. The most growth in GHG

emissions is projected to come from CO₂.

The climate change strategy report provides assessments of the contribution and costs of a range of measures. Not all options can be assessed and in some cases the opportunities have a relatively high cost.

With Ireland's existing policies and measures, an increase in GHG emissions of 40 % from 1990 to 2010 is forecast, and the Kyoto commitment is exceeded by 14.5 Mt CO₂ equivalent. Additional measures bridge this gap and thus Ireland is predicted to meet its commitment.

⁽¹⁾ The projections are from Ireland's climate change strategy. Section 9.5 provides some descriptions of the projection methodology.

Table A.130 Assessment of the target

	Mt CO₂ equivalent	Percentage of 1990 level (six gas basket)
Base year (from projections) ⁽¹⁾	53.8	
Commitment	60.7	13.0
With existing PAMs ⁽¹⁾	75.2	39.8
Gap (negative means no gap)	14.4	26.8
Effect of additional PAMs ⁽¹⁾	14.7	27.3
Effect of additional PAMs including sinks	15.4	28.7

⁽¹⁾ The target is assessed assuming the upper limit for halogenated gases and excluding carbon sinks.

Description of modelling approach

The projections for 2050 have been developed by the EPA based on activity data from official sources, in accordance with IPCC guidelines. They are also based on ESRI energy projections and include non-energy sources of CO₂. The range in projections is due to two possible scenarios for halogenated gases — therefore, a low and high projection has been made. Economic growth assumptions are those found in the ESRI *Medium-term review 1999–2005*. No details of the parameters used in the model have been provided.

Country Conclusions

Ireland's limitation target of 13 % corresponds to a quantitative limitation target of 60.7 Mt CO₂ equivalent per annum for the period 2008–12. Ireland will need to achieve annual emissions savings of 14.5 Mt CO₂ equivalent per annum during the commitment period. This saving is forecast to be covered by additional policies and measures in the climate change strategy.

Italy

Sources of information

The information in this appendix is based on the following.

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Table A.131 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+	Information is shown in various levels of detail, depending on the scenarios. For the trend scenario only a summary of major measures is given and overall a fairly wide mix of instruments. However, the measures that need to be taken to implement these policies are not clearly stated.
Objectives of policies	++	The 3NC details quantitative targets for many, but not all specific technical measures. For some technical measures no specific correlation is made to the underlying policies.
Which greenhouse gases?	++	All gases are detailed in the emission inventories for 1990 to 2000. The trend scenario includes all six gases; the reference and with additional measures scenarios include all gases, but are given in detail only for CO ₂ , N ₂ O and CH ₄ .
Status of implementation	++	Not very clear. The full chain of necessary events (policy implementing measure–emission reduction) is not always transparent. Some policies labelled as implemented in the policies' overview table are specified as only partially implemented in the continuous text of the 3NC.
Implementation body specified	+	For many measures, the responsible bodies (i.e. those which passed the policies) are listed in the 3NC (1).
Quantitative assessment of implementation	++	
Interaction with other PAMs discussed	+	Only partly addressed.

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

UNFCCC website. [http://62.225.2.23/default1.htf?time=02 %3A25 %3A22+PM](http://62.225.2.23/default1.htf?time=02%3A25%3A22+PM) accessed June 2001

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This chapter has been prepared using information provided by Ecofys.

Quality and transparency of reporting

The third national communication (3NC) of Italy provides an overview of many important aspects related to Italian and European climate change policy. However, some potential for improvement regarding future reports is seen in the following points.

- Distinctive different projections should be described giving comprehensive information on the expected effect of specific policies and measures (including implementing bodies and nature of the instruments) on emissions of specific greenhouse gases.
- The status of implementation of policies and measures is not clear in

the third national communication and could be greatly clarified.

- The model for the projections in the 3NC was partly constructed using the Ceprig approach. The exact methodology and the approach used for emissions not related to the combustion of energy sources is not detailed.
- HFCs, PFCs and SF₆ should be included in the with measures and with additional measures projection split.
- Projections should be comprehensively distinguished both by types of emissions (six gases) and by the sectors used in the CRF.

Unless stated otherwise, the information included originates from Italy's third national communication.

Assessment of policies and measures

The third Italian national communication does not explicitly provide a with measures and a with additional measures scenario. The contribution of policies and measures are assessed in three scenarios with a different level of policy intervention:

(1) Depending on the policy and measure, the following bodies are involved: Ministry of Productive Activities, Ministry of the Environment, Ministry of Industry, Trade and Craft, Ministry of Transport, Ministry of the Treasury, Ministry of Finance, Ministry of Agriculture, Ministry of Foreign Affairs, Ministry of Public Works, Ministry of Justice, Interministerial Committee for Economic Planning, Authority for Electricity and Gas, the regions, ENEA, ANCI, ENEL SpA.

Table A.132 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	++	The following three scenarios have been distinguished. <ul style="list-style-type: none"> • The 'trend' scenario 'under current legislation' (2010 emission = + 11.3 % relative to the base year). • A 'reference' scenario, herein referred to as the with measures scenario; including the implementation of programmes adopted under domestic laws and European directives, as well as under ministerial decrees and decisions of the Interministerial Committee for Economic Planning (2010 emission = + 1.4 % relative to the base year). • An 'open set' of additional programmes and initiatives, herein referred to as the with additional measures scenario (2010 emission = up to - 7 % relative to the base year) ⁽²⁾.
Expressed relative to inventory for previous years	++	Data in the inventory part of the 3NC and data of projections broken down by greenhouse gas deviate only slightly. A comparison of inventory and projections data broken down by sectors is not possible as the sector definition in the projections part differs substantially from the CRF sector definition.
Starting year	+++	1990 for CO ₂ , CH ₄ and N ₂ O; 1995 for the F-gases.
Split of projections	++	Projections according to the scenarios trend, with measures and with additional measures (see above) are provided for the following sectors. <ul style="list-style-type: none"> • From energy uses, of which: <ul style="list-style-type: none"> - energy industries - industry - transports - residential and tertiary - agriculture - others (military and leaks). • From other sources, of which: <ul style="list-style-type: none"> - industrial processes - agriculture - waste. • Carbon credits from JI and CDM measures for the base year, 1995, 2000 and 2010. A split by gases is only given for the trend scenario.
Presentation of results	++	Not very transparent. The projections of the with additional measures scenarios are not given in one comprehensive table, but have to be calculated manually.
Description of model (level of detail, approach and assumptions)	+	The Ceprig model (bottom-up) has been used for CO ₂ emissions from combustion of energy sources. For emissions from other sectors and gases, the model used is not explained. However, the assumptions used for the trend scenario are listed.
Discussion of uncertainty	-	Uncertainties are mentioned at some places but are not assessed systematically in the modelling approach.
Details of parameters and assumptions	++	Most important parameters are given in absolute and relative terms. Whether underlying economic assumptions vary in the different scenarios is not mentioned.

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

- the trend scenario including policies and measures under current legislation;
 - a reference scenario — herein referred to as the with measures scenario — including the implementation of programmes adopted under domestic laws and European directives, as well as under ministerial decrees and decisions of the Interministerial Committee for Economic Planning — the distinction between the trend and the reference scenario is not very clear;
 - an open set of additional programmes and initiatives to achieve the objectives of the Kyoto Protocol, herein referred to as the with additional measures scenario.
- The emission reductions projected in Italy's second national communication have been re-evaluated as part of a study by the Environment Ministry on the basis of policies that were expected to be implemented by 2010 or those that had already been implemented. The projections in 3NC — in the with

⁽²⁾ For many of the additional measures a range of potential emission reduction is given, so that projected emissions for 2010 vary from a decrease by 4,8% (minimum) over 5,7% (calculated average) to 7,0% (maximum) in the with additional measures scenario. For further calculations the average value will be used if not otherwise stated.

Table A.133 Summary of the effect of policies and measures included in the projections (Mt CO₂ equivalent) ⁽³⁾

	With measures ⁽⁴⁾	With additional measures ⁽⁵⁾
<i>From energy uses, of which:</i>	39.6	68.4
Energy industries	26.0	26.0
Industry	0.0	10.0
Transports	7.5	21.0
Residential and tertiary ⁽⁶⁾	6.1	11.3
Agriculture	0.0	0.3
Others (military and leaks)	0.0	0.0
<i>From other sources, of which:</i>	0.0	8.1
Industrial processes	0.0	6.2
Agriculture	0.0	0.5
Waste	0.0	0.6
Others (F-gases and solvents)	0.0	0.8
<i>Carbon credits from JI and CDM measures</i>	12.0	12.0
Total	51.6	88.5

additional measures scenario — show the potential to reach the goals set by the Kyoto Protocol (– 6.5 %). However, Italy has not presented an independent analysis to support this estimation.

Table A.134 gives the outcome of PAMs as estimated in the third national communication — a summary of major measures adopted or discussed in the three scenarios mentioned above.

⁽³⁾ Source: 3NC, Table 4.2, pp. 83–85, Table 5.3, p. 114, Table 5.24, p. 130 and Annex I, Table 3, p. 204.

⁽⁴⁾ Reference scenario.

⁽⁵⁾ Open set of additional programmes and initiatives.

⁽⁶⁾ Sometimes referred to as 'civil'.

Table A.134 Detailed information on policies and measures (7)

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Policies and measures in the trend projections (8)								
Energy	Decreases and various instructions	Supports in stock account aimed at increasing the efficiency of power plants, spread of co-generation plants and promotion of natural gas use.			Implemented		19.7	
Energy	Legislative Decree No 79 of 16 March 1999 (Bersani)	Liberalisation of the electric sector. Implemented by the Ministry of Productive Activities, Authority for Electricity and Gas and ENEL SpA.			Implemented			
Energy	Ministerial Decree No 106 of 29 March 2001, Minister for the Environment, Resolution No 224/00 AEEG	'Programme for photovoltaic roofs' realises plants from 1 to 50 kWp connected to low-tension distribution network in Italy, from 2000 to 2002.			Implemented		0.12	
Energy	Various decrees	Maintenance of the current progressive structure of domestic electric tariffs.			Implemented		10	
Energy	Legislative Decree of 24 April 2001	1.6 Mtoe of energy saving from the efficient use of energy; 1.3 Mtoe of saving of primary energy from the reduction of gas use.			Implemented		7-8	
Energy	Voluntary agreement with ENEL	The first VA being implemented, signed with ENEL in 2000.			Implemented		12	
Energy	Ministerial Decree of 11 November 1999, Minister for Productive Activities and Minister for the Environment	Decree supporting the regulation of electricity production from renewable sources (Legislative Decree No 79 of 16 March 1999, Art. 11, par. 1,2,3).			Implemented		6	
Energy	Ministerial Decree of 18 March 2002, Ministry of Productive Activities	Modifications and integrations to decree of the Minister for Industry, Trade and Craft in agreement with the Minister for the Environment, 11 November 1999, concerning the directives for the implementation of rules on the subject of the production of electricity from renewable sources as of paragraphs 1, 2 and 3 of Art. 11 of Legislative Decree No 79 of 16 March 1999.			Implemented			
Energy	Resolution of the Authority for Electricity and Gas No 42/02	Conditions for the recognition of co-generation of electricity/heat in conformity with Art. 2, paragraph 8, of Legislative Decree No 79 of 16 March 1999.			Implemented			
Energy	Several legislative decrees	Diffusion of the use of natural gas, enlargement and updating of transport lines and distribution.			Implemented		0-5	

(7) Summary of major measures.

(8) Under current legislation.

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Industry	VA with Montedison (1998)	Voluntary agreement between the Italian Government and Montedison: different projects supported by means of subsidies. Reduction objective of 10 Mt CO ₂ for 2010, but unclear annual target and geographical localisation.			Implemented		0-0.3	
Industry	VA with the glass industry	Voluntary agreement with the glass industry, programme of 10 % emission reduction to 2005; potential reduction of 0.4 Mt CO ₂ eq./year.			Implemented			
Industry	Public allocation	Allocation by the Italian Government of EUR 7 million for the adaptation of four steel plants to EU standards.			Implemented			
Industry	Various	Increase in the use of methane in the industry.			Implemented		3	
Industry	Law No 10/91, Art. 19	Compulsory appointment of an energy manager in industrial plants consuming more than 10 000 tep year of primary energy and in the services companies consuming more than 1 000 tep/year. In 1997, about 2 500 industries and 1 000 service companies had appointed a manager.			Implemented			
Industry	VA between ENEL (2000) and the Ministry of Productive Activities, Ministry of the Environment	Campaigns to increase the use of efficient light bulbs and to reduce the size of electric engines. (It is estimated that if the size of all electric engines was adequate, a 2 % saving in electric consumption would be achieved).			Implemented			
Transport	Ministerial decree of 17 February 2000, Minister for the Environment	Financing plan called 'Ecological Sundays' aimed at: realising, integrating or completing public means of transport producing zero or low emissions; regulations and restrictions to the access to central areas in several major cities through automatic control systems or implementation of a 'road pricing' system; promotion of the use of low-impact fuels.			Implemented			
Transport	VA with FIAT (1988)	Reduction at 145g CO ₂ /km of control on CO ₂ emissions from cars.			Implemented		6.8	
Transport	Law No 140 of 11 May 1999	Rules concerning production activities: Art. 6: regulations on the re-financing and extension of incentives (for the acquisition of motorcycles and motor vehicles).			Implemented			
Transport	Resolutions of the Interministerial Committee for Economic Planning of 20 November 1995 and 21 April 1999, No 448/99, No 488/99 and No 388/00	Three series of financing decrees: (a) 52 projects, total investment amounting to EUR 7.3 billion, approved in 1999; (b) 23 projects, total investment amounting to EUR 2.2 billion, approved in 2000; (c) 32 projects, total investment amounting to EUR 1.9 billion, estimated but not approved yet.			Implemented		2.6-3.2	

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Transport	Ministerial decree of 6 June 2000 (financing deriving from Law No 194 of 18 June 1998, Art. 2, para. 5), Minister for the Environment	Financing to the regions for the replacement of buses for public transport in operation for more than 15 years.			Implemented			
Transport	Ministerial decree of 28 May 1999, Ministers for the Environment, Transport and Treasury	Financial incentives to local authorities and private businesses for the acquisition of vehicles with zero or low emissions (hybrids, electric, methane, LPG cars) in urban areas with more than 150 000 inhabitants (Law No 426 of 9 December 1998).			Implemented		1.0	
Transport	Ministerial decree of 20 December 2000, Minister for the Environment	Incentives for the conversion to natural gas or LPG of non-catalysed vehicles.			Implemented			
Transport	VA of 6 April 2001, Ministers for the Environment, Productive Activities, Finance, Agriculture, ENEA, ANCI, regions.	Promotion of 'Bio-diesel' in the distribution networks and public means of transport.			Implemented			
Transport	Law No 403 of 14 October 1999, Minister for Foreign Affairs	Ratification and implementation of the Convention for the Protection of the Alps of 1991; programme of measures in the sector of freight traffic from road to rail/sea.			Implemented		1.0	
Transport	Law No 27 of 18 February 2000 (Conversion of Legislative Decree No 484 of 20 December 1999, with modifications to Law No 454 of 23 December 1997), Minister for Transport	Actions aimed towards the development of intra-modality systems, according to EU regulations.			Implemented			
Transport	Ministerial decree of 7 June 2000 (Ministers for Transport and Public Works)	Allocation to a fund promoting the use of bicycles under Law No 366/1998 and self-governing regions and provinces.			Implemented			
Transport	Resolution of the Interministerial Committee for Economic Planning No 113 of 2 November 2000	General transport plan including stabilisation proposals on emissions to 2010 compared with 1990 levels.			Implemented			
Transport	Ministerial decree of 20 December 2000, Minister for the Environment	Promotion of 'car sharing'.			Implemented			
Transport	Minister for the Environment	Incentives for the planning of 'mobility managers' in businesses, for the transport of passengers and goods.			Implemented			
Transport	Ministerial decree of 25 January 2000, Minister for the Environment	'Ecological Sundays'; co-financing of projects aimed at promoting public awareness to sustainable transport.			Implemented			
Transport	Circular No 2708 of 30 June 1999, Ministry of the Environment	Support to Ministerial Decree No 163 of 21 April 1999 for the identification of health and environmental criteria according to which the Mayor must take steps aimed toward the reduction of urban traffic.			Implemented			

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Transport	EU directives	In application of Directive 2001/1/EC of the European Parliament and of the Council of 22 January 2001 amending Council Directive 70/220/EEC concerning measures to be taken against air pollution from emissions from motor vehicles, OJ L 35 of 6 February 2001.			Implemented			
Transport	Ministerial decree of 1 June 2001, Ministry of Transport	Application of Directive 1999/96/EC of the European Parliament and the Council of 13 December 1999 concerning the rapprochement of the legislations of the Member States about the measures to be adopted against the emission of gaseous pollutants and polluting particulates generated by self-ignition engines for vehicle propulsion and against the emission of gaseous pollutants produced by spark-ignition engines fuelled by means of natural gas or liquefied petroleum gas for vehicle propulsion, modifying Directive 88/77/EEC of the Council.			Implemented			
Transport	Ministerial decree of 1 June 2001, Ministry of Transport	Application of modifications to Directive 1997/68/EC of the European Parliament and the Council of 16 December 1997 concerning the measures to be adopted against the emission of gaseous pollutants and polluting particulates generated by internal-combustion engines to be installed on non-road movable machines.			Implemented			
Transport	Ministerial decree of 25 July 2001, Ministry of the Environment	Campaign 'Ecological days 2001'.			Implemented			
Transport	Ministerial decree of 2 April 2002, Ministry of the Environment	Application of Directive 1999/30/EC of the Council of 22 April 1999 concerning limit values of ambient air quality for sulphur dioxide, nitrogen dioxide, particles and lead and of Directive 2000/69/EC concerning limit values of ambient air quality for benzene and carbon monoxide.			Implemented			
Energy	Various decrees	Increase in the use of natural gas in the residential and service industry sectors.			Implemented		8.0	
Energy	Implementation of Law 10/91	Reduction in heat consumption of new residential and service industry buildings.			Implemented		3.7	
Energy	Implementation of Law 10/91, Art. 4, Paragraphs 1-2	Reference criteria for the insulation of constructions. As of 1999, reduction of 10 % in CO ₂ for new constructions built in last two years.			Implemented			
Energy	Implementation of Law 10/91	Reduction in consumption of heat in restructured buildings.			Implemented		2.0	
Energy	Law 449/97, Art. 31	Income tax (IRPEF) deduction allowed for 41 % of restructuring expenses. Only in force since 1998 and 1999.			Implemented			
Energy	Resolution 137/98 of the Interministerial Committee on Economic Planning — AV	Introduction of a code of self-regulation in the energy-environmental sector for the buildings of public administration.			Implemented			

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Energy	AV with ENEL (2000)	Information campaign to increase use of high-energy-efficiency light bulbs, eliminate large size, inadequate electric motors and promote heat pumps and microwave ovens.			Implemented			
Energy	EU Directive	Standards for home appliances, labelling.			Implemented			
Energy	Ministerial decree of 10 July 2001, Ministry of Productive Activities	Endorsement of Directive 98/11/EC, passed by the Commission on 27 January 1998 to set the procedures for application of Directive 92/75/EEC of the Council regarding labels indicating the energy efficiency of light bulbs for use in the home.			Implemented			
Energy	EU directive	Application of eco-labels in old constructions. Implementation planned for 2002.			Implemented			
Energy	Implementation Law 10/91	ENEA and FIRE courses and information on energy efficiency. DSM measures: heat pumps and cogeneration.			Implemented			
Energy	3 April 2001, national project	'Solar town' programme aimed at local government bodies and regional governments in central-southern Italy that aim to install solar energy systems for the production of hot water in public buildings. Also calls for young people to be trained for employment in the solar energy sector.			Implemented			
Energy	3 April 2001, national project	'Solar thermal' programme: municipalities with more than 50 000 inhabitants and municipally owned gas distribution enterprises are able to present, starting from 3 April 2001, applications for financing to back the low temperature production of heat.			Implemented			
Energy	June 2001, Interministerial Agreement, Ministries of the Environment and Justice	National programme for introducing solar energy in Italian penitentiaries: to result in installation of 3 000 m ² of collectors in five years.			Implemented			
Energy	Ministerial decree of 26 March 2002, Ministry of Productive Activities	Implementation of Directive 2000/55/EC of the European Parliament and Council on the energy-efficiency prerequisites of the power-feeds for fluorescent lights.			Implemented			
Inter-sectoral	Law 448/98, Article 8	'Carbon tax' frozen at 1999 levels			Implemented			
Inter-sectoral	Law 388/2000	Article 22: products that contribute to environmental protection exempted from taxes. Article 23: tax reductions for some sectors. Article 110: fund for measures geared towards reducing emissions of CO ₂ and increasing energy efficiency.			Implemented			

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Inter-sectoral	Legislative Decree No 227 of 18 May 2001	Reorganisation and modernisation of the forestry sector in accordance with Article 7 of Law No 57 of 5 March 2001. Regulates agricultural and forestry development in compliance with the objectives of sustainable development.			Implemented			
Inter-sectoral	Ministerial decree of 21 May 2001	Distribution of financing to regional programmes on the carbon tax.			Implemented			
Inter-sectoral	Ministerial decree of 4 June 2001, Ministry of the Environment, Finance, Productive Activities	Programmes of national importance involving emissions of greenhouse gases, in implementation of Art. 3 of Ministerial Decree No 337 of 20 July.			Implemented			
Inter-sectoral	Law No 120 of 1 June 2002	Ratification and enactment of the Kyoto Protocol to the UN Framework Convention on Climate Change, established in Kyoto on 11 December 1997.			Implemented			
Inter-sectoral	Law No 118 of 16 June 2002	Conversion into law, with modifications, of Legislative Decree No 68 of 19 April 2002, containing urgent measures for the animal husbandry sector and for the fight against forest fires.			Implemented			
Policies and measures in the with measures projections ⁽⁹⁾								
Energy	Bill of Ministry of Productive Activities, 'Reorganisation of the energy sector', July 2002	Expansion of the CC for 3 200 MW			Approved or established		8.9	
Energy	GRTN plan of 2002, bill of MPA, 'Reorganisation of the energy sector', July 2002	Expansion of import capacity for 2 300 MW			Approved or established		10.6	
Energy	White Paper, Directive 2001/77/EC, bill of MPA, 'Reorganisation of the energy sector'	Further increase of electricity generation from renewables of 2 800 MW			Approved or established		6.5	
Energy	Decreets of Ministry of Industry, Commerce and Craft 24 April 2001	Efficiency of end use			Approved or established		6.3	
Transport	Protocols of the Ministry of the Environment, Fiat, Oil Union, and Ministry of Industry, Fiat consortium for LPG, Decree No 256 of 17 July 1998, Decree of 27 March 1998	Buses and private cars with low carbon fuels (LPG, methane)			Approved or established		1.5	
Transport	Decreets of Ministry of the Environment, MPA Commission Guidelines, Ministry of the Treasury	Optimisation and collectivisation systems for private transportation (car pooling, car sharing, jitneys)			Approved or established		2.1	
Transport	Decreets of Ministry of Environment Guidelines by the Commission of MPA, Ministry of Treasury	Reformulation of taxes on oils and realisation of computer-telematic systems			Approved or established			

⁽⁹⁾ Reference scenario.

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Transport	Deliberation of 21 December 2001, Interministerial Committee for Economic Planning, 'Target law', PGT	Development of domestic infrastructures			Approved or established		3.9	
Policies and measures in the with additional measures projections (10)								
Energy		Replacement of industrial engines with high-efficiency engines with saving from 2.0-7.2 TWh, high-efficiency industrial engines.			Not established		1-3.6	
Energy		Implementation of COSFI standard with saving of 1.0 TWh.			Not established		0.5	
Energy		Replacement of transformers .			Not established		1.0	
Energy		Small/medium-sized cogeneration with production between 10 and 20 TWh.			Not established		0.8-1.5	
Energy		Energy production from municipal waste and biogas, also with combined combustion in cement works equal to 750-1 300 MW.			Not established		1.8-3.8	
Energy		Increase of electricity generation from renewables, 500-1 200 MW.			Not established		1.5-3.1	
Energy		Diffusion of solar heating.			Not established		0.2	
Energy		Research and development in the photovoltaic sector with 'niche' uses.			Not established		0.1	
Energy		Extension decrees on the efficiency of the end use sector (MITC, 24 April 2001) and regional measures with savings between 1.5 and 2.9 Mtoe/year.			Not established		3.8-6.5	
Agriculture		CO ₂ reduction from energy consumption.			Not established		0.28-0.34	
Transport	Programme agreement	Replacement of circulating cars with cars at 120 g/KmCO ₂ with savings between 1.5 and 2.5 Mtoe.			Not established		3.5-6.0	
Transport	European Directives	Improvement of energy efficiency of heavy transport means with savings between 0.1 and 0.3 Mtoe.			Not established		0.3-0.8	
Transport	Ministry of Transport, extension of programme agreement, Ministry of the Environment and OU	Use of diesel bio-diesel up to 5 % of transportation grade diesel.			Not established		4.0	
Transport	Ministerial decree	Revision of calculation method of vehicle property tax and its correlation with periodic tests.			Not established		1.3	

(10) Open set of additional programmes and initiatives.

Sector	Name of policy or measure	Objective and/or activity	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂ eq.) in 2010	CCPM
Transport	National and local regulations and incentives	Reorganisation of urban traffic.			Not established		0.8	
Transport		Promotion of rail transport and connection to interchange parking areas.			Not established		0.6	
Transport		Urban mobility plans (PUM).			Not established		1.5-3.0	
Transport		Telematic solution for transport.			Not established		0.5	
Transport		Realisation of pilot projects with hydrogen, cell and fuel-propelled systems for transport by rail, road, sea and river.			Not established		0.1-0.3	
Transport		Development and experimental use of materials enabling the reduction of vehicle and train masses.			Not established		0.2-0.6	
Transport		Realisation and diffusion of optimised engines using methane as mono-fuel and direct injection LPG as mono-fuel.			Not established		0.5-1.2	

Table A.135 Summary of projections by gas in 2010 (Mt CO₂ equivalent) ⁽¹¹⁾

	Base year ⁽¹²⁾	With measures ⁽¹³⁾	With additional measures ⁽¹⁴⁾
CO ₂	439.8	440.2	
CH ₄	39.5	29.4	
N ₂ O	40.3	43.1	
HFC	0.7	14.1	
PFC	0.3	0.7	
SF ₆	0.5	0.6	
Total	521.0 ⁽¹⁵⁾	528.1	491.2
Change relative to base year (%)		1.4	- 5.7

Table A.136 Summary of projections by sector in 2010 (Mt CO₂ equivalent) ⁽¹⁶⁾

	Base year	With measures	Change relative to base year (%)	With additional measures			Change relative to base year (additional measures) ⁽¹⁷⁾ (%)	Trend scenario ⁽¹⁸⁾
				high	low	average		
From energy uses, of which:	424.9	444.5	4.6	422.2	409.1	415.7	- 2.2	484.1
Energy industries	147.4	144.4	- 2.0	144.4	144.4	144.4	- 2.0	170.4
Industry	85.8	80.2	- 6.5	73.3	67.2	70.3	- 18.1	80.2
Transport	103.5	134.7	30.1	123.4	119.1	121.3	17.1	142.2
Residential and tertiary	70.2	68.0	- 3.1	64.2	61.5	62.9	- 10.5	74.1
Agriculture	9.0	9.6	6.7	9.3	9.3	9.3	3.3	9.6
Others (military and leaks)	9.3	7.6	- 18.3	7.6	7.6	7.6	- 18.3	7.6
From other sources, of which:	96.1	95.6	- 0.5	87.5	87.5	87.5	- 8.9	95.6
Industrial processes	35.9	30.4	- 15.3	24.2	24.2	24.2	- 32.6	30.4
Agriculture	43.4	41.0	- 5.5	40.5	40.5	40.5	- 6.7	41.0
Waste	13.7	7.5	- 45.3	6.9	6.9	6.9	- 49.6	7.5
Others (F-gases and solvents)	3.1	16.7	438.7	15.9	15.9	15.9	412.9	16.7
Carbon credits from JI and CDM measures	0.0	- 12.0		- 12.0	- 12.0	- 12.0		0.0
Total	521.0	528.1	1.4	497.7	484.6	491.2	- 5.7	579.7

Evaluation of projections

The projections listed in the third national communication range from an increase of 1.4 % in the 2010 reference/with measures scenario to a decrease of up to 7 % in the target-driven with additional measures scenario. The third national communication estimates that under the currently implemented policies (trend scenario) an increase of 11.3 % compared with base year emissions will occur by 2010.

Description of modelling approach

The modelling approach used for the different projections in the third national communication is not explained very clearly.

For CO₂ emissions from combustion of energy sources, projections are drawn from the Cefrig model (emission calculation and policies for the reduction of greenhouse gases), based on the system dynamics approach.

⁽¹¹⁾ Source: 3NC, Table 5.2, p. 113.

⁽¹²⁾ 1990 for CO₂, CH₄ and N₂O; 1995 for HFC, PFC and SF₆.

⁽¹³⁾ Reference scenario.

⁽¹⁴⁾ Open set of additional programmes and initiatives, average emission reduction.

⁽¹⁵⁾ Total unequal to sum of all gases due to rounding error.

⁽¹⁶⁾ Source: 3NC, Table 4.2, pp. 83-85, Table 5.3, p. 114, Table 5.24, p. 130 and Annex I, Table 3, p. 204.

⁽¹⁷⁾ Average emission reduction.

⁽¹⁸⁾ Under current legislation.

Table A.137 Assessment of the target

	Mt CO ₂ equivalent	Percentage of base year level (six gas basket)
Base year (from projections)	521.0	100.0
Commitment ⁽¹⁹⁾	487.1	93.5
With existing PAMs ⁽²⁰⁾	528.1	101.4
Gap (negative means no gap)	41.0	7.9
Effect of additional PAMs ⁽²¹⁾	36.9	7.1
Remaining gap	4.1	0.8

Table A.138 Modelling parameters ⁽²²⁾

Parameter	2000	2010	Unit
Population	57.8	58.5	Millions
Population	0.0	+ 0.1	% per year
Gross national product	1 962.6	2 398.0	Thousand billions of LIT, 1995
Average growth rate	1.89	1.99	% per year
Industrial production			
Family use			
International fuel prices (prices in 2001, USD)			
Oil (brent)	29.00	22.00	USD 2001/bbl
Gas (imported to Italy)	3.48	3.16	USD 2001/GJ
Coal (imported to Italy)	0.94	0.92	USD 2001/GJ
National fuel prices (national production)			
Oil	26.06		USD 2001/bbl
Gas	2.73		USD 2001/GJ
Energy			
Market liberalisation: from 2002 for electricity, from 2005 for gas			
Renewables share	2.3	3.5	% on total net production + import
Discount rate	7.5	7.5	% per year
Industry – national fuel prices			
Oil (heavy fuel oil, low sulphur)			
Gas			
Coal			
Electricity			
Discount rate	8.0	8.8	% per year
Tertiary – national fuel prices			
Oil (diesel oil)			
Gas			
Coal			
Electricity			
Discount rate	5.0	5.0	% per year
Transport			
Passenger km	890	1 066	passenger/km
Average growth rate	1.55	1.79	% per year
Freight, > 50 km	230	275	tonnes/km
Average growth rate	2.13	1.6	% per year

The Ceprig model formally elaborates statistical and/or econometric data, obtained by means of differential equations. Sources generating CO₂ are divided into the following sub-sectors: industry, residential, service,

agriculture, transport, power and bunkers. For each of these sectors the modelling is described in some more detail individually. Mainly a bottom-up approach has been followed which is explained to yield greater accuracy

⁽¹⁹⁾ According to the third national communication, total GHG emissions amounted to 521 Mt CO₂ equivalent in 1990 (1995 for the F-gases; CO₂ emissions do not include emissions and removals from land-use change and forestry); 6.5% of this total equals 33.9 Mt.

⁽²⁰⁾ As estimated in the third national communication, reference scenario.

⁽²¹⁾ Third national communication, open set of additional programmes and initiatives, average estimation.

⁽²²⁾ Used for the trend scenario.

and detail than top-down approaches using macro-variables. No methodology is described for the five remaining greenhouse gases.

Table A.138 shows the parameters used in the projections.

Country conclusions

The activities implemented in Italy to date are expected to stop emissions

from increasing more than 11.3 % in comparison with the base years 1990 and 1995. Further, as yet unknown, future policies and measures are likely to reduce this figure. The Kyoto mechanism has been used and it holds additional potential for emission reductions.

Luxembourg

Sources of information

- Stratégie nationale de réduction des émissions de gaz à effet de serre
— First part, May 2000

Quality and transparency of reporting

The strategy document describes six major areas for intervention. Each of these is subdivided into specific measures which are described in detail. There are no estimates of the separate contributions from each action and it is unclear as to whether the with measures scenario already includes some contributions from these actions.

Projections of emissions are provided for all gases separately and at the sector level for CO₂. There is no information on forecasting methodologies and this needs discussion with national officials.

Assessment of policies and measures

A baseline scenario of non-intervention is provided together with an intermediate intervention scenario. All gases are considered and for CO₂, a sector analysis is also provided.

Six areas of intervention are defined and each of these is subdivided into specific actions.

Table A.139 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	+++	Mainly actions are described
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O + industrial gases	
Status of implementation	+	Qualitative descriptions of opportunities only
Implementation body specified	-	
Quantitative assessment of implementation	-	No quantitative assessments made
Interaction with other PAMs discussed	-	Not examined

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

Table A.140 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	++	With and without measures scenarios given
Expressed relative to inventory for previous years	++	With measures forecast starts at 1999 (inventory available for 1998)
Starting year	1999	For the with measures scenario. Without measures base year, 1990
Split of projections	Shown for all gases	
Presentation of results	-	CO ₂ by sector. National total for other gases
Description of model (level of detail, approach and assumptions)	++	No description of modelling approach. Basic economic scenario assumptions provided
Discussion of uncertainty	-	No discussion of uncertainty in the projections
Details of parameters and assumptions	+	Upper and lower range provided for projections. List of assumptions

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

Table A.141 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures (¹)	With additional measures
Industry	4.659	
Domestic	0.142	
Road transport	0.182	
Other	0.482	
Total	5.465	

(¹) Intermediate intervention scenario.

Table A.142 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Policies and measures in the with measures projections									
Energy supply	Renewable energy — wind, solar, biomass, hydro, biofuels, biogas, wood	Lower CO ₂ of electricity generation	Mainly CO ₂	Regulation and fiscal (subsidy)	Implemented (*)	Not given	Not provided		Yes
Energy supply	Improved efficiency in power and heat generation	Lower CO ₂ systems	Mainly CO ₂	Fiscal (subsidy)	Implemented (*)	Not given	Not provided		No
Commercial and residential	Energy efficiency	Reduced energy demand	Mainly CO ₂	Regulation, fiscal and voluntary agreement	Implemented/Adopted (*)	Not given	Not provided		Yes
Cross-sectoral	Fiscal measures — taxation	Reduced energy demand	Mainly CO ₂	Fiscal (taxation)	Adopted (*)	Not given	Not provided		No
Transport	Transport — new technologies, community transport, information	Reduce demand	Mainly CO ₂	Fiscal and other	Adopted (*)	Not given	Not provided		Yes
Business	International cooperation, trading, CDM, JI, sinks	Mainly CO ₂	No discussion	Economic and other	Adopted (*)	Not given	Not provided		Yes

(*) Status interpreted from limited information.

Table A.143 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	Without measures ⁽¹⁾	With measures ⁽²⁾
CO ₂	11.7	14.2	8.7
CH ₄	0.50	0.50	0.54
N ₂ O	0.20	0.20	0.22
HFC, PFC, SF ₆ ⁽³⁾	0.02	0.11	0.11
Total	12.4	15.0	9.6
Change relative to base year (%)		20.5	- 22.9

⁽¹⁾ This scenario is non-intervention and appears to be a without measures reference scenario.

⁽²⁾ Intermediate intervention scenario.

⁽³⁾ The base year for halogenated gases is 1995.

Table A.144 Summary of projections by sector in 2010 (Mt CO₂)

	Base year	Without measures ⁽¹⁾	Change relative to 1990 (%)	With measures ⁽²⁾	Change relative to 1990 (with measures) (%)
CO ₂					
Industry	6.7	7.2	7	2.5	- 62
Domestic	1.3	1.9	49	1.8	38
Transport	0.9	1.6	74	1.4	53
Other	1.3	1.4	5	0.9	- 32
Sinks	- 0.3	- 0.3	0	- 0.3	0
Fuel export sold	1.8	2.5	35	2.5	35
Non-CO ₂ gases	0.7	0.8	13	0.9	23
Total	12.4	15.0		9.6	

⁽¹⁾ This scenario is non-intervention and appears to be a without measures reference scenario.

⁽²⁾ Intermediate intervention scenario.

Table A.145 Assessment of the target

	Mt CO ₂ equivalent	Percentage of 1990 level (six gas basket)
Base year (from projections)	12.42	
Commitment	8.94	- 28.0
With existing PAMs ⁽¹⁾	9.57	- 22.9
Gap (negative means no gap)	0.63	5.1
Effect of additional PAMs	0.00	—

⁽¹⁾ Intermediate intervention scenario.

Evaluation of Projections

The latest business as usual projections show total greenhouse gas increases of 20.5 % between 1990 and 2010. This projection is named 'scénario de non-intervention' and it is assumed that it does not include any abatement policies. This is not made clear in the strategy document. The 'scénario d'intervention intermédiaire' gives a 23 % emissions reduction compared with Luxembourg's commitment under the EU burden sharing agreement of - 28 %. Between 1990 and 1998, emissions fell by 32.6 % resulting mainly from industrial reductions.

According to the May 2000 strategy, the largest percentage increase is projected for the halogenated gases although these are still a small fraction of the total. Methane and agricultural N₂O are projected to remain constant under the non-intervention scenario and to increase slight under the intermediate intervention scenario.

The existing policies and measures are projected to have the largest impact on the industry sector, where CO₂ emissions are cut by 62 % relative to 1990 emissions. With no intervention, the transport sector CO₂ emissions are

predicted to increase by 74 % between 1990 and 2010. With existing measures, the increase over this time frame is still high at 53 %.

Under the intermediate intervention scenario, which is assumed to include existing policies and measures, emissions decrease by 23 % between 1990 and 2010. The resultant shortfall of 0.6 Mt of CO₂ equivalent to reach the Kyoto target is small in comparison with the base year emissions and should not be difficult to make up.

Description of modelling approach

Describe the modelling approach and main input assumptions. The Member State should provide the information indicated in the reporting guidelines.

Country Conclusions

Luxembourg has the largest reduction target in the EU at – 28 %, and by 1998 had achieved reductions of almost 33 %. The intermediate intervention (with measures) scenario is forecast to achieve reductions of 22.9 %, although it is not clear in the current strategy document which measures are included and the policies and measures included in the strategy are not analysed to assess contribution. A comprehensive set of policies and measures is nevertheless identified.

The gap between target and forecast is approximately 5 % of 1990 emissions, equivalent to 0.63 Mt CO₂ and the contribution from measures defined in the intermediate intervention scenario is 5.5 Mt CO₂. The additional 5 % required should not therefore prove difficult, although additional measures to be adopted are not yet clear.

The Netherlands

Sources of information

- Wijngaart, R. van den, Ybema, J. R. (2002), *Reference projection for greenhouse gases in the Netherlands — Emission projections for the period 2001–10* (RIVM/ECN 2002)
- Ministry of Housing, Spatial Planning and Environment (February 2002), *The progress of the Netherlands climate change policy — an assessment at the 2002 evaluation moment* (MHSPE 2002)
- Third national communication of the Netherlands to the UNFCCC, October 2001
- The Netherlands' climate policy implementation plan, part I (NCPIP, June 1999)
- The Dutch assault on greenhouse gases (fourth quarter of 1999); several brief introductions to each sector from the Internet (<http://www.minvrom.nl/minvrom/pagina.html?id=1314>, loaded on 10 April 2000)
- *EEA assessment of EC and Member States' greenhouse gas emission trends 1990–98*, final draft, 12 May 2000
- Second national communication of the Netherlands to the UNFCCC, 1997
- Interview with Paul G. Ruysenaars, Ministry of Housing, Spatial Planning and the Environment (Minvrom) of the Netherlands on 14 June 2000; as well as comments from the same expert on the draft report, received in August 2000

- Interview with Michiel Beeldman, Dutch Energy Research Foundation, Policy studies (ECN), on 27 June 2000

Quality and transparency of reporting

Information on policies and measures has been taken from the third national communication and is summarised in Table A.146.

Information on projections is provided by the MHSPE, 2002. The level of information about these projections is summarised in Table A.147.

Assessment of policies and measures

The new Dutch climate strategy described in the national climate policy implementation plan (NCPIP), part I, involves four main components:

- the 'basic package', which includes PAMs that are planned to be implemented;
- the 'reserve package', which includes measures that can be implemented if at one of two evaluation 'moments' (2002 and 2005) it becomes likely that the country might not achieve its commitment;
- an 'innovation package' for the long-term climate strategy (beyond the first commitment period);
- a decision to approach 50 % of the predicted reduction requirements by the use of 'flexible mechanisms'.

Table A.146 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	++	PAMs for the 'with measures' projection are given in detail; however, which PAMs are considered in the 'with additional measures' projection is not clear
Objectives of policies	++	Described in the text and in overview table
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O, HFC, PFC, SF ₆	
Status of implementation	+++	Status of implementation is given in detail (however, year of implementation or adoption and budget means allocations to individual measures are not stated)
Implementation body specified	+++	
Quantitative assessment of implementation	+++	Reduction in 2010 is given
Interaction with other PAMs discussed	-	

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

Table A.147 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	With measures (with additional measures)	In the MHSPE (2002) a new reference projection has been developed; it considers the PAMs of the NCPIP where decisions have been taken before 1 July 2001; effects of PAMs in preparation have been taken into account only on an aggregated level
Expressed relative to inventory for previous years	+++	
Starting year	1995	
Split of projections	+++	Seven sectors for CO ₂ , CH ₄ , N ₂ O and for F-gases
Presentation of results	+++	Overview on effects of P&Ms presented in a table split by sector and greenhouse gas
Description of model (level of detail, approach and assumptions)	+++	No statement on the models used (but a source is given); split of sectors is not completely clear
Discussion of uncertainty	+++	The exogenous developments taken into account in the uncertainty range are: <ul style="list-style-type: none"> • industrial sector growth or recession • electricity prices in surrounding countries • natural gas and oil prices • competitive position, Dutch refining sector • industrial structure effects • effectiveness of energy policy • intensity of renewable energy policies in other countries and tradability • autonomous growth in vehicle kilometres • greenhouse horticulture reaction to gas market • growth of new energy functions in the services sector (ICT) • market imperfection in Dutch electricity sector • success of technical developments in off-shore wind energy
Details of parameters and assumptions	+++	The most important assumptions are stated

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

Table A.148 Summary of the effect of policies and measures included in the projections (Mt CO₂ equivalent)

	With measures	With additional measures
Industry (including refineries)	7	n/a
Energy and waste companies	3	n/a
Agriculture	0	n/a
Traffic	1	n/a
Households	1	n/a
Trade, services, government	1	n/a
Other	0	n/a
Total	13	17 to 20

Source: MHSPE, 2002.

Both the strategy and the evaluation of climate policy have passed Parliament. All measures in the basic package except for road pricing (kilometre tax) have now been implemented.

Measures in the basic package have been assessed by the National Institute for Public Health and the Environment (RIVM) and the Netherlands Energy Research Foundation (ECN) with regard to the range of expected effects assuming the measure is implemented.

The range noted by the institutes takes into account the uncertainty about the ultimate form the measure will take in one case (the kilometre tax, which is still being prepared) and uncertainty about the extent of compliance and enforcement in the other cases.

According to the institutes, the largest uncertain reduction potential includes measures at coal-fired power plants (6 Mt), renewable energy (1.2 Mt) and energy savings in different sectors (2.8 Mt).

Table A.149 gives a detailed overview on the PAMs of the basic package which are considered in the with additional measures scenario. The effects of PAMs summarised in Table A.148 are taken from a more recent projection (MHSPE, 2002). Thus, they are not fully consistent with CO₂ savings given for each measure in Table A.149 which are taken from the third national communication.

Table A.149 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							With measures projection, 2010	With additional measures projection, 2010	
Policies and measures in the with measures and the with additional measures projections									
Energy (1.A.1.a)	5 % renewables in 2010	Decrease emissions through increased market share for renewable energy	CO ₂	1. economic 2. fiscal 3. voluntary 4. other 5. other	1. implemented 2. implemented 3. implemented 4. adopted 5. adopted	National government, provincial governments, energy companies, housing corporations	2.00	0.00–0.30	Yes
Energy (1.A.1.a)	Measures at coal-fired power plants	Decrease emissions through fuel switch and efficiency improvement	CO ₂	1. voluntary 2. fiscal 3. regulatory	1. adopted 2. implemented 3. implemented	National government, owners of coal-fired plants	0.80	0.70–1.70	Yes
Energy (1.B.2)	Emissions from oil and gas production	Identify reduction potential	CH ₄	1. other	1. planned	National government		0.15	No
Transport (1.A.3)	EU agreement on fuel-efficient cars	Reduce CO ₂ emissions from new cars by 25 % per kilometre between 1995 and 2008	CO ₂	1. voluntary	1. implemented	European Commission, car manufacturers	1.20		Yes
Transport (1.A.3)	CO ₂ differentiation in vehicle tax and car labelling	Encourage purchases of fuel-efficient cars	CO ₂	1. fiscal 2. regulatory	1. adopted 2. implemented	National government, car dealers			Yes
Transport (1.A.3)	Encouraging in-car instruments	Promote monitoring instruments for fuel-efficient driving behaviour	CO ₂	1. fiscal 2. voluntary	1. implemented	National government, car dealers, garages			Yes
Transport (1.A.3)	Tax measures to limit passenger traffic	Discourage commuter traffic and personal use of company cars	CO ₂	1. fiscal	1. implemented	National government			No
Transport (1.A.3)	Increased tyre pressure	Reduce road friction and energy consumption	CO ₂	1. voluntary 2. education	1. implemented 2. implemented	National government, car dealers, garages			No
Transport (1.A.3)	Road pricing	Improve access to cities and reduce congestion	CO ₂	1. other	1. adopted	National government		0.70–1.50	No
Transport (1.A.3)	Stepped up enforcement of speed limits	Reduce speeding and save fuel	CO ₂	1. regulatory	1. implemented	National government			No
Transport (1.A.3)	Traffic and transport projects in CO ₂ reduction plan	Improve logistics efficiency of goods transport, improve driving behaviour	CO ₂	1. economic 2. education	1. implemented 2. adopted	National government, NOVEM, Senter		0.20–0.30	No
Transport (1.A.3)	Reduction of emissions from catalytic converters	Further European regulations	NO _x	1. other	1. planned		0.00		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							With measures projection, 2010	With additional measures projection, 2010	
Industry (1.A.2)	Energy savings in industry	Attain 'world top' by 2012 in most energy-intensive sectors; take all measures in other sectors with internal rate of return > 15 % after taxes	CO ₂	1. voluntary 2. voluntary 3. regulatory 4. fiscal	1. implemented 2. implemented 3. implemented 4. implemented	National government, provincial government, industry, NOVEM	1.40	0.05-0.20	Yes
Industry (1.A.2)	Reduction of HFC, PFC as (H)CFC alternatives	Improve knowledge about emissions and reduction possibilities and realise as much reduction potential as possible	HFC, PFC	1. other 2. regulatory 3. voluntary 4. economic 5. fiscal	1. planned 2. adopted 3. adopted 4. implemented 5. implemented	National government, provincial government, industry	1.00		Yes
Industry (2)	Reduction of PFCs from the aluminium industry	Adjustments to production process	PFC	1. voluntary 2. regulatory		National government, provincial government, industry	1.20		Yes
Industry (2)	Reduction of HFCs from processes	Install/optimize afterburner	HFC	1. regulatory	1. implemented	Provincial government, industry	3.60		Yes
Industry (2)	SF ₆ from chips industry and heavy current technology	Identify reduction potential	SF ₆	1. other	1. planned	National government, industry, research institutes		0.20-0.30	Yes
Agriculture (4)	Energy savings in greenhouse horticulture	To improve energy efficiency by 65 % between 1980 and 2010	CO ₂	1. voluntary 2. regulatory 3. other 4. fiscal 5. economic	1. implemented 2. adopted 3. adopted		0.10	0.00-0.80	Yes
Forestry (5)	CO ₂ sequestration	Accelerate afforestation in the Netherlands	CO ₂	1. other 2. fiscal	1. implemented 2. implemented	National government	Not analysed		No
Waste (6)	Emissions from former dumpsites	Identify reduction in CH ₄ potential	CH ₄	1. other	1. planned	National government, research institutes		0.50-1.50	Yes
Energy (1.A.4.b)	Energy performance advice	Energy in existing households	CO ₂	1. voluntary 2. fiscal	1. implemented 2. implemented	Energy companies, National government	1.0	0.05-0.20	Yes
Energy (1.A.4.b)	Encouraging energy-efficient appliances	Increase penetration of most efficient appliances	CO ₂	1. regulatory 2. fiscal	1. implemented 2. implemented	National government, retailers	0.80		Yes
Energy (1.A.4.a)	Energy performance advice	Save energy in existing non-residential buildings	CO ₂	1. voluntary 2. fiscal 3. regulatory	1. implemented 2. implemented	Energy companies, National government	0.70		Yes
Energy (1.A)	Promotion of combined heat and power (CHP)	Encourage construction of new and continued use of existing CHP capacity	CO ₂	1. fiscal	1. implemented	National government	0.50		Yes

Source: Third national communication, RIVM/ECN 2002.

Table A.150 Summary of projections by gas in 2010 (Mt CO₂ equivalent)

	Base year	With measures	With additional measures
CO ₂	159	191	n/a
CH ₄	27	14	n/a
N ₂ O	17	15	n/a
HFC	4	5	n/a
PFC	2		
SF ₆	0		
Total	212	225	219 to 222
Change relative to base year (%)		6.1	3.3 to 4.7

Source: MHSPE, 2002.

Table A.151 Summary of projections by sector in 2010 (Mt CO₂ equivalent)

	Base year	With measures	Change relative to 1990 (%)	With additional measures	Change relative to 1990 (additional measures) (%)
Energy and waste management	57	56	- 1.8	n/a	n/a
Industry and refineries	67	77	14.9	n/a	n/a
Transport	30	40	33.3	n/a	n/a
Trade, services, government	7	10	42.9	n/a	n/a
Households	20	20	0.0	n/a	n/a
Agriculture	27	20	- 25.9	n/a	n/a
Other	4	2	- 50.0	n/a	n/a
Total	212	225	6.1	219 to 222	3.3 to 4.7

Source: MHSPE, 2002.

Table A.152 Assessment of the target

	Mt CO ₂ equivalent	Percentage of 1990 level (six gas basket)
Base year (from projections)	212	100
Commitment ⁽¹⁾	199	94
With existing PAMs	225	106
Gap (negative means no gap)	26	12
Effect of additional PAMs	3 to 6	1 to 3

Evaluation of projections

According to the with measures projection, greenhouse gas emissions will increase to 225 Mt CO₂ equivalent by 2010 (Table A.150). This is 6.1 % more than in the base year. With the additional measures implemented since July 2001 greenhouse gases will increase only to 219 or 222 Mt CO₂ equivalent (+ 3.3 or 4.7%).

Table A.151 gives an overview of the contributions of individual sectors to the total GHG emissions in the two considered scenarios.

In Table A.152 the results of the target assessment are given. In the with measures scenario the total greenhouse gas emissions will be 13% above the target (- 6%). Through additional measures GHG emissions can be further reduced by 3 to 6 Mt CO₂ equivalent. However, the target (199 Mt CO₂ equivalent) will be failed by 10 percentage points if only domestic measures are taken into consideration. According to the MHSPE (2002), the remaining gap will be closed by emission credits from flexible mechanisms.

⁽¹⁾ The base year value to calculate the target (212 Mt CO₂ equivalent) was different to the base year value used in the projections (217 Mt CO₂ equivalent). According to the burden sharing agreement, the Netherlands is obliged to reduce greenhouse gas emissions by 6% compared with its 1990 level.

Table A.153 Modelling parameters

Parameter	2001	2010	Unit
Economic indicators			
GDP	2.5	2.5	%/year
Relevant world trade	6.5	6.5	%/year
Labour volume	1.0	1.0	%/year
Labour productivity market sector	1.9	1.9	%/year
Value added			
Industry	2.5	2.5	%/year
Services	3.0	3.0	%/year
Government, healthcare	1.7	1.7	%/year
Agriculture	1.8	1.8	%/year
Construction	2.0	2.0	%/year
Private consumption	3.1	3.1	%/year
Socio-demographic indicators			
Population		16.6	million
Other indicators			
Passenger kilometres		122	billion
Tonne kilometres		35	billion
Livestock population		25	million
Price indicators			
Oil price		22 ⁽²⁾	USD/bbl

Description of modelling approach

The projections presented by the NCPIP are based on the 'global competition' scenario of the long-term outlook of the Dutch Central Planning Bureau (CPB) because it provides a robust background against which to assess the effects of policies and measures. However, the global competition scenario has gradually become less suitable as a background for formulating and verifying climate policies for the medium term because there have been many changes in the energy market and the Dutch economy since the scenario was developed in 1995. As the global competition scenario no longer provides a good reference for assessing whether the Netherlands will be able to meet the Kyoto target with current policies, a new reference scenario had to be developed in the MHSPE (2002).

The new reference projection was made by the National Institute for Public Health and the Environment (RIVM) and the Netherlands Energy Research Foundation (ECN) at the request of the Ministries of Economic Affairs and the Environment. It looks at emissions in the Netherlands and at the domestic policy

measures aiming to influence those emissions. Possibilities for utilising the Kyoto mechanisms are not addressed.

The RIVM and the ECN made two variants of the reference projection, one which does take the effect of NCPIP policies into account, and one which does not. The projections provide an estimate of developments in energy consumption, energy prices, energy conservation, fuel mix and emissions during the next 10 years. Because the projection is intended as a policy reference, it is based on central assumptions regarding socioeconomic developments, world energy prices, technological developments and so forth.

The assumptions regarding economic developments during the coming years are largely in line with the optimistic variant of the Central Planning Bureau's (CPB) estimates for the medium term (MLT). Developments which are good for the economy often lead to higher emissions. CO₂ emissions are, after all, still linked to economic growth, although the link is getting relatively weaker. Therefore, robust climate

⁽²⁾ 15 to 22 USD/bbl.

policies need to be based on optimistic assumptions about future economic developments. In the optimistic variant of the MLT the economy is assumed to grow by an average of 2.75 % per year in 2003–10. This is a conservative strategy from the point of view of climate policies.

The modelling parameters for the projections are given in Table A.153.

Country conclusions

The third national communication is based on the national climate policy implementation plan (NCPIP), which was passed by the parliament in mid-1999 (Ruysenaars). The 'basic package' contains various specific instruments of which several are nearly ready for implementation or have now been (partly) implemented.

The Netherlands programme is, according to the new projections in the MHSPE, 2002, designed to fill the gap of 40 Mt CO₂ equivalent that is expected to remain in 2010 after taking into account the effects of existing measures. Half of the gap (17 to 20 Mt CO₂ equivalent) will be met using domestic policies and measures and the other half using the Kyoto mechanisms.

The strategy allows for possible adverse developments by setting a 'reserve package' aside, with measures that

can quickly be adapted. This enables flexibility and also seems to cater for any problems related to the use of the Kyoto mechanism, since these measures could be used instead.

The Dutch climate strategy is not specifically targeted at addressing reporting requirements under the EU monitoring mechanism or the UNFCCC and therefore does not incorporate several requirements of the monitoring reports or the UNFCCC national communications. On the other hand, it is easily accessible, and appears to be very consistent.

Detailed projections of individual policies and measures are reported in the third national communication. These projections are not consistent with the updated with measures scenario presented by the MHSPE, 2002. Moreover, there is no clear classification of PAMs according to the UNFCCC implementation status criteria or the status criteria used in this study (or with a benchmark year). Nevertheless, there is a relatively clear description of implementation stages. The same applies to the type of instrument column of the PAM table. Although not completely consistent with the guidelines, the criteria given there can be easily and clearly identified and understood.

Portugal

Sources of Information

The information in this appendix is based on the following.

- Communication, May 2002, Luisa Basilio, Ministry of the Environment, Portugal
- Portuguese greenhouse gas inventory, 2000
- First version of Portuguese climate change national programme – resumé of updated existing policies and measures presented in 'Workshop on energy-related national and EU-wide projections of GHG emissions, 27–28 February 2002', by Alvaro Martins, CEEETA, ISEG – Technical University of Lisbon

A national programme for climate changes is being prepared. A first version for public discussion was published at the end of 2001 (<http://www.iambiente.pt>) and a new version prepared for the end of 2002. This document is the source for the listed policies and measures.

The figures presented in this appendix are those considered in the 2001 version of the national programme, as proposed in GASA-DCEA-FCT(2000) ⁽¹⁾. The projections considered are now being revised.

Quality and Transparency of Reporting

The national programme, in its 2001 version, presents a first list of

policies and measures that will reduce greenhouse gas emissions in a range of sectors including electricity production, refineries, combustion in industry, transport and waste. However, the impact of these policies and measures has not yet been completely quantified in relation to a baseline projection and the costs of the measures are being estimated.

The latest projections contain a without measures scenario, covering CO₂, CH₄, N₂O, PFCs, HFCs and SF₆, with the first projection year being 2000. Actual inventory data for all six GHG is presented for 1990 to 2000. Projections have been made for 2000, 2005 and 2010. These projections are now being revised for the period 2000–15. Emissions from international transport are included. The overall methodology for projected emissions is well described and the major assumptions are presented.

Assessment of Policies and Measures

The effects of policies and measures affecting the energy, industry, transport and waste sectors will be included in the with measures scenario to be considered in the 2002 revision.

A without measures projection has been provided, which enables the measure of the mitigation effort to be attained with the sets of policies and measures to be approved.

Details of policies and measures are provided below. This information has been published in the national

Table A.154 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	++	Further details of policy objectives provided at meeting
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O	
Status of implementation	+	Some details given at meeting
Implementation body specified	+	Some details given at meeting
Quantitative assessment of implementation	–	To be defined
Interaction with other PAMs discussed	+	Being considered

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

⁽¹⁾ GASA-DCEA-FCT (2000), Emissão e controlo de gases com efeito de estufa em Portugal. Ministério do Ambiente e do Ordenamento do Território, Março 2000.

Table A.155 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	Without measures	Only one scenario provided
Expressed relative to inventory for previous years	+++	
Starting year	2000	First year for which projection is made
Split of projections	+++	
Presentation of results	+++	
Description of model (level of detail, approach and assumptions)	++	
Discussion of uncertainty	-	
Details of parameters and assumptions	++	Discussion of parameters and assumptions

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

Table A.156 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures	With additional measures
Total		

Note: This summary was not available at the time of preparation of the report.

programme for climate change ⁽²⁾. These new policies and measures are split into immediate (existing) and additional measures.

⁽²⁾ MAOT (2002), Programa Nacional para as Alterações Climáticas, Março 2002 (<http://www.iambiente.pt>).

Table A.157 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO ₂)		CCPM
							2010	2020	
Energy supply	Renewables electricity supply	Electricity generation and supply	Mainly CO ₂	Economic, regulatory	Implementation	Ministry of Economy	3.3-4.1		Yes
Energy supply	Energy efficiency in the electric system	Energy efficiency in electricity supply	Mainly CO ₂	Technical	Implementation	Not given	0.7		No
Industry	Emissions control and RUE	Reduction in emissions	CO ₂ and F-gases	Economic, regulatory	Implementation	Ministry of the Environment, Ministry of Economy	0.71		Yes
Residential and services	Renewables development and solar hot water	Switching to renewable energy	Mainly CO ₂	Economic, fiscal	Implementation	Ministry of Economy Ministry of Finance	0.5		No
Residential and services	National programme for RUE in buildings	Energy consumption reduction targets	Mainly CO ₂	Regulatory	Adopted	Ministry of Economy	- 0.65		No
Waste/Residues	Waste plans for industry, urban waste and hospital residues	Increasing the waste valorisation practices	CH ₄	Regulatory	Implementation	National Waste Institute	0.4		Yes
Waste/Residues	IPPC directive	Not given	CH ₄	Regulatory	Implementation	Environmental Institute	Not given		Yes

Table A.158 Summary of projections by gas in 2010 (Mt CO₂ equivalent)

	Base year	Without measures (reference scenario)	With additional measures
CO ₂ ⁽¹⁾	44.1	74.3	
CO ₂ ⁽²⁾	40.3	69.6	
CH ₄	12.88	8.0	
N ₂ O	7.63	8.6	
PFCs	0.16	0.16	
HFCs		1.92	
SF ₆	0.91	0.002	
Total ⁽¹⁾	64.9	91.5	
Total ⁽²⁾	61.2	88.3	
Change relative to base year (%) ⁽¹⁾		40.9	
Change relative to base year (%) ⁽²⁾		44.3	

Source: Personal communication, Luisa Basilio 2002, Ministry of the Environment, Portugal.

⁽¹⁾ Projection excludes sinks.

⁽²⁾ Projection includes sinks.

Table A.159 Summary of projections by sector in 2010 (Mt CO₂ equivalent)

	Base year	Without measures	Change relative to 1990 (%)	With additional measures	Change relative to 1990 (additional measures) (%)
CO ₂ equivalent		(a)			
Energy	39.7		71		
Industrial processes	4.1		59		
Solvent use	0.3		20		
Agriculture	0.0		–		
Land-use change and forestry	– 3.7		18		
Waste	0.01		5 356		
Non-CO ₂ equivalent gases	20.8	(a)	31		
Total ⁽¹⁾	64.9	91.5	40.9		
Total ⁽²⁾	61.2	88.3	44.3		

Source: Personal communication, Luisa Basilio 2002, Ministry of the Environment, Portugal.

⁽¹⁾ Excludes sinks.

⁽²⁾ Includes sinks.

(a) The projections have not taken into account this breakdown.

Table A.160 Assessment of the target

	Mt CO ₂ equivalent ⁽¹⁾	Percentage of 1990 level (six gas basket)
Base year (from projections)	64.90	
Commitment	82.50	27.0
Without existing PAMs	91.50	40.9
Gap (negative means no gap)	9.00	13.9
Effect of existing and additional PAMs	n/a	

⁽¹⁾ Totals exclude sinks.

Evaluation of projections

The without measures projection shows total greenhouse gases (excluding LUCF) increasing by 40.9 % between 1990 and 2010. This compares with Portugal's commitment under the EU burden sharing agreement of + 27 %

Halogenated gases have a base year of 1995, all other gases have 1990 as the base year.

Description of modelling approach

Emission projections are based on existing sectoral activity projections from various government departments including energy, agriculture and forests and on various national and EU plans.

Modelling parameters

Parameter	2000	2010	Unit
Population	10.02	10.2	Million
GDP	17.06	23.84	10 ⁹ PTE 95
Oil (international price)	23	28	USD (1995)/bbl
Coal (international price)	54	57	USD (1995)/t
Transport passenger growth	85 447	131 984	Passenger/km (millions)
Freight growth	23 715	40 125	Tonnes/km (millions)

Source: DGE (1999), A Procura de Energia em Portugal, 2000–20.

In the case of demand side energy-related emissions (mostly CO₂), these are calculated from energy use figures contained in a 1999 study by the General Directorate of Energy (DGE), which used as its basis a variant of the MEDEE simulation model. Structural changes and efficiency improvements are incorporated in the model on the basis of exogenously specified growth rates and autonomous energy efficiency improvements respectively.

For electricity production, emissions are calculated from the plan of expansion of the public electric system performed by the national grid company (REN) and the DGE.

Emissions from land transport are also based on energy consumption projections from the DGE.

Agricultural emissions of methane are based on the forecast of livestock numbers from the Ministry of Agriculture and Forests. In the case of methane from waste, the projections are based on the waste strategic plan from the National Waste Institute.

For nitrous oxide, emissions from agriculture take account of a general increase in the intensity of fertiliser

usage, as well as an expansion of irrigated areas in the south of the country which is expected to lead to higher fertiliser application rates.

Country Conclusions

Portugal is preparing a national programme on climate change, with the involvement of the relevant stakeholders. A first version aiming to measure the mitigation effort and to facilitate the discussion with the agents concerned has been published⁽³⁾. By the end of 2002, a revised version will be presented, considering both the without and with measures scenarios.

In terms of measures, a distinction will be made between immediate, additional and reserve sets of measures. In the next version of the national programme a 'commitment scenario' will be analysed and the adequate policies and measures and instruments as well as their emission impacts and costs will be proposed.

Portugal aims not to exceed its commitment under the EU burden sharing agreement.

⁽³⁾ MAOT (2002), Programa Nacional para as Alterações Climáticas, Março 2002 (<http://www.iambiente.pt>).

Spain

Sources of information

The information in this appendix is based on Spain's third national communication (<http://unfccc.int/text/resource/docs/natc/spanc3.pdf>) and comments provided by the Spanish Ministry of the Environment.

Quality and transparency of reporting

Table A.161 Information provided on policies and measures (from the third national communication)

Information provided	Level provided	Comments
Policy names	+++	Key sectors' opportunities are described (75 PAMs)
Objectives of policies	+++	Objectives are strictly directed at GHG abatement; sometimes there are very detailed descriptions
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O, HFC, PFC, NO _x , CO	
Status of implementation	++	Most measures are adopted (63%) or already implemented (37%)
Implementation body specified	++	
Quantitative assessment of implementation	++	Only few PAMs have been quantified for 2005 (not for 2010 or later); in some sectors no quantitative assessment has been provided
Interaction with other PAMs discussed	+	Interaction with other PAMs discussed only for some sectors

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

Table A.162 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	With measures, with additional measures	In the third national communication both scenarios are only provided for CO ₂ emissions; it is not clearly stated which measures are considered in the 'with measures' and which in the 'with additional measures' projection
Expressed relative to inventory for previous years	1990	Only 1990 in the third national communication
Starting year	1990, 1995	
Split of projections	+	A split of projections is given only for CO ₂ ; a split by gases is not provided as other greenhouse gases are not projected
Presentation of results	++	Results presented in both tabular and graphical form
Description of model (level of detail, approach and assumptions)	+	CO ₂ forecasts use a bottom up approach (MED-PRÓ), other gases use trend analysis
Discussion of uncertainty	-	Uncertainty issues of the projections are not discussed or mentioned
Details of parameters and assumptions	-	Parameters assumed in the projections are not provided

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

Assessment of policies and measures

The third national communication discusses mostly existing measures and provides only few planned or additional PAMs. Quantitative assessment is not given for all measures, and in most cases, for 2005. However, all measures regarding new power plants or modification of existing ones have estimations for CO₂ reduction compared with coal and natural power gas plants for 2010. The national forestry plan, which was adopted on 5 July 2002, provides estimations for contribution of forestation and reforestation. According to these estimations, the capture of CO₂ might increase to 60 million tonnes of

carbon (equivalent to 220 million tonnes of CO₂) by 2030. Sector discussions cover energy, transport, commercial, institutional and residential, industry, waste, agriculture and forestry. A summary of the effects of PAMs in the individual sectors (Table A.163) is not provided. Table A.164 gives detailed information on the policies and measures.

In the PAM summaries of the third national communication it is not clearly stated whether a measure is considered under with measures or under the with additional measures scenario (Table A.164).

Table A.163 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures	With additional measures
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
n/a	n/a	n/a
Total	n/a	n/a

Table A.164 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Energy (1.A.1.a)	1. Premium for energy production in special regime	Establish premiums for less contaminating energy production	CO ₂	Economic	Implemented	Ministry of Economy			Yes
Energy (1.A.1.a)	2. Promotion plan for renewable energy								
Energy (1.A.1.a)	2.1. Extension of the use of wind power	Installation of 8 140 MW additional power	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	7.7 to 19.1		Yes
Energy (1.A.1.a)	2.2a. Extension of the use of biomass for electricity and heating	Installation of 1 708 MW additional power and 12 810 GWh increased generation	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	5.0 to 12.5		Yes
Energy (1.A.1.a)	2.2b. Extension of the use of biomass for heating	Make energetic use of additional 900 ktoe (kilo tonnes of oil equivalent)	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	2.6		Yes
Energy (1.A.1.a)	2.3. Extension of the use of small hydro power	Installation of 720 MW additional power	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	0.9 to 2.2		Yes
Energy (1.A.1.a)	2.4. Extension of the use of biogas	Installation of 78 MW and generation of 546 GWh	CO ₂ , CH ₄	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology, Local Councils	0.2 to 0.5		Yes
Energy (1.A.1.a)	2.5. Extension of the use of biofuels	Production increase of 500 ktoe (kilo tonnes of oil equivalent)	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	1.4		Yes
Energy(1.A.1.a)	2.6. Extension of hydro power	Installation of 350 MW additional with increased generation of 700 GWh	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	0.3 to 0.7		Yes
Energy (1.A.1.a)	2.7. Extension of the use of photovoltaics	Installation of 135 MW additional with increased generation of 203 GWh	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	0.1 to 0.2		Yes
Energy (1.A.1.a)	2.8a. Extension of the use of solar thermal energy	Increase of the surface installed by 4.5 million m ² with an increase of production of 309 ktoe (kilo tonnes of oil equivalent)	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	0.9		Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Energy (1.A.1.a)	2.8b. Extension of the use of solar thermal energy	High temperature electricity generation (200 MW)	CO ₂	Economic, fiscal, regulatory, other	Implemented	Ministry of Economy, Ministry of Science and Technology	0.5	Yes	
Energy (1.A.1.a)	a. Other measures in electricity generation	Electricity production by incineration of solid urban waste (200 MW)	CO ₂					No	
Energy (1.A.1.a)	b. Other measures in electricity generation	Combined-cycle electricity generation of at least 13 600 MW	CO ₂					Yes	
Energy (1.A.1.a)	c. Other measures in electricity generation	Application of some EC directives (IPPC, large combustion plants and national emission ceilings)	CO ₂	Regulatory		Ministry of the Environment, Ministry of Economy		Yes	
Energy (1.A.1.a)	3. National plan for R & D in energy issues	Promotion of technology for less contaminating energy systems	CO ₂	Economic	Implemented	Ministry of Economy, Ministry of Science and Technology	1.3	Yes	
Energy (1.A.1.a)	4. Other measures of regional or local ambit								
Energy(1.A.1.a)	4.1. Law 6/2001 of 31 May 2001 of the Parliament of Cataluña about lighting	Regulation of installations, appliances and instruments for outside and inside lighting with regard to light contamination	CO ₂	Regulatory	Adopted	Regional and local public administrations in Cataluña		No	
Energy (1.A.1.a)	4.2. Programme for energy saving and efficiency, co-generation and renewable energy of Castilla and León	Energy saving, substitution of mineral oil products, diversification, renewable energy (except of wind and solar)	CO ₂	Economic	Adopted	Regional public administration in Castilla y León	0.1	No	
Energy (1.A.1.a)	4.3. Wind energy plan of Castilla and León	Renewable energy: wind	CO ₂	Economic, regulatory, other	Adopted	Regional public administration in Castilla y León	5.6	No	
Energy (1.A.1.a)	4.4. Solar plan of Castilla and León (line I: solar thermal energy)	Renewable energy: solar thermal	CO ₂	Economic, regulatory, other	Adopted	Regional public administration in Castilla y León	0.0	No	
Energy (1.A.1.a)	4.5. Solar plan of Castilla and León (line II: photovoltaic energy)	Renewable energy: photovoltaics	CO ₂	Economic, regulatory, other	Adopted	Regional public administration in Castilla y León	0.1	No	
Energy (1.A.1.a)	Article 35 of Law 51/2002 of 27 December	Tax reduction for solar energy in constructions	CO ₂	Economic	Adopted	Ministry of Finance			
Energy (1.A.1)	Royal Decree 2818/1998 of 23 December	Special tax regime for the production of energy from renewable sources and waste and cogeneration	CO ₂ , CH ₄	Economic	Adopted	Ministry of Finance			
Energy (1.A.1)	Royal Decree 1436/2002 of 27 December	Special price for the production of energy from renewable sources and wastes and cogeneration in 2003	CO ₂ , CH ₄	Economic	Adopted	Ministry of Economy, Ministry of Finance			
Energy (1.A.1)	Order CTE/2688/2002 of 28 October	National plan I+D+I for 2003. Energy and materials efficiency	CO ₂	Other	Adopted	Ministry of Science and Technology			

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Energy (1.A.1) and transport (1.A.3)	Article 28 of Law 51/2002 of 27 December	Tax reduction for renewable energy, cogeneration and companies' mobility plans	CO ₂	Economic	Adopted	Ministry of Finance			
Transport (1.A.3)	1.1. Programme for railroad activities, plan 2000-07	Promotion of railway transport: increase of energy efficiency of entire transport system through a shift from air and road transport to railways	CO ₂	Economic	Implemented	Ministry of Promotion			Yes
Transport (1.A.3)	1.1.a. Development of a high-speed railroad network	Promotion of railway transport: increase of energy efficiency of entire transport system through a shift from air and road transport to railways	CO ₂	Economic	Implemented	Ministry of Promotion	0.3		Yes
Transport(1.A.3)	1.1.b. Improvement of the network for short distances	Promotion of railway transport: increase of energy efficiency of entire transport system through a shift from air and road transport to railways	CO ₂	Economic, regulatory, other	Implemented	Ministry of Promotion			Yes
Transport (1.A.3)	1.1.c. Promotion of freight transport on railways	Promotion of railway transport: increase of energy efficiency of entire transport system through a shift from air and road transport to railways	CO ₂	Economic, regulatory, other	Implemented	Ministry of Promotion			Yes
Transport (1.A.3)	1.2. Liberalisation of railway transport	Promotion of railway transport: increase of energy efficiency of entire transport system through a shift from air and road transport to railways	CO ₂	Regulatory	Adopted	Ministry of Promotion			No
Transport (1.A.3)	2. Improvement of quality and state of conservation of infrastructure	Improved use of roads and increased energy efficiency of road transport	CO ₂	Economic	Implemented	Ministry of Promotion			No
Transport (1.A.3)	3. Promotion of public transport in cities and metropolitan regions	Increase of energy efficiency of entire transport system through a shift from cars to public transport	CO ₂	Economic	Implemented	Ministry of Promotion and Ministry of Finance, local councils			Yes
Transport (1.A.3)	4.1. Training of drivers in energy savings	Improved energy efficiency of road transport services and improved use of roads	CO ₂	Education	Implemented	Ministry of Promotion			No
Transport (1.A.3)	4.2. Renewal of heavy vehicles fleet	Improved energy efficiency of road transport services and improved use of roads	CO ₂	Regulatory, economic	Implemented	Ministry of Promotion and Ministry of Economy			Yes
Transport(1.A.3)	4.3. Route optimisation due to GPS technology	Improved energy efficiency of road transport services and improved use of roads	CO ₂	Fiscal	Implemented	Ministry of Promotion and Ministry of Finance			Yes
Transport (1.A.3)	5. Renewables plan of AENA (solar and wind in airports and control centres)	Reduction of emissions from airports and control centres	CO ₂	Economic	Implemented	Ministry of Promotion			Yes
Transport (1.A.3)	6.1. Optimisation of operations in airports and airlines	Improved energy efficiency of air transport services	CO ₂	Economic	Implemented	Ministry of Promotion and airlines			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Transport (1.A.3)	6.2. Improvement of control systems for air traffic	Improved energy efficiency of air transport services	CO ₂	Regulatory, economic	Implemented	Ministry of Promotion and European Union		No	
Transport (1.A.3)	6.3. Renewal of aircraft fleet	Improved energy efficiency of air transport services	CO ₂	Regulatory	Implemented	Ministry of Promotion and European Union		Yes	
Transport (1.A.3)	7. National plan for cars at the end of their life	Recycling and utilisation of residues from used cars	HFC and PFC	Regulatory, economic	Implemented	Ministry of Promotion and Ministry of Finance, local councils		No	
Transport (1.A.3)	8. Voluntary agreements with car manufacturer	Reduction of specific CO ₂ emissions of new cars, target 120 g/km in 2008	CO ₂	Voluntary	Implemented	European Commission and employers' association		Yes	
Transport (1.A.3)	9. Programme Prever	Modernisation of car fleet, increase of road safety and environmental protection	CO ₂	Economic	Implemented	Ministry of Finance		Yes	
Transport (1.A.3)	Article 9 of Law 24/2001 of 27 December	Tax rise of fossil fuels	CO ₂	Economic	Adopted	Ministry of Finance			
Transport (1.A.3)	Article 31 of Law 51/2002 of 27 December	Tax reduction for environment-friendly vehicles	CO ₂	Economic	Adopted	Ministry of Finance			
Transport (1.A.3)	Article 32 of Law 51/2002 of 27 December	Tax reduction for retirement of vehicles	CO ₂	Economic	Adopted	Ministry of Finance			
Transport (1.A.3)	Article 6 of Law 53/2002 of 30 December	Reduced tax for biofuels	CO ₂	Economic	Adopted	Ministry of Finance			
Energy (1.A.4.a and b)	Plan for promotion of flats	Energy efficiency	CO ₂	Economic	Adopted	Public administrations		Yes	
Energy (1.A.4.a and b)	Regulations for thermal installations in buildings	Energy efficiency of thermal installations in buildings	CO ₂	Regulatory	Adopted	Public administrations		Yes	
Energy (1.A.4.a and b)	Allocation of costs for central heating according to individual consumption	Reduction of energy consumption in households	CO ₂	Education	Adopted	Consumer		No	
Energy (1.A.4.a and b)	Substitution of bulbs by compact fluorescent lamps	Reduction of energy consumption in the household and commercial sector	CO ₂	Education	Adopted	Consumer		Yes	
Energy (1.A.4.a and b)	Natural replacement of electrical appliances by highly efficient appliances	Incentives for the use of more energy efficient appliances	CO ₂	Education	Adopted	Consumer		Yes	
Energy (1.A.4.a and b)	Energy certificates for new buildings	Reduction of energy consumption in new buildings	CO ₂	Regulatory	Adopted	Public administrations		Yes	
Energy (1), industrial processes (2)	Spanish strategy for energy efficiency (E4)	Reduction in energy consumption by modifications of habits and industrial processes	CO ₂	Regulatory	Under discussion	Ministry of Economy	Under calculation		Under calculation

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Industry (2)	Profit initiative (programme for promotion of technical investigations)	Industrial research for environment-friendly processes and energy and resources efficiency		Economic, other	Adopted				No
Industry (2)	Financial incentives for investment in technology for environmental protection	Incentives for acquiring ecological industrial equipment, setting up less contaminating or mitigation processes, and less contaminating industrial vehicles		Economic, other	Adopted				No
Industrial processes (2) and waste (6)	Article 2 of Law 24/2001 of 27 December	Tax deductions for investment in new environment-friendly equipment	CO ₂	Economic	Adopted	Ministry of Finance			
Waste (6)	Disposal programme (national urban waste plan)	Capture and use of biogas	CH ₄ , CO ₂	Regulatory, economic	Adopted	Local and autonomous administrations	Cannot be quantified	Cannot be quantified	No
Waste (6)	Disposal programme (national urban waste plan)	Capture and use of biogas for methanisation	CH ₄ , CO ₂	Regulatory, economic	Adopted	Local and autonomous administrations	Cannot be quantified	Cannot be quantified	No
Waste (6)	Disposal programme: closure, sealing and gas capture at uncontrolled landfill sites (national urban waste plan)	Capture and use of biogas	CH ₄ , CO ₂	Regulatory, economic	Adopted	Local and autonomous administrations	Cannot be quantified	Cannot be quantified	No
Waste(6)	Compost programme (national urban waste plan)	Use of organic parts for compost production	CH ₄ , CO ₂	Regulatory, economic	Adopted	Local and autonomous administrations	Cannot be quantified	Cannot be quantified	No
Waste (6)	Royal Decree 1481/2001 of 27 December	Managing of all waste landfill sites	CO ₂ , CH ₄	Regulatory	Adopted	Ministry of the Environment			
Waste (6)	Resolution of 13 January 2000	National plan for urban wastes. Minimisation of residues, recycling and energy production	CO ₂ , CH ₄	Regulatory	Adopted	Ministry of the Environment			
Energy (1-A.1), industrial processes (2) and waste (6)	Law 16/2002 of 1 July (integrated pollution prevention and control)	Limit the emissions of pollutants; integrated authorisation for all plants	CO ₂ , CH ₄	Regulatory	Adopted	National and regional authorities			
Agriculture (4)	Realisation of annual GHG inventories for agriculture on provincial level in Spain	Identify problems and pursue adequate measures	CH ₄ , N ₂ O, NO _x , CO	Other	Adopted	Cooperation of the General Secretariat of Agriculture and the Ministry of the Environment	Cannot be quantified	Cannot be quantified	No
Agriculture (4)	Establishment of nitrogen balances for Spanish agriculture on provincial level	Support for estimation of GHG in calculations concerning nitrogen	CH ₄ , N ₂ O, NO _x , CO	Other	Adopted	General Secretariat of Agriculture	Cannot be quantified	Cannot be quantified	No
Agriculture (4)	Actualisation of map on cultivation and utilisation on a scale of 1:50 000	Knowledge of use and utilisation of soils	CH ₄ , N ₂ O, NO _x , CO	Other	Adopted	General Sub-Directorate of Grass Cultivation	Cannot be quantified	Cannot be quantified	No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Agriculture (4)	Actualisation of the Spanish agro-climate characterisation	Attainment of precise climate variables for GHG estimation	CH ₄ , N ₂ O, NO _x , CO	Other	Adopted	General Sub-Directorate of Grass Cultivation	Cannot be quantified	Cannot be quantified	No
Agriculture (4)	Development of cartographic model on risks of erosion	Identification of zones vulnerable to erosion in order to establish cultivation methods which reduce oxidation of organic substances	CO ₂	Other	Adopted	General Sub-Directorate of Grass Cultivation	Cannot be quantified	Cannot be quantified	No
Agriculture (4)	Characterisation of production systems for herbaceous crops	Knowledge of precise inputs for GHG estimation	CH ₄ , N ₂ O, NO _x , CO	Other	Adopted	General Directorate of Agriculture and the National Institute for Agricultural Research	Cannot be quantified	Cannot be quantified	No
Agriculture (4)	Cooperation with the Ministry of Science and Technology on scientific investigation, development and technological innovation	Distinction of Spain with regard to emitting processes	CH ₄ , N ₂ O, NO _x , CO	Other	Adopted	General Secretariat of Agriculture and the National Institute for Agricultural Research	Cannot be quantified	Cannot be quantified	No
Agriculture (4)	Start of action programmes against nitrate contamination in vulnerable zones	Reduction of use of fertilisers (about 56 000 t/year), which avoids the emissions of 1 010 t/year of N ₂ O and 308 000 t/year of CO ₂ due to production process	N ₂ O, CO ₂	Education, voluntary	Adopted	Cooperation of the General Secretariat of Agriculture with the Ministry of the Environment, application by local authorities	0.6		No
Agriculture (4)	Promotion of best practice codes for fertilisation in agriculture	Adequate use of dung in order to reduce needs of synthetic N by about 55 000 t/year which avoids emissions of 1 000 t/year of N ₂ O and 302 500 t/year of CO ₂ due to production process	N ₂ O, CO ₂	Education, voluntary	Adopted	Coordination by the Ministry of Agriculture, Fisheries and Food, application by local authorities	0.6		No
Agriculture (4)	Establishment and control of agro-environmental conditions which are attached to the direct support in framework of the common agricultural policy (CAP)	Prohibition to burn stubble fields avoiding 2 160 t of methane and 50 t of dinitrogen oxide emissions	CH ₄ , N ₂ O, NO _x , CO	Regulatory, economic	Adopted	Coordinated by the Ministry of Agriculture, Fisheries and Food	0.1		No
Agriculture (4)	Establishment and control of the agro-environmental conditions which are attached to the direct support in the framework of the common agricultural policy (cap)	Maintain not cultivated lands (20 % of basic surface) which results in a reduction of the use of mineral fertilisers by 117 000 t yearly and in a reduction of about 2 120 t N ₂ O emissions	N ₂ O	Regulatory, economic	Adopted	Coordinated by the Ministry of Agriculture, Fisheries and Food. Application by local authorities	0.7		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Agriculture (4)	Rural development programme for accompanying measures in Spain: rationalisation of use of agricultural lands through a plan of reforestation of lands which are cultivated or used pasturage	Reforestation of 22 000 ha yearly of agricultural land in order to achieve 153 000 ha in 2006 which results in a reduction of 13 300 t of N or a reduction of 240 t N ₂ O emissions in 2006	N ₂ O	Regulatory, economic	Adopted	Coordinated by the Ministry of Agriculture, Fisheries and Food and the Ministry of the Environment. application by local authorities	0.1	No	No
Agriculture (4)	Rural development programme for accompanying measures in Spain	Alteration of poor land for growing of cereals to pasture and stubble fields	N ₂ O	Regulatory, economic	Adopted	Coordinated by the Ministry of Agriculture, Fisheries and Food	Cannot be quantified	Cannot be quantified	No
Agriculture (4)	Rural development programme for accompanying measures in Spain	Prevention of fires and conservation of extensive pasture systems (49 622 ha/year)	CH ₄ , N ₂ O, NO _x , CO, CO ₂	Regulatory, economic	Adopted	Coordinated by the Ministry of Agriculture, Fisheries and Food application by local authorities			No
Agriculture (4)	Coordination of agricultural policies with other sectors which generate sub-products that can be used in agriculture	Use of 300 000 t/year of compost from sewage sludge in agriculture reducing about 9 000 t/year of synthetic N whose production would involve emitting 49 500 t/year of CO ₂ ; the reduction of methane is estimated at 5 000 t	N ₂ O, CH ₄ , CO ₂	Voluntary	Adopted	Coordination of different ministerial departments, among them that of agriculture, fishery and food	0.2		No
Agriculture (4)	Coordination of agricultural policies with other sectors which generate sub-products that can be used in agriculture	Use of 400 000 t/year of compost from solid household waste in agriculture reducing about 11 000 t/year of synthetic N whose production would have emitted 64 350 t/year of CO ₂ . In addition, the 1 200 000 t/year of solid household waste do not decompose in landfill sites, which avoids methane emissions of about 48 000 t/year	N ₂ O, CH ₄ , CO ₂	Voluntary	Adopted	Coordination of different ministerial departments, among them that of agriculture, fishery and food	1.1		No
Agriculture (4)	Improve characteristics of feed for intensive stock farming in order to increase digestion	To reduce methane emissions; methane emissions by enteric fermentation in bovines could be reduced by 50 000-60 000 t/year; at the moment the effect can only be quantified through approximation on the bovine	CH ₄	Voluntary	Adopted	Cooperation of the Ministry of Agriculture, Fisheries and Food with local authorities	1.2		No
Agriculture (4)	Stimulation of rural hygiene plans initiated by some local councils	To selectively gather plastic from greenhouses, vegetal rests and other polluting products and recycle them	CH ₄ , N ₂ O, NO _x , CO, CO ₂	Education, voluntary	Adopted	Local councils	It is still not possible to evaluate the answer	It is still not possible to evaluate the answer	No
Agriculture (4)	Increase of wooden biomass CO ₂ sinking action by reforestation	At the moment, it is not possible to quantify the effect; and the objective cannot be made specific either	CO ₂	Other	Adopted	Cooperation of the Ministry of Agriculture, Fisheries and Food with the Ministry of the Environment and local authorities	It is still not possible to evaluate the answer	It is still not possible to evaluate the answer	No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2005	2010	
Agriculture (4)	Promotion plan for renewable energies	Increase of the surface destined to biomass production for obtaining energy, replacing fossil fuels, from land at the moment cultivated, mainly in semi-arid dry lands, reaching 800 000 to 1 000 000 hectares in 2010, to obtain about 3 350.00 tonnes of oil equivalent that will avoid CO ₂ emissions to the atmosphere of 10 284 500 tonnes	CO ₂	Regulatory, economic	Adopted	Cooperation of different ministerial departments, among them that of agriculture, fishery and food	10.3		No
Forestry (5)	National forest plan 2002-32 (adopted 5 July 2002)	Forestation and reforestation of 3 800 000 hectares and forest management of 1 300 000 hectares, resulting in the fixation of 55 and 6.7 million tonnes of carbon	CO ₂	Regulatory	Adopted	Ministry of the Environment and regional authorities		220.0 (1)	
Forestry (5)	Forestation	Forestation of agricultural lands	CO ₂		Adopted	Ministry of Agriculture, Fisheries and Food, Ministry of the Environment and local authorities	Being calculated	Being calculated	No
Forestry (5)	Reforestation	Increase carbon sinks through the increase of biomass stocks	CO ₂		Adopted	Ministry of Agriculture, Fisheries and Food, Ministry of the Environment and local authorities	Being calculated	Being calculated	No
Forestry (5)	Forest management	Increase biomass in forests by means of forestry operations	CO ₂		Adopted	Ministry of the Environment and local authorities	Being calculated	Being calculated	No
Forestry (5)	Forest fires	To avoid the destruction of stocks of CO ₂ and its release to the atmosphere	CO ₂		Adopted	Ministry of the Environment and local authorities	Cannot be quantified	Cannot be quantified	No
Forestry (5)	Health of forests	To avoid the destruction of stocks of CO ₂ and its release to the atmosphere	CO ₂		Adopted	Ministry of the Environment and local authorities	Cannot be quantified	Cannot be quantified	No
Forestry (5)	National forest inventory	Knowledge of the existence of fixed biomass and carbon	CO ₂	Other	Adopted	Ministry of the Environment	Cannot be quantified	Cannot be quantified	No
Forestry (5)	National forest map	Map and geo-reference of stocks of carbon in forests	CO ₂	Other	Adopted	Ministry of the Environment	Cannot be quantified	Cannot be quantified	No
Forestry (5)	Database of nature	Detailed knowledge of stocks of carbon and the impact of the activities on sinks in forests	CO ₂	Other	Adopted	Ministry of the Environment	Cannot be quantified	Cannot be quantified	No
Forestry (5)	Calculation of factors of expansion of biomass	Detailed knowledge of the existence of biomass of all components of a forest system	CO ₂	Other	Adopted	Ministry of the Environment and research institutes	Cannot be quantified	Cannot be quantified	No
Forestry (5)	Measurement of carbon flows in forest systems	To model the capture dynamics and the release of carbon in forest systems	CO ₂	Other	Adopted	Ministry of the Environment and research institutes	Cannot be quantified	Cannot be quantified	No

(1) By the end the plan in 2032.

Table A.165 Summary of projections by gas in 2010 (Mt CO₂ equivalent)

	Base year	With measures	With additional measures
CO ₂	226.1	307.0	265.0
CH ₄	34.7	n/a	n/a
N ₂ O	41.2	n/a	n/a
HFC	5.6	n/a	n/a
PFC	0.8	n/a	n/a
SF ₆	0.1	n/a	n/a
Total	308.5	n/a	n/a
Change relative to base year (%)	100	n/a	n/a

Table A.166 Projections of CO₂ emissions by sector in 2010 (Mt CO₂)

	Base year	With measures	Change relative to 1990 (%)	With additional measures	Change relative to 1990 (additional measures) (%)
Industry	49.0	65.0	32.7	59.0	20.4
Transport	60.0	105.0	75.0	89.0	48.3
Residential	11.0	19.0	72.7	16.0	45.5
Services	5.0	8.0	60.0	8.0	60.0
Agriculture	8.0	11.0	37.5	10.0	25.0
Electricity generation	64.0	85.0	32.8	70.0	9.4
Refineries	10.0	14.0	40.0	13.0	30.0
Total	207.0	307.0	48.3	265.0	28.0

Table A.167 Assessment of the target (only CO₂)

	Mt CO ₂ equivalent	Percentage of 1990 level
Base year (from projections)	207	100
Commitment	238	115
With existing PAMs	307	148
Gap (negative means no gap)	69	33
Effect of additional PAMs	42	20

Table A.168 Modelling parameters

Parameter	2000	2010	Unit
n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a

Evaluation of projections

The third national communication provides no projections for total greenhouse gases but only for CO₂.

In the with measures scenarios, CO₂ emissions will grow by 48% to 307 tonnes CO₂ whereas the increase in the with additional measures scenario will still be + 28% to 265 tonnes CO₂.

According to the burden sharing agreement, Spain is allowed to increase its GHG emissions by 15%. Due to the lack of projections for all six greenhouse gases a gap analysis can only be made for CO₂ (Table A.167). According to the projections given in the third national communication, CO₂ emissions will be about 50% higher in 2010 than in 1990. Compared with Spain's commitment, there will be a 'CO₂ gap' of 69 Mt in the with measures scenario. If additional measures are considered, 42 Mt CO₂ can be furthermore reduced. However, there will still remain a gap of 27 Mt CO₂ equivalent, which has to be filled by PAMs targeted at the other greenhouse gases or by use of the flexible mechanisms of the Kyoto Protocol.

Under a six gas approach, Spain's base year emissions of all six greenhouse gases are 309 Mt CO₂ equivalent in 1990. In accordance with the burden sharing agreement, they might increase to 355 Mt CO₂ equivalent for the period between 2008 and 2012. In the most recent inventory, total GHG emissions are at 380 Mt CO₂ equivalent in 1999, i.e. they exceed the target for 2010 by 25 Mt CO₂ equivalent.

Description of modelling approach

Two scenarios are presented in the third national communication: the 'Escenario tendencial' (tendency

scenario, business as usual) corresponds to the with measures scenario whereas the 'Escenario ahorro' (saving scenario) corresponds to the with additional measures scenario. The horizon of the projections is 2010 only.

Projections are calculated only for CO₂. The modelling approach comprises three phases. The simulation starts with the projection of energy consumption in industry, transport, the residential sector, services and agriculture. The second phase simulates the transformation sector and calculates — based on the results from the first phase — the primary energy demand. In the last phase primary energy demand is transformed to CO₂ emissions.

Sensitivity analyses for different economic developments or varying price scenarios have not been performed. Key parameters of the projections are also not stated in the third national communication.

Country conclusions

Reporting by Spain to the monitoring mechanism has been limited to the national communications to the UNFCCC. However, in the third national communication, the level of information on projections and PAMs has been increased substantially. Nevertheless, important information or data for the assessment of the Spanish climate policy are still missing, including projections for all greenhouse gases, clear distinctions between measures which are considered in the with measures or the with additional measures scenario, sensitivity and provision of the key parameters used in the projections, and so on.

On the basis of the third national communication, it currently appears that a gap of 69 Mt CO₂ (equivalent to 33 % of 1990 emissions) exists between their burden sharing target and the GHG forecasts for 2010. If PAMs considered in the with additional measures are implemented, this gap might be reduced to 27 Mt CO₂ (equivalent to 13% of 1990 emissions). In the third national communication there are no data available to help understand how this remaining gap may be filled by further PAMs or the use of flexible mechanisms of the Kyoto Protocol. However, new activities have been initiated to overcome this obstacle in future.

1. The composition and functions of the National Council for Climate (NCC) have been recently changed to include all relevant stakeholders: all public administrations, NGOs, sectoral organisations. The NCC is already working on a national plan to comply with the Kyoto Protocol, including the prioritisation of recommended measures.
2. On an informal basis, three working groups have been established and are already working actively with representatives of the affected ministries of the national administration and the main national organisation of all industries involved:
 - working group one is charged with the follow-up of the emissions trading directive;
 - working group two deals with the promotion of initiatives to develop and implement JI and CDM projects;
 - working group three is studying different possible measures to be adopted (sector by sector) to fulfil the Spanish emission target under the Kyoto Protocol after the EC burden sharing agreement.

Sweden

Sources of Information

- Report to the monitoring mechanism, December 2001
- Report to the monitoring mechanism, December 2002
- Sweden's third national communication to the UNFCCC, 2001

Quality and transparency of reporting

The information on policies and measures is taken from the monitoring paper and the third national communication. A clear discussion is presented of the aims of the various policies and measures and the policies and measures are summarised in a table. Good details are provided of the costs and implementation of the policies. For a few measures, quantification of their effect is given but only until 2005.

The latest projections contain a with measures scenario covering all six greenhouse gases with a base year of 1990 for carbon dioxide, methane

and nitrous oxide and 1995 for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. It is not clear which of the individual policies and measures is included in the projections. The totals are disaggregated by gas and by sector (energy, transport, process, agriculture and waste), and individual gases are disaggregated further. For 2010, one projection is provided but for 2020 there are two scenarios dependent on assumptions made about the nuclear power plants. The modelling and parameter assumptions made are described with a good level of detail.

Assessment of policies and measures

Table A.171 shows an overview of the areas in which policies and measures are defined. Many of the policies are not quantified. Table A.172 gives more details of the measures.

Table A.169 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	+++	
Which greenhouse gases?	CO ₂ , CH ₄ and halogenated gases	
Status of implementation	+++	
Implementation body specified	+++	
Quantitative assessment of implementation	+	Provided for some but not all measures and only up to 2005
Interaction with other PAMs discussed	+	Discussed for some measures

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

Table A.170 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	With measures	
Expressed relative to inventory for previous years	Yes, 1990-99, all gases	
Starting year	1990, 1995 for halogenated gases	
Split of projections	++	Projections split by gas and sector but base year emissions not given for all splits
Presentation of results	++	Results presented in both tabular and graphical form. Base year emissions difficult to identify
Description of model (level of detail, approach and assumptions)	+++	Details of the models and parameter assumptions good
Discussion of uncertainty	+	Some discussion of uncertainty
Details of parameters and assumptions	+++	Good level of detail on energy use in different sectors and on underlying assumptions

Table A.171 Overview of national policies and measures (Mt CO₂)

	With measures ⁽¹⁾	With additional measures
Energy supply	1.5 ⁽²⁾	
Business	nq	
Industrial processes	nq	
Transport	0.1	
Residential	nq	nq
Public	nq	
Agriculture	nq	
Land-use change	nq	
Waste management	0.7	
International	0.2	
Total	nq	

⁽¹⁾ It is not clear whether the policies are included in the with measures scenario, these figures represent all implemented policies. Not all measures are quantified.

⁽²⁾ This figure is for policies in the energy field and will include energy savings in other sectors.

nq: Not quantified but policies in that area.

Table A.172 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings 2005	CCPM
Energy	Certificate system for renewable energy	Quota bases electricity certificate system — quotas based on a target to increase renewable energy generation by 10 TWh between 2002 and 2010	CO ₂	Regulatory	Implemented	Government	5	No
Energy	Development of technologies and market launch of wind power	To develop large-scale wind power applications	CO ₂	R & D	Implemented	Government		No
Energy	Transitional support for wind power	To provide additional support to wind when the electricity certificate system is in place	CO ₂		Implemented	Government		No
Energy	Energy tax	Reduce energy use in all sectors	CO ₂	Fiscal	Implemented	Government		No
Energy	Reform of electricity market	Liberalise the electricity market	CO ₂	Fiscal	Implemented	National tax board	8	No
Energy	Special pilot project for biomass fuels	Make biomass fuel more competitive	CO ₂	Fiscal	Implemented	STEM	—	No
Energy	Investment grants for biomass-fuelled CHP	Increase renewable electricity generation	CO ₂	Fiscal	Implemented	STEM	—	No
Energy	Investment grants and subsidies for renewable power	Increase renewable electricity generation	CO ₂	Fiscal	Implemented	STEM	655	No
Energy	Conversion from electric to district heating	Reduce electricity consumption	CO ₂	Economic	Implemented	STEM	292	No
Energy	Conversion from electric to other individual heating	Reduce electricity consumption	CO ₂	Economic	Implemented	STEM	162	No
Energy	Information, procurement and labelling of new energy technologies	Reduce electricity consumption	CO ₂	Economic	Implemented	Local government	57.5	No
Energy	Measures to develop electric heating supply in southern Sweden	Reduce energy consumption	CO ₂	Economic/information	Implemented	STEM	300	No
Energy	Municipal energy planning	Need to compensate for closure of Barseback	CO ₂	Economic	Implemented	STEM	70	No
Energy	Planning, building and housing act	Reduce energy consumption	CO ₂	Regulatory	Implemented	STEM	—	No
Energy	Environmental code for infrastructure products	Reduce energy consumption	CO ₂	Regulatory	Implemented	National board of housing	—	No
Energy	Standards for energy use in residential and commercial properties	Assess impact of projects on climate	CO ₂	Regulatory	Implemented	Swedish Environmental Protection Agency	—	No
Energy	Comprehensive municipal planning	Reduce energy consumption	CO ₂	Regulatory	Implemented	National board of housing	—	No
Energy	Measures for R & D	Reduce energy consumption	CO ₂	Regulatory	Implemented	National board of housing	—	No
Energy		R & D to develop new fuels and technologies	CO ₂	R & D	Implemented	STEM	—	No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings 2005	CCPM
Energy	Local investment programmes for ecological adjustment	Municipal adjustment to achieve ecological sustainability	CO ₂	Economic	Implemented	Local Government	—	No
Energy	General environmental factors to be considered under the environmental code	Establish certain fundamental principles	CO ₂	Regulatory	Implemented	Swedish Environmental Protection Agency	—	No
Energy	Investment programmes for ecological buildings	Reduce energy consumption	CO ₂	Economic	Implemented	National board of housing	—	No
Waste	Collect landfill gas	Reduce methane emissions	CH ₄	Regulatory	Implemented	Swedish Environmental Protection Agency	—	No
Waste	Ban on landfilling of organic waste	More stable landfills and use of waste as a resource	CH ₄	Regulatory	Implemented	Municipalities	—	No
Waste	Ban on landfilling of sorted burnable waste	Improve disposal of all burnable waste	CH ₄ /CO ₂	Regulatory	Implemented	Swedish Environmental Protection Agency	781	No
Waste	Waste tax	Reduce quantity of landfilled waste	CH ₄	Fiscal	Implemented	Swedish Environmental Protection Agency	—	No
Waste	Landfill directive	Improve waste management	CH ₄	Regulatory	Implemented	Swedish Environmental Protection Agency	—	Yes
Residential	Grants for home solar heating systems	Increase use of solar energy	CO ₂	Regulatory	Implemented	Local government	4	No
Residential	Heat insulation for buildings	Tougher requirements for thermal bridges	CO ₂	Regulatory	Implemented	National Board of Housing	—	No
Residential	Swan criteria for oil burners	Nordic eco-labelling has produced criteria for oil burners with an output up to 120 kW	CO ₂	Regulatory	Implemented	—	—	No
Residential	Investment grants for ecological building	Reduce energy consumption	CO ₂	Economic	Implemented	Ministry of Finance/ Board of Housing	—	No
Residential	Energy declarations for apartment buildings	Better overview of energy status of Swedish buildings	CO ₂	Regulatory	Proposed	National Board of Housing	—	No
Residential	Individual metering of heating and hot water	Increase awareness of energy use	CO ₂	Voluntary	Proposed	National Board of Housing	—	No
Residential	EC directive on efficient energy use in buildings	Increase energy efficiency of buildings	CO ₂	Regulatory	Proposed	Government	—	Yes
Forestry	Start-up grants for energy forests	Cultivation of energy forest	CO ₂	Economic	Implemented	National Board of Agriculture	—	No
Forestry	Environmental factors to be considered under the silviculture act	Sustainable forestry	CO ₂	Regulatory	Implemented	National Board of Forestry	—	No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings 2005	CCPM
Forestry	National Board of Forestry recommendations on forest fuel extraction	Optimise biomass fuel abstraction	CO ₂	Regulatory	Implemented	National Board of Forestry	—	No
Forestry	Protected areas	Protect certain forest ecosystems	CO ₂	Regulatory	Implemented	National Board of Forestry	—	No
Forestry	Environmentally related forestry certification	Sustainable forestry	CO ₂	Miscellaneous	Implemented	National Board of Forestry	—	No
Forestry	Tighter restrictions on the use of nitrogen fertilisers on forest soils	Reduce nitrogen leaching from forest soils	N ₂ O	Regulatory	Implemented	National Board of Forestry	—	No
Transport	Procurement of ethanol/petrol hybrid cars	Increase the scope for use of biomass motor fuels	CO ₂	Voluntary	Implemented	NUTEK	—	No
Transport	Promoting development and use of IT and traffic information methods	Reduce fuel consumption	CO ₂	R & D	Implemented	VV	—	No
Transport	Green car	Reduce fuel consumption	CO ₂	R & D	Implemented	Ministry of Industry and Trade	—	No
Transport	Transport quality assurance and economical driving transport projects	Reduce fuel consumption	CO ₂	Miscellaneous	Implemented	VV	100	No
Transport	Joint programmes for development of more environmentally compatible vehicles	Reduce fuel consumption	CO ₂	Miscellaneous	Implemented	NUTEK	—	No
Transport	Greater investment in tramway infrastructure	Make trams more competitive	CO ₂	Miscellaneous	Implemented	National rail administration	—	No
Public	The challenger municipalities project	Begin phasing out use of fossil fuels in five municipalities	CO ₂	Miscellaneous	Implemented	Municipalities	—	No
Public	Climate objectives set by municipalities	Reduce impact on climate	CO ₂	Miscellaneous	Implemented	Municipalities	—	No
Industry	Encouraging the introduction of environmental management systems in small and medium-sized business	Reduce impact on climate	CO ₂	Information	Implemented	NUTEK	—	No
Halogenated gases	The refrigerants order	Govern the use of refrigerants including halocarbons	F-gases	Regulatory	Implemented	Swedish Environmental Protection Agency	—	No
International	Joint implementation	Improve efficiency of the Baltic energy systems	CO ₂	Economic	Implemented	STEM	220	No
International	Participation in World Bank Carbon Fund	Develop flexible mechanism	CO ₂	Economic	Implemented	Ministry of Industry and Trade	—	No

Table A.173 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	With measures	With additional measures
CO ₂	55.8	57.7	
CH ₄	6.8	4.7	
N ₂ O	7.2	7.4	
F-gases	0.5	1.1	
Total	70.4	70.9	
Percentage change relative to 1990		+ 1	
CO ₂ removals, land use and forestry	- 20.3	- 24.3	

Table A.174 Summary of projections by sector in 2010 (Mt CO₂)

	Base year	With measures	Change relative to 1990 (%)	With additional measures	Change relative to 1990 (additional measures) (%)
Energy ⁽¹⁾	34.6	33.3	- 4		
Transport	19.7	22.3	+ 13		
Industrial processes and F-gases	5.6	7	+ 25		
Agriculture	8	7.4	- 8		
Waste management	2.5	1	- 60		
Total	70.4	70.9			

(¹) This is the total for all energy use except for transport.

Table A.175 Assessment of target

	Mt CO ₂ equivalent	Six gas basket (%)
Base year from projection	70.4	
Commitment	73.2	+ 4
With existing PAMs	70.9	1
Gap	- 2.3	3
Additional PAMs	—	—

The support for solar heating was continued for a further two years from 1 January 2003. Other activities that were either extended or introduced include information on energy efficiency in different sectors, local and regional initiatives on energy and coordination of technology procurement and market launches.

The carbon dioxide tax on fuels was raised by 19 % as of 1 January 2003. At the same time, the energy tax rates on petrol and diesel oil are to be lowered by that amount. There is, therefore, no overall increase in taxation of petrol and diesel, except for the annual index-linked adjustment of the tax rates. The energy tax on electricity has also risen by SEK 0.029 per kWh.

The tax on landfilled waste rose from SEK 288 to SEK 370.

Evaluation of projections

The projections presented here are those contained in the third national communication and on the 1990 inventory reported in that document. The breakdown by greenhouse gas is presented in Table A.173. The with measures projections meet the Kyoto commitment so a with additional measures projection is not presented.

Table A.174 summarises the projections by sector. All sectors except transport and residential are projected to decrease in the with measures projections.

An assessment of the target is presented in Table A.175. The commitment is for + 4 % compared with 1990 and the with measures projection is + 1 %.

Description of modelling approach

Three main model types have been used for projections and scenarios in the third national communication:

- economic-technical models for energy use (National Energy Administration) and energy supply (Markal) combined with analytical models for future transport demand (SIKA's passenger and goods transport model);
- spreadsheet models in which expert assessments are made of future changes in premises (activity data and emission factors). Emissions are quantified using IPCC/UNFCCC methodology;
- statistical analyses and supplementary expert assessments.

The scenarios for carbon dioxide emissions from the energy sector are based on calculations and assessments of developments in the energy system. The energy system comprises energy use as well as supply. Scenarios have been produced for various energy sub-sectors. These are then combined to form an energy balance. Energy consumption is balanced by energy supply. In addition to end use in industry, housing and services, and transport, the user side also includes conversion and distribution losses, as well as international shipping. The supply side comprises total supply of fuel and hydropower generation, nuclear power generation, wind power and net import of electricity. The methods and analyses used are based on a socioeconomic perspective.

Method for expert assessments and use of spreadsheet models

The basic approach is the methodology used to determine emissions of greenhouse gases developed by the IPCC and used in the common reporting format under the climate convention. In some cases, UN methodology has been supplemented with national emission factors or has been expanded to better describe national conditions. These calculations principally require input data in the form of activity data, emission factors, correction factors and their changes over time. Assessments have been made of the way this input data changes over time as a consequence of the objectives and measures decided up to 1999. This has been done in consultation with experts at various agencies and trade organisations. The advantage of these models is that the same type of input data are used for historical emissions and the time series is thus congruent. The drawback is that input data for the calculations must be determined independently — often in the form of output data from another model or with the help of experts.

Spreadsheet models of this kind are used for projections for halocarbons, methane and nitrous oxide from agriculture, forest sinks of carbon dioxide and methane from waste (landfill).

The drawback of the simple analysis is that the models do not specifically take into account any overlaps or synergies between sectors or policy areas. The estimates of future emissions must

Parameter	1997	2010	Unit
Population		9 039 000	0.14 % growth per annum (1997–2010)
GDP	1.9		Change per annum (1997–2010) (%)
Renewables share (%)	47	46	Includes large-scale hydro
Crude oil (international price)	19.12	17	USD/barrel
Coal (international price)	44.1	42	USD/tonne
Natural gas (international price)	2.3	2.6	USD/Mbtu (million British thermal units)
Transport passenger growth	118	148	Passenger/km
Freight growth	82	103	Tonnes/km

Projection parameters for STEM model.

Source: Questionnaire.

therefore be supplemented with expert assessments of the potential impact of current political objectives, measures and instruments on emissions.

Country Conclusions

In the documents provided under the EU monitoring mechanism, the description of the policies in terms of costs and implementation is good. However, the greenhouse gas savings arising from the policies are stated

only for 2005. No additional policies and measures are described as the with measures projection already meets the commitment under the burden sharing agreement. New policies introduced in 2002 strengthen action in renewable energy and in the energy efficiency field. There has also been an increase in 'green' taxation.

Details of the methodology and parameters used are good.

United Kingdom

Sources of Information

- The United Kingdom's third national communication under the United Nations Framework Convention on Climate Change, 2001
- Climate change – United Kingdom programme, 2000
- Projections of non-CO₂ greenhouse gases for the United Kingdom, Working paper, October 2000
- Energy projections for the UK, Energy paper 68, 2000
- The costs and benefits of the climate change programme methodology for appraisal of measures (paper provided for clarification), May 2000
- The derivation of the carbon savings figures included in the United Kingdom's draft climate change programme (paper provided for clarification), May 2000
- <http://defraweb/environment/climatechange/07.htm>

Quality and transparency of reporting

The third national communication draws on the UK climate change programme. It provides a clear list of policies and measures to reduce greenhouse gas emissions in a range of sectors. The impact of the measures has been quantified in relation to the with measures projection. The with measures projection includes measures introduced since Kyoto. These are described and estimates of the savings given.

Costs and benefits of policies and measures were assessed in developing

the programme. They are discussed in general terms in the published material and sources of more detailed information are signposted.

The table on policies and measures follows the UNFCCC guidelines, and additional information is provided in footnotes.

The latest projections contain a with measures scenario covering all six greenhouse gases with a base year of 1990 for carbon dioxide, methane and nitrous oxide and 1995 for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. This projection includes measures introduced since Kyoto. They are identified and quantified separately. Projections are for five-year intervals to 2020 and are disaggregated both by end user and by source categories. There are nine source category sectors: energy supply, business, industrial processes, transport, domestic, public, agriculture, land-use change, and waste. Emissions from domestic aviation and shipping are included in the projections in accordance with UNFCCC reporting requirements. Trends in international emissions are reported separately and are excluded from the baseline and projections in accordance with UNFCCC reporting requirements. Policy initiatives for the future in this area are referred to. The description of the methodology is good when all the documents are used together. The additional measures are designed to reduce CO₂ and the sectors where they will have an impact are identified.

Table A.176 Information provided on policies and measures

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	+++	
Which greenhouse gases?	CO ₂ , CH ₄ , N ₂ O, HFC, PFC and SF ₆	Most detail in CO ₂ but quantification of effect also included for other gases
Status of implementation	+++	Clear indication of which measures are additional
Implementation body specified	+++	Generally central government but some local action
Quantitative assessment of implementation	+++	Details for most PAMs – ranges given for some
Interaction with other PAMs discussed	+++	The interactions between policies has been included and cumulative effect of additional measures in 2010 given

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

Table A.177 Information provided on projections

Category of information	Level of information provided	Comments
Scenarios considered	With measures With additional measures	Both given for different sectors. With measures projections are also disaggregated by gas
Expressed relative to inventory for previous years	Yes	
Starting year	2000	
Split of projections	++	Projections split by gas and sector. Industry and service sectors aggregated as 'business'.
Presentation of results	+++	Results presented in both tabular and graphical form
Description of model (level of detail, approach and assumptions)	+++	Details of the models in the working papers
Discussion of uncertainty	+++	Overall uncertainty and sources discussed
Details of parameters and assumptions	++	Summary table for key parameters in third national communication — more details in supporting papers

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

Table A.178 Summary of the effect of policies and measures included in the projections (Mt CO₂)

	With measures ⁽¹⁾	With additional measures ⁽²⁾
Energy supply	14.7	
Business	7.3	23.5
Industrial processes		
Transport	6.4	20.9
Residential		17.1
Public		2.2
Agriculture		2.2 ⁽³⁾
Land-use change		
Waste management	1.1	
Total	29.5	65.8

⁽¹⁾ This represents those measures introduced post-Kyoto and does not include all measures included in the with measures projections.

⁽²⁾ Since projections were made (November 2000), all of the policies and measures in the with additional measures projections have been either implemented or adopted, but are not yet within the with measures projections.

⁽³⁾ Afforestation.

Assessment of policies and measures

Table A.178 gives an overview of the estimated effects of national policies on total greenhouse gas emissions. The figures given for the with measures projection are for the policies and measures introduced since Kyoto. Other existing policies and measures have not been quantified separately.

Table A.179 gives details of the estimated effects of individual policies and measures. The with measures

projections include the impact of new measures introduced since Kyoto, which are quantified separately in the climate change programme and included in Table A.179. The additional measures are aimed at CO₂ reduction. There are a number of existing policies, for example, voluntary agreements on HFCs, aimed at reducing non-CO₂ greenhouse gases but these are not detailed in the table below.

Table A.179 Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Policies and measures in the with measures projections									
Energy supply	NFFO	Electricity generation and supply	CO ₂	Regulatory	No longer in place	Electricity regulator	5.5	5.5	No
Energy supply	Renewables obligation	Electricity generation and supply	CO ₂	Regulatory	Adopted	Industry regulator (Ofgem)	9.2	9.2	No
Business and public	Climate change levy	Energy use by business and public sectors	CO ₂	Fiscal	Implemented	Government	7.3	7.3	No
Transport	Fuel duty escalator to 1999	Transport demand and fuel efficiency	CO ₂	Fiscal	No longer in place	Government	3.7-9.2	6.6	No
Waste management	Waste strategy and EU landfill directive	Waste	Methane	Regulatory and fiscal	Implemented	Government	0.4-1.8	nq	Yes
Policies and measures in the with additional measures projections									
Business	Climate change agreements and IPPC	Energy use by energy-intensive sectors	CO ₂	Negotiated agreements and regulatory	Implemented	Government	9.2	>15.4	In part
Business and public	Energy efficiency measures under the climate change levy package	Energy use by business and public sectors	CO ₂	Fiscal	Implemented	Carbon trust	1.8	> 1.8	No
Business	Emissions trading scheme	All UK companies	All	Economic	Implemented	Government	7.3	> 7.3	No
Business, residential and public	Amendment of building regulations	Energy use in buildings	CO ₂	Regulatory	Adopted	Government	5.1	> 3.7	No
Residential	Residential energy efficiency, including energy efficiency commitment	Energy use in homes	CO ₂	Regulatory and fiscal	Implemented	Government, industry regulator (Ofgem) and energy supply companies	9.5-13.6	16.5	No
Residential	Community heating	Energy use in homes	CO ₂	Fiscal (grant assistance)	Implemented	Government, various public and private sector bodies	3.3	3.3	No
Residential	New HEES	Energy use in homes	CO ₂	Fiscal (grant assistance)	Implemented	Government	0.7		No
Residential	Appliance standards and labels	Energy use in homes	CO ₂	Regulatory	Implemented	Government	0.7-1.5		Yes?
Residential	Central heating for pensioners and families	Energy use in buildings	CO ₂	Fiscal (grant assistance)	Implemented	Scottish Executive	0.4	0.4	No
Public	Public sector targets	Energy use in public buildings	CO ₂	Voluntary agreements	Adopted	Public sector	1.8	1.8	No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO ₂)		CCPM
							2010	2020	
Public, business and residential	Reform of building regulations and public sector tables	Energy use in buildings	CO ₂	Regulatory and voluntary agreements	Adopted	Scottish Executive	0.4	0.4	No
Transport	EU voluntary agreement, backed up by changes to company car taxation and vehicle excise duty	Vehicle fuel efficiency	CO ₂	Voluntary agreements and fiscal (taxation)	Implemented	Government, car manufacturers, European Commission	14.7	27.5	Yes (in part)
Transport	Ten-year plan	System improvements	CO ₂	Fiscal (investment)	Adopted	Government	5.9	5.9	No
Transport	Sustainable development	System improvements in Scotland	CO ₂	Fiscal (investment)	Adopted	Scottish Executive	0.4	0.4	No
Forestry	Afforestation	Extended forest area since 1990	CO ₂	Fiscal (grant assistance)	Implemented	Government and devolved administrations	2.2	4.4	

Table A.180 Summary of projections by gas in 2010 (Mt CO₂)

	Base year	With measures	With additional measures
CO ₂	602.8	553.3	487.5
CH ₄	77.0	42.5	42.5
N ₂ O	67.1	43.3	43.3
HFC	15.0	10.6	10.6
PFC	1.1	0.4	0.4
SF ₆	1.1	1.1	1.1
Total	764.1	651.2	585.4
Change relative to base year (%)		- 14.8	- 23.4

Table A.181 Summary of projections by sector in 2010 (Mt CO₂)

	Base year	With measures	Change relative to 1990 (%)	With additional measures	Change relative to 1990 (additional measures) (%)
Energy supply	247.1	171.2	- 30.7	171.2	- 30.7
Business	132.7	131.6	- 0.8	108.2	- 18.5
Industrial processes	56.8	20.2	- 64.5	20.2	- 64.5
Transport	130.5	160.6	23.0	139.7	7.0
Residential	80.7	84.7	5.0	67.7	- 16.1
Public	16.1	16.1	0.0	13.9	- 13.6
Agriculture	55.7	47.7	- 14.5	45.5	- 18.4
Land-use change	19.4	10.3	- 47.2	10.3	- 47.2
Waste management	24.9	9.2	- 63.2	9.2	- 63.2
Total	764.1	651.2	- 14.8	585.4	- 23.4

Table A.182 Assessment of the target

	Mt CO ₂ equivalent	Percentage of 1990 level (six gas basket)
Base year (from projections)	764.1	
Commitment	668.6	- 12.5
With existing PAMs ⁽¹⁾	651.2	- 14.8
Gap (negative means no gap)	- 17.4	- 2.2
Effect of additional PAMs	65.8	- 23.4

Evaluation of projections

The data in Tables A.180 to 182 are based on information from the third national communication.

Table A.180 shows the projections by greenhouse gas for 2010 and Table A.181 summarises the projections by sector. All sectors except transport and residential are projected to decrease in the with measures projections.

The with measures projections shows that the United Kingdom is expected to slightly exceed its commitment of a 12.5 % reduction in greenhouse gas emissions under the EU burden sharing agreement.

In addition to its international commitments, the United Kingdom has a domestic goal to reduce carbon dioxide emissions in 2010 by 20 % compared with 1990. Additional quantified measures are identified which could reduce emissions of the six greenhouse gases to 23 % below 1990 levels, and emissions of carbon dioxide to 19 % below 1990 levels, by 2010.

The United Kingdom's 3NC also contains a discussion of uncertainty in the projections which is estimated to be ± 10 MtC (± 37 Mt CO₂) in 2010. This corresponds to an uncertainty of about 5 % of base-year emissions in the with measures scenario. This means that the

⁽¹⁾ The existing measures include ones introduced since Kyoto.

Gas	Sector	Sources and types of information
Methane	<i>Agriculture</i>	Ministry of Agriculture, Fisheries and Food — livestock numbers
	<i>Fuel combustion</i>	
	Electricity generation	Department of Trade and Industry (DTI) — projections of electricity generation
	Gas distribution	Gas distribution and storage companies — leakage reductions
	Mining	DTI and largest mining company — coal demand projections and methane mitigation plans
	Oil and gas	United Kingdom Offshore Operators Association (UKOOA) and DTI — forecast of oil and gas production and number of installations
	Transport	AEA Technology and DETR — road traffic forecast
	<i>Landfill</i>	AEA Technology report for DETR — effects of policies, UK population and site design and recovery schemes
	<i>Sewage sludge</i>	Population and estimated likely changes in disposal routes
Nitrous Oxide	<i>Agriculture</i>	MAFF — fertiliser use, crop areas and national populations
	<i>Industrial processes</i>	Chemical company — projections of production and estimates of mitigation
	<i>Transport</i>	AEA Technology and DETR — vehicle fleet composition and projected energy use
	<i>Electricity generation</i>	DTI — projections of electricity generation
Halogenated gases		March Consulting — projections of use and leakage rates

range of emissions in 2010 under the with measures scenario would be 619 to 684 Mt CO₂. At the upper end of the range the United Kingdom would fail to meet its Kyoto commitment by about 15 Mt CO₂. However, as the additional measures are worth a further 66 Mt CO₂ it seems likely that the United Kingdom would meet its commitment even if the with measures projection is optimistic and the additional measures deliver less than expected.

Description of modelling approach

Emissions projections are based on existing sectoral activity projections and are described in the two working papers. These papers describe the models in some detail — a summary is presented here.

Demand side energy-related emissions are calculated from projections of energy demand carried out by the Department of Trade and Industry (DTI). The energy scenarios are based on a set of interconnected economic models of consumption in the electricity supply industry and 12 other sectors. The demand model is based on econometric equations including fuel share equations, stock equations, for example,

number of cars and energy demand equations.

For electricity production, emissions can be estimated on a plant-by-plant basis.

Six core scenarios are used based on three GDP assumptions (low, central and high growth) and two energy price assumptions (high and low energy prices). The key variables for these scenarios are given in the paper on energy projections (EP68). The model also includes parameters for structure of demand and the fuel mix for particular sectors.

Details of the calculation of the costs and benefits of policies and measures and of the derivation of the carbon savings figures are given in the two additional papers.

Sources and types of information for projections for non-CO₂ greenhouse gases are given in the working paper and summarised in the table below.

A simplified energy demand model is used to assess uncertainty in the CO₂ projections. The simple model contains only energy demand, price, GDP and

Modelling parameters

Parameter	2000	2010	Unit
GDP	2.25–3.25	1.75–2.75 ⁽¹⁾	Percentage growth/year
International oil price ⁽²⁾	10–20	10–20	USD/bbl 1999 prices
Gas (national price — business)	13.8–17.7	10.9–21.5	p/therm (pence per therm)1999 prices
Coal (national price — business)	11–12.2	11.7–15.3	p/therm (pence per therm)1999 prices

Source: Questionnaire.

⁽¹⁾ For the period, 2006–20.

⁽²⁾ Different scenarios — 2010 at 2000 prices.

temperature as independent variables. Uncertainty in the current non-CO₂ projections is summarised in the third national communication and reported in detail in the background documentation.

Country Conclusions

The main document used for this summary was the third national communication. The level of detail and clarity of the documents from the United Kingdom is very good. The details of the methodology for the projections are available and contain a reasonable level of detail on the models and parameters. It would be helpful if the projections for the business sector could be disaggregated to show industry separately from the service sector. The additional policies and measures are summarised in a table, which makes clear the potential greenhouse gas savings.

The projected fall from the 1990 baseline with existing measures, including the impact of some introduced since Kyoto, is 14.9 % in the basket of six greenhouse gases by 2010 which slightly exceeds the United Kingdom's burden sharing target of – 12.5 %. Additional new policies and measures are described which could reduce GHG emissions to 23 % below base-year levels by 2010.

About half of the current reduction and about one third of the projected

reduction by 2010 in greenhouse gas emissions arises from changes in the electricity supply industry, such as the switch from coal to gas and increased efficiency in nuclear industry. However, there is an active programme of policies and measures and a domestic goal to reduce carbon dioxide emissions by 20 % of 1990 levels by 2010.

The with measures projection includes three specific measures that are discussed in the programme:

- the effect of the energy price rises from the climate change levy;
- the fuel duty escalator to 1999; and
- a reduction arising from the UK target of 10 % of electricity supplied by renewables by 2010.

The first two measures have been implemented, the last represents a challenging target but policies are in place to encourage the introduction of renewables.

All the extra measures included in the with additional measures projection have either been implemented or adopted since the projection was made. It is intended that all the outstanding additional measures be implemented as soon as possible.