

## Italy

### Sources of information

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This Chapter has been prepared using information provided by Ecofys.

## Quality and transparency of reporting

The Italian Second National Communication 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:

- The status of implementation of policies and measures was not clear in the Second National Communication (NC2). The status of these was greatly clarified in Contaldi 1999 and has now been further expanded in a study recently completed by Ecofys in collaboration with ANPA (Byers et al, 2001).
- The model for the projections in the NC2 was constructed using a macroeconomic (MARKAL) approach into which technical measures that were already financed and economically viable (NC2) were integrated. The exact methodology used to do this is not detailed. The three reduction scenarios constructed on the basis of this reference scenario were calculated using reduction targets instead of the expected reductions associated with specific policy instruments. A direct link between implemented or planned policies and their expected outcomes was not made.
- Double counting due to the interaction between measures and overlaps between measures might occur and should develop methods to avoid this.
- HFCs, PFCs and SF<sub>6</sub> should be included in the projections and the policy & measure chapters.
- Projections should be distinguished both by types of emissions (6 gases) and by sector.

Unless stated otherwise, the information included in table 1 and 2 originates from Italy's Second National Communication.

**Table 1: Information provided on policies and measures**

Information provided	Level provided	Comments
Policy names	++	Relatively detailed; <sup>1</sup> a fairly wide mix of instruments is given. However, the measures that need to be taken to implement these policies are not clearly stated.
Objectives of policies	++	The NC2 only details quantitative targets for specific technical measures. No specific correlation between the underlying policies and these technical measures are made.
Which GHGs?	++	All gases are detailed in the emission inventories for 1990, 1994 & 1995. However, the projections only include CO <sub>2</sub> (mostly energy related), CH <sub>4</sub> and N <sub>2</sub> O.
Status of implementation	+++ from data other than the NC2	Several sources of data on implementation <sup>2</sup> go some way in clarifying the link between policies and their expected emission reduction but the full chain of necessary events (policy — implementing measure — emission reduction) is not always clear.
Implementation body specified	++	The responsible bodies (i.e.: those which passed the policies) are listed in the NC2 and the recent report by Ecofys/ANPA. However, due to organisational changes in the new Italian government it is likely that some responsibilities for implementation will change. <sup>3</sup>
Quantitative assessment of implementation	++	
Interaction with other P&Ms discussed	+	Only partly addressed

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

<sup>1</sup> See Second National Communication, p. 93–134

<sup>2</sup> Important recent documents containing information on the status of implementation are:

1) Progress report on mitigation options of energy related CO<sub>2</sub> emissions (Contaldi, 1999): The degree of implementation of measures described in the NC2, p.148 is provided in Annex 1 of the Progress report.

2) Presentation by GC. Tosato (1999) containing details on the combined energy/carbon tax, which has been suspended in order to compensate for the effects of the high oil prices.

3) Report by Ecofys and ANPA July 2001, "Evaluation of National Climate Change Policies in EU member states, Country Report Italy". Details the expected emission reductions by 2010 associated with currently implemented policies and measures.

4) standards and guidelines for the use of the most efficient energy devices and the reduction of energy consumption in space heating and air conditioning (NC2, p.320–321),

5) the "National Program for Research on Climate" (NC2, p.320) and

6) the combined quota and certificate system for electricity produced from renewable energy sources, which has been introduced as an element of the "Decreto Bersani" in November 1999.

<sup>3</sup> Depending on the policy and measure, the following bodies are involved: Interministerial Committee for Economic Planning (CIPE), Ministry of Environment, Ministry of Education, University and Scientific and Technological Research, Ministry of Public Works, Ministry of Industry, Ministry of Agriculture, Ministry of Transport.

**Table 2: Information provided on projections**

<b>Category of information</b>	<b>Level of information provided</b>	<b>Comments</b>
Scenarios considered	++	<p>The following four scenarios have been distinguished:</p> <ul style="list-style-type: none"> <li>• The 'trend' scenario which is the reference scenario (2010 emission = +13.3 % relative to 1990)</li> </ul> <p>Three target driven scenarios, which result from sets of specific technical measures are also presented:</p> <ul style="list-style-type: none"> <li>• Scenario A: Modernisation and local environment protection (2010 emission = -1.3 % relative to 1990)</li> <li>• Scenario B: European Union Objectives (2010 emission = -7 % relative to 1990)</li> <li>• Scenario C: Further interventions (2010 emission = -12.5 % relative to 1990)</li> </ul> <p>The underlying economic assumption was not varied in the different scenarios.</p>
Expressed relative to inventory for previous years	++	Percentage reductions are presented throughout NC2 and absolute reductions are defined in Annex 3.
Starting year	++	1990
Split of projections	++	<p>Projections according to the Scenarios Trend, A, B and C (see above) are provided for the following sectors</p> <ul style="list-style-type: none"> <li>- Energy sector (electricity sector)</li> <li>- Industry</li> <li>- Transportation</li> <li>- Residential/commercial/service</li> <li>- Agriculture and</li> <li>- Waste</li> </ul> <p>for the years 1990, 1995, 2000, 2005 and 2010. For the national totals, a distinction is made between CO<sub>2</sub> and total GHGs (comprising CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O), whereas only CO<sub>2</sub> is reported for the sectors listed above). Methane and N<sub>2</sub>O emissions are reported (p. 157–161) and abatement methods are described, but comprehensive trajectories with a distinction by source categories and scenarios are not yet available. The F gases were not included.</p>
Presentation of results	++	
Description of model (level of detail, approach and assumptions)	++	The MARKAL model (LP model, bottom-up) and econometric models have been used (pp. 145). The use of the latter is not clearly stated in the NC2. However, the assumptions 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 terms.

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

## Assessment of policies and measures

The Second Italian National Communication does not 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:

- Scenario A — Modernisation and local environmental protection;
- Scenario B — European Union Objectives;
- Scenario C — Further interventions.

These scenarios are contrasted by the trend scenario (Second National Communication, Table 5.1, p. 97). In table 3 the results of scenario A have been state instead of the lacking ‘with measures’ and the results of Scenario B instead of the ‘with additional measures’ scenario.

**Table 3: Summary of the effect of policies and measures included in the projections (Mt CO<sub>2</sub>)**

	With measures <sup>4</sup>	With additional measures <sup>5</sup>
Energy sector: production, processing distribution	18	23
Industry sector	13	20
Transport and mobility sector	23	25
Residential, commercial and service sectors	5	18
Agricultural, livestock and forestry sector (incl. bio fuels)	2	3
Waste processing sector	16	20
<b>Total</b>	<b>77</b>	<b>109</b>

These emission reductions have been re-evaluated as part of a study by Ecofys on the basis of policies that are expected to be implemented by 2010 or those that have already been implemented. The conclusion of this study was that as a best estimate the 2010 emissions of Italy would total 587 Mt CO<sub>2</sub> eq., which is an 8.1 % increase in emissions from 1990. Note that this is not necessarily the official Italian estimate.

Table 4 gives the outcome of P&Ms as estimated by Ecofys/ANPA (July 2001). All P&Ms pre-Kyoto are considered as element of the with measures projections whereas all post-Kyoto measures are considered as element of the with additional measures projection.

<sup>4</sup> Scenario A – Modernisation and local environmental protection.

<sup>5</sup> Scenario B – European Union Objectives.

**Table 4: Detailed information on policies and measures**

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
<b>Policies and measure in the with measures projection</b>									
Energy (1.A.1.a.)	CIPE 6 rules. 1992.	Sets rates for electricity produced by renewables and cogeneration and promoted new power plants from these sources.	CO <sub>2</sub>	Economic	Pre				Yes
Energy (1.A.2.)	Pres. Decree 203/88 & guidelines 1990.	Air quality improvement system to protect health and the environment with emission limitations favouring the use of fuel with lower sulphur content. Non-compliance leads to penal action.	CO <sub>2</sub>	Regulatory	Pre				No
Agriculture (4.)	EC regulation 2078/92	Incentives encouraging organic agricultural practices.	N <sub>2</sub> O, CO <sub>2</sub>	Fiscal	Pre	Ministry of Agriculture	-0.2		No
Waste(6.)	Legislative decree 22/97	Objectives for differentiated recycling of paper, moist urban solid waste and dry urban solid waste. Moist portion is composted. Waste recovery and incineration procedures. Set up of eco-environmental platforms for waste storage and processing.		Other	Pre	Ministry for the Environment and CI SPEL- Federambiente			No
Waste (6.)	1996 Financial Law	Tax on landfill waste.		Fiscal	Pre				No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Waste (6.)	DM 25/05/91	As of January 1 <sup>st</sup> 2000, only moist waste materials corresponding to specific technical provisions and recycled, recovered or processed materials may be discharged to landfill.	CH <sub>4</sub>	Regulatory	Pre				No
Waste (6.)	Laws 9 and 10/91, CIP 6/92	Installation of plants powered by waste tip biogas planned.	CH <sub>4</sub>	Other	Pre				No
Energy (1.A.2.)	Law no. 10/91 Art. 19	Compulsory appointment of an energy manager in industrial companies consuming over 10 000 toe in primary resources and services consuming over 1 000 toe/ yr.	CO <sub>2</sub>	Regulatory	Pre	Italian regional government			Yes
<b>Policies and measures in the with additional measures projection</b>									
Energy (1.A.1.a.)	Legislative decree. N. 79 of 16.3.99. (Bersani decree)	Liberalisation of the electricity sector.	CO <sub>2</sub>	Economic	Post	Ministry of Industry, the Authority for Electric Energy and Gas and ENEL S.p.A.			Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Energy (1.A.1.a.)	Decree N. 106 of 29.3.01 Deliberation N°224/00 AEEG	'Photovoltaic roofs' programme: Aims at realising, in the 2000–02 period, photovoltaic plants with power from 1 to 50 kWp connected with the electric low tension distribution network and integrated/placed in building structures placed in Italy	CO <sub>2</sub>	Other	Post	Ministry of the Environment	-0.1		Yes
Energy (1.A.1.a.)	Legislative decrees 24 April 2001	1.6 Mtoe of primary energy savings from efficiency in electricity use. 1.3 Mtoe of primary energy savings from reduction of gas use	CO <sub>2</sub>	Other	Post	Distribution companies	-7.8		Yes
Energy (1.A.1.a.)	Voluntary agreement	Voluntary agreement, signed in year 2000	CO <sub>2</sub>	Voluntary agreement	Post	ENEL	-12.0		No
Energy (1.A.1.a.)	Ministerial decree of 11.11.99	Directives for the enforcement of regulations in the matter of electric energy from renewable sources (legislative decree N. 79 of 16.3.99, art. 11, par. 1,2,3). Sets specific targets for dissemination of renewable sources, to be achieved from 2002, and defines necessary tools to gain them	CO <sub>2</sub>	Regulatory	Post	Ministry of Industry Ministry of the Environment			Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Energy (1.A.2.)	V.A. 1998	Voluntary agreement between the government and Montedison. Series of projects throughout the organisation. Supported by tax relief and reduced legislation by the government.	CO <sub>2</sub>	Voluntary Agreement	Post	Montedison companies	-0.3		No
Energy (1.A.2.)	Governmental aid	Italian Government grant to upgrade 4 steel works to EU standards.	CO <sub>2</sub>	Fiscal (grant)	Post	Ministry of Industry			Yes
Energy (1.A.2.)	Voluntary agreement, 2000	Campaign for increasing the use of efficient lighting systems. Campaign to eliminate over sizing of electric motors. Promotion of heat pumps. Promotion of electrical heating devices for big spaces, of microwave ovens, electric ovens for industry.	CO <sub>2</sub>	Voluntary Agreement	Post	Min. Environment, Min. Industry, Min. trade and ENEL			Yes
Energy (1.A.4.a. & b.)	Voluntary agreement, 2000	Campaign for increasing the use of efficient lighting bulbs. Consists of information campaign and the diffusion of 10000 efficient light bulbs. Promotion of heat pumps, also using water as heating reservoir. Promotion of microwaves ovens.	CO <sub>2</sub>	Voluntary agreement	Post	Min. Environment, Min. Industry, Min. trade and ENEL			Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Energy (1.A.4.a. & b.)	Laws implement Law 10/91 Art. 4C 1–2	Call for criteria to reduce limit values of specific power lost through insufficient insulation	CO <sub>2</sub>	Regulatory	Post		-2.0		Yes
Energy (1.A.4.a. & b.)	Voluntary agreement, 1999	Courses & info. on energy efficiency. DSM measures: heat pumps and cogeneration	CO <sub>2</sub>	Information and education	Post	ENEA and FIRE			Yes
Energy (1.A.4.a. & b.)	CIPE decision 137/98. Voluntary Agreement	Introduction of a self regulating code for the energetic environmental quality of buildings used by the public administration	CO <sub>2</sub>	Voluntary agreement	Post				Yes
Transport (1.A.3.)	Decree of 17.2.00	Financing programmes under the 'Ecological Sundays' initiative aimed at: Realising, integrating or completing public transport systems with zero or low emissions; regulating and controlling town centres' traffic through automated systems and road pricing implementation; promoting of use of low environmental impact fuels	CO <sub>2</sub>	Information, economic & other	Post	Ministry of the Environment			No
Transport (1.A.3.)	Voluntary agreement 1988	Reducing average test cycle CO <sub>2</sub> emissions to 145g CO <sub>2</sub> /km, by 2008	CO <sub>2</sub>	Voluntary agreement	Post	FIAT, Ministry of Environment	-7.0		Yes

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Transport (1.A.3.)	Public transport infrastructure, CIPE decrees 20.11.95, 21.4.99, law N°448/99, N°488/99 and N°388/00	3 series of ministerial decrees financing: 52 projects with total investment cost of €7.3 billion, up to 1999 23 projects with total investment costs of €2.2 billions, approved in 2000 32 projects for a total investment cost of €1.9 billions, budgeted but still to be approved to date	CO <sub>2</sub>	Other	Post		-3.2	Yes	
Transport (1.A.3.)	Law N. 140 Of 11.5.99.	Rules in the matter of production activities: Art. 6: Rules of refinancing and incentives' extension (for purchase of motorcycles and motor vehicles)	CO <sub>2</sub>	Regulation	Post		0.0	No	
Transport (1.A.3.)	Decree Of 28.5.99	Granting of loans to local authorities to finance actions in environmental field provided for by Law N. 426 of 9.12.98. Provision of financial aid for the purchase of vehicles with low or zero emissions (hybrid, electric, gas engine, and LPG cars, with new technology) to public authorities, bodies and private companies which provide public utilities in urban areas with more than 150,000 inhabitants	CO <sub>2</sub>	Fiscal (subsidy)	Post	Ministry of the Environment Ministry of Transport Ministry of the Treasury	-1.0	No	

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Transport (1.A.3.)	Circular N. 2708 Of 30.6.99.	Enforcement of ministerial decree. N. 163 of 21.4.99 for the 'identification of environmental and sanitary criteria according to which traffic limitation measures are taken'. Gives instructions on criteria for the definition of planned measures of traffic limitation or prohibition in order to remove structural causes of car pollution from urban traffic	CO <sub>2</sub>	Other	Post	Ministry of the Environment Town councils			No
Transport (1.A.3.)	Law N. 403 Of 14.10.99	Ratification and implementation of the Convention for Protection of Alps in 1991. Commitment to take measures in the transport sector to reduce negative effects through a shift towards railways, especially for freight	CO <sub>2</sub>	Other	Post	Ministry of Foreign Affairs	-1		No
Transport (1.A.3.)	Ministerial decree Of 25.1.00	'Car free Sundays'. Co-financing of projects aimed at awakening public opinion to sustainable mobility issues, as well as executing interventions targeted to reduce the environmental impact of urban traffic and to promote sustainable mobility systems	CO <sub>2</sub>	Fiscal	Post	Ministry of the Environment			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Transport (1.A.3.)	Law N. 27 Of 18.2.00 (implementing legislative decree N. 484 of 20.12.99, with amendments to law N. 454 of 23.12.97)	Actions for road haulage restructuring and inter-modality development. Promotes the evolution of the national road haulage towards more advanced and competitive service modes and the development of combined transport. Encourages environmental impact reduction according to European Union regulations	CO <sub>2</sub>	Other	Post	Ministry of Transport			Yes
Transport (1.A.3.)	Ministerial decree Of 6.6.00 (Financial aid provided for by law N. 194 of 18.6.98. art. 2, par. 5)Ministry of Environment	Financial aid to regions for the replacement of local public transport buses in service for more than 15 years, the purchase of electric means of passengers' public transport to be used in old town centres and in pedestrian precincts & the purchase of other land and lagoon passenger public transport means	CO <sub>2</sub>	Fiscal	Post		-3.2		No
Transport (1.A.3.)	Ministerial decree Of 7.6.00	Distribution of Funds for cycle mobility under the law N. 366 of 1998. Co-financing of actions for cycle mobility among regions and autonomous provinces	CO <sub>2</sub>	Fiscal	Post	Ministry of Transport & Ministry of Public Works	0.0		No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Transport (1.A.3.)	CIPE Decision N. 113 of 2.11.00	National Plan of Transport and Logistics. Contains proposals for a set of measures for the stabilisation of CO <sub>2</sub> emissions at 2010 to the 1990 levels	CO <sub>2</sub>	Other	Post	Ministry of Transport, Ministry of Public Works, Ministry of Environment			No
Transport(1.A.3.)	Decree of 20.12.00 (to be registered)	Incentives for the conversion to natural gas and LPG of un-catalysed vehicles	CO <sub>2</sub>	Fiscal	Post	Ministry of Environment			No
Transport (1.A.3.)	Decree of 20.12.00 (to be registered)	Car sharing promotion. Promotes a connected and integrated system of local car sharing services	CO <sub>2</sub>	Information	Post	Ministry of Environment			No
Transport (1.A.3.)	Decree of 20.12.00 (to be registered)	Incentive for programmes proposed by company mobility managers. Promotes actions towards demand management of passengers and goods mobility, aimed at reducing the environmental impact of traffic in urban and metropolitan areas. Refers to the 'area mobility managers'	CO <sub>2</sub>	Fiscal	Post	Ministry of the Environment			No
Transport (1.A.3.)	Voluntary agreement of 6.4.01	Bio diesel promotion Provides for the introduction of bio diesel — Diesel oil mixtures in the national supply network, and for their use in public transport and in public interest services.	CO <sub>2</sub>	Voluntary agreement	Post	Ministry of Environment, Ministry of Industry, Ministry of Finance, Ministry for Agricultural ENEA, ANCI, Trade unions, Regions, Environmental groups			No

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (Mt CO <sub>2</sub> )		CCPM
							2010	2020	
Agriculture (4.)	Ministerial decree 86/99.	Code for good agricultural practice		Other	Post				No
Agriculture (4.)	Legislative decree 152/99. (Enforcing EU dir. 91/271 & 91/676)	Provisions to reduce water pollution, for wastewater treatment and for protection of water against agricultural nitrate pollution.	N <sub>2</sub> O	Regulatory	Post		-0.3		No
Agriculture (4.)	Ministerial decree 401/99 Implements Art 1, c.3 & 4 of legislative decree 30.4.98	Provision of financial aid for the production and use of renewable energy sources in the agricultural sector		Fiscal	Post				No
Waste (6.)	Presidential decree 27.4.1999, no. 158	Updated tariff for waste.		Fiscal	Post				No
Energy (1.A.2.)	Voluntary agreement programme	Glass industry to reduce GHG emissions by 10 % by 2005.	CO <sub>2</sub>	Voluntary agreement	Post	Glass industry	0.4		Yes
Energy (1.A.4.a. & b.)	Voluntary agreement, 2000	Standards for electric appliances. Remove inefficient appliances from the market.	CO <sub>2</sub>	Voluntary agreement	Post				Yes
Energy (1.A.4.a. & b.)	Voluntary agreement, 2000	Mandatory labelling for household appliances.	CO <sub>2</sub>	Regulatory	Post				Yes
Energy (1.A.4.a. & b.)	Law 449/97. Art 31	Income tax (IRPEF) deduction of 41 % of expenses for restructuring buildings including renewable energy sources.	CO <sub>2</sub>	Fiscal	Post				Yes



## Evaluation of projections

The projections listed in the Second National Communication range from an increase of 13.3 % in the 2010 reference scenario to a decrease of 12.3 % in the 'further interventions' target-driven scenario C. The Ecofys/ANPA report of July 2001 estimates that under the currently implemented policies an increase of 8.1 % on 1990 emissions will occur by 2010. It is necessary to note that policies and measures that are planned but currently not yet officially accepted are not included here. Thus the final outcome may be a somewhat lower emission level than predicted here.

**Table 5: Summary of projections by gas in 2010 (Mt CO<sub>2</sub>)**

	Base year	With measures <sup>6</sup>	With additional measures <sup>7</sup>
CO <sub>2</sub>	443.1	453.5	425.4
CH <sub>4</sub>	48.9	39.1	35.5
N <sub>2</sub> O	51.0	45.1	45.1
HFC		n/a	N/a
PFC		n/a	N/a
SF <sub>6</sub>		n/a	N/a
<b>Total</b>	<b>543.0</b>	<b>537.7</b>	<b>506.0</b>
% change relative to base year		-1.0 %	-6.8 %

**Table 6: Summary of projections by sector in 2010 (MtCO<sub>2</sub>)**

Sector	Base year <sup>8</sup>	With measures <sup>6</sup>	% change relative to 1990	With additional measures <sup>7</sup>	% change relative 1990 (additional measures)
Energy	163.6	172.0	5.1 %	167.0	2.1 %
Industry	118.1	106.8	-9.6 %	99.8	-15.5 %
Transport	97.5	112.1	15.0 %	110.1	12.9 %
Residential, commercial and service	82.0	74.7	-8.9 %	61.7	-24.8 %
Waste	63.7	61.9	-2.9 %	60.9	-4.5 %
Agriculture	18.1	10.6	-41.6 %	6.6	-63.7 %
<b>Total</b>	<b>543.0</b>	<b>538.0</b>	<b>-0.9 %</b>	<b>506.0</b>	<b>-6.8 %</b>

<sup>6</sup> Scenario A – Modernisation and local environmental protection.

<sup>7</sup> Scenario B – European Union Objectives.

<sup>8</sup> Second National Communication, page 20

**Table 7: Assessment of the target**

	Mt CO <sub>2</sub> equiv.	% of 1990 level (six gas basket)
Base year (from projections)	543.0	100.0 %
Commitment <sup>9</sup>	507.7	93.5 %
With existing P&Ms <sup>10</sup>	587.0	108.1 %
Gap (-ve means no gap)	79.3	14.6 %
Effect of additional P&Ms <sup>11</sup>	506.0	93.2 %

## Description of modelling approach

It is stated in the Second National Communication (p. 145) that two methods have been employed to generate the projections:

1. The well-known MARKAL model, which is a bottom-up model, based on linear programming (optimisation model). MARKAL has been introduced and is being promoted by the International Energy Agency (IEA, Paris). It has been described in many publications, among them IPCC's Second Assessment Report. A MARKAL model tailored to the Italian energy system has been used for the Second National Communication. The main reasons for this choice are given (Second National Communication, p. 145, footnote 11) and the major exogenic data are presented (Second National Communication, p. 146, Table 6.6).
2. Secondly, both econometric models (top-down models) and simulation models have been used policies (Second National Communication, p.145).

The econometric models are used firstly to provide the MARKAL model with input data (particularly detailed sectoral demand values for energy services) and secondly to check the consistency of the results of the MARKAL model (compare Second National Communication, Table 6.7, p. 147). Engineering simulation models are used, therefore to check the potential of measures and top-down models are used to check the consistency of the overall energy data.

Table 8 shows the parameters used in the projections.

<sup>9</sup> According to the Second National Communication total GHG emissions amounted to 543 Mt CO<sub>2</sub> eq. in 1990 (comprising CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O; without emissions from land-use change and Forestry); 6.5% of this total equals 35.3 Mt. In contrast, according to the revised data submitted to the UNFCCC (<http://www.sinanet.anpa.it/aree/atmosfera/emissioni/Emissioni.asp>, 2000), total GHG emissions amounted to 518.5 Mt CO<sub>2</sub> eq. in 1990 (including all six gases of the Kyoto Protocol; without emissions from land-use change and Forestry); 6.5% of this total equals 33.7 Mt.

<sup>10</sup> As estimated by Ecofys/ANPA (July 2001) on the basis of currently implemented measures. The existing measures include ones introduced since Kyoto.

<sup>11</sup> Assumed: Scenario B – European Union Objectives.

**Table 8: Modelling parameters**

Parameter	2000	2010	Unit
Population	57.3	56.5	millions
Population	0.0	-0.1	% per year
Gross national product	1,530	1,865	Thousand billions of LIT 1990
Average growth rate	2.0	2.0	% per year
Industrial production	118	145	1990 = 100
Family use	1,207	1,471	Thousand billions of LIT 1990
<b>International fuel prices</b> (prices in 1995 LIT with 1995 LIT/USD exchange rate)			
Oil	235	270	LIT/kg oil eq.
Gas	220	253	LIT/kg oil eq.
Coal	150	150	LIT/kg oil eq.
<b>National fuel prices (national production)</b>			
Oil	223	259	LIT/kg oil eq.
Gas	220	253	LIT/kg oil eq.
<b>Energy</b>			
Market liberalisation: from year 2002 for electricity, from year 2005 for gas			
Renewables share	2.3	1.5	% per year
Discount rate	7.5	7.5	% per year
<b>Industry — national fuel prices</b>			
Oil (heavy fuel oil, low sulphur)	245		LIT/kg oil eq.
Gas	332		LIT/kg oil eq.
Coal	150		LIT/kg oil eq.
Electricity	97–140		LIT/kWh
Discount rate	10.0	10.0	% per year
<b>Tertiary — national fuel prices</b>			
Oil (diesel oil)	1,590		LIT/kg oil eq.
Gas	1,239		LIT/kg oil eq.
Coal	300		LIT/kg oil eq.
Electricity	350		LIT/kWh
Discount rate	5.0	5.0	% per year
<b>Transport</b>			
Passenger km	878	994	Thousand billions of pass. km
Average growth rate	1.3	1.3	% per year
Freight	272	331	Thousand billions t/km
Average growth rate	2.3	2.2	% per year

## Country conclusions

The activities implemented in Italy to date are expected to stop emissions from increasing more than 8.1 % in comparison to 1990 (Ecofys/ ANPA, 2001). Further, as yet unknown, future policies and measures are likely to reduce this figure further. The uses of Kyoto Mechanisms and sinks have also not yet been included and hold additional potential for emission reductions.

The scenarios evaluated in the Ecofys/ANPA study refer to a higher energy use scenario than the 'reference scenario' considered in the NC2, taking into consideration the energy consumption patterns up to year 2000.

New complete scenario projections on the basis of such changes have not yet been made, but will be available in the Third National Communication, which is due to be published in the fourth quarter of 2002. Further changes in comparison to the Second National Communication will include the addition of the fluorinated gases in emission projections, clearer definition of emissions by sector and gas and a direct link between planned or implemented policy, its implementing measures and the expected emission reductions as a result.