

# Romania

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## 1. SUMMARY

The GHG emission in the Kyoto base year (1989) has been revised very recently following the Expert Review Team's (ERT) recommendations. The revised base year emission is a bit lower than calculated earlier, it is 278.225 Mt CO<sub>2</sub>eq. The current level of GHG emissions is far below the Kyoto target commitment (-8% based on 1989 emission). Considering the economic growth scenarios and the projected GHG emissions, it is obvious that Romania will fulfill its reduction without any additional measures. However, a substantive potential exists for further reducing the carbon intensity of the economy. Fuel switch and increased energy efficiency in the power sector are the most promising areas. In the non-energy sectors, methane emissions from agriculture and waste sectors can be further reduced. The recent MMS from 2007 provides with information on projection regarding the main assumptions included to the models, but description is not detailed. Updated emission projections -taking into consideration the recent inventory data submitted in 2008- are provided for 2010, 2015 and 2020. Projections for 2010 both for WEM and WAM scenario show that greenhouse gases emission will not reach 70 % of the Kyoto base year emission. Romania's WEM and WAM projections for 2010 show 31.6 % and 35.3 % reduction from base year emissions respectively, against a target of an 8 % reduction. Information on national policies and measures is very limited. Romania plans to participate in flexible mechanisms of the Kyoto Protocol, but there is no intention and need for utilizing their effect for compliance.

## 2. GHG PROJECTIONS AND PROGRESS TO KYOTO TARGETS

Kyoto base year is 1989 for all gases. The projections are based on calculations carried out using ENEP (Energy and Power Evaluation Program). The main models used are MAED, WASP, BALANCE and IMPACT. WEM/WAM/WOM scenarios were developed for all gases and sectors for 2010, 2015 and 2020. The Kyoto base year emission was revised based on the expert review; the new value is a bit lower than submitted originally by Romania in 2008, it is 278.225 Mt CO<sub>2</sub>eq. Considering the revised Kyoto target, compliance will be achieved without any problem. Projected emission for 2010 (also for 2015 and 2020) is much below the Kyoto target. However GHG emission from energy sector is projected to be increasing for the 2010-2020 period mostly due to the fossil fuels combustion and the use of domestic energy sources as lignite and hard coal.

Table 1 shows projections reference year emissions, while Table 2 shows 1990 data for all gases, from (country's) latest emissions inventory. A correction factor has been applied to the projections in Table 2, as described in section 4. Metadata.

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Table 1 shows, for all gases and main sectors:

- GHG emission projections for the two scenarios “with existing measures” (WEM) and “with additional measures” (WAM), as reported by Romania;
- Historic emissions (in the “reference year”) as reported together with projections.

For Romania the reference year is 2004.

Table 2 shows, for all gases and main sectors:

- 1990 GHG emissions as reported in the latest (2008) GHG emissions inventory (1990-2006);
- Adjusted GHG emission projections for the WEM and WAM scenarios. This adjustment of the projections reported in Table 1 is carried out to allow consistency and comparability between projections and the latest (2008) GHG inventory data<sup>1</sup>. In the case of Romania, the correction factor is small (0.99076).

**Table 1. Summary of reported projections by sector and by gas in 2010 (Mt CO<sub>2</sub>-eq.)**

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF <sub>6</sub> , HFCs and PFCs)			Total		
	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM	Reference year	2010 WEM	2010 WAM
<b>Energy (excl. transport)*</b>	86.8	107.3	101.4	11.7	14.7	13.6	0.4	0.0	0.5	NA	NA	NA	98.9	122.0	115.4
Energy supply	49.0	65.0	61.0	10.9	13.8	12.7	0.2	NE	0.5	NA	NA	NA	60.1	78.8	74.2
Energy – industry, construction	26.6	28.3	27.1	0.0	0.1	0.1	0.1	NE	NE	NA	NA	NA	26.7	28.4	27.2
Energy – other (commercial, residential, agriculture)	11.2	14.0	13.3	0.8	0.8	0.8	0.2	NE	NE	NA	NA	NA	12.1	14.9	14.0

<sup>1</sup> The adjustment consists in applying an adjustment factor to projections from Table 1. This factor is the ratio between total emissions in the reference year as reported in the 2008 GHG inventory report (or, if the reference year is the base-year under the Kyoto Protocol, in the report of the review of the initial report under the Kyoto Protocol) and total emissions in the reference year as reported by the country with projections (Table 1).

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Transport (energy)	14.6	18.9	17.4	0.1	0.1	0.1	0.0	0.5	NE	NA	NA	NA	14.7	19.4	17.4
Industrial processes	15.0	22.2	20.5	0.0	0.0	0.0	3.2	4.1	4.0	0.7	0.6	0.6	18.9	26.9	25.1
Waste	0.1	0.1	0.1	6.6	8.2	8.0	0.6	0.7	0.6	NA	NA	NA	7.3	8.9	8.8
Agriculture	NA	NA	NA	7.6	8.0	7.7	12.6	7.0	6.8	NA	NA	NA	20.2	15.1	14.5
Other	0.3	0.3	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.3	0.3	0.3
<b>Total (excl. LULUCF)</b>	<b>116.7</b>	<b>148.8</b>	<b>139.6</b>	<b>25.9</b>	<b>30.9</b>	<b>29.5</b>	<b>16.9</b>	<b>12.3</b>	<b>11.9</b>	<b>0.7</b>	<b>0.6</b>	<b>0.6</b>	<b>160.2</b>	<b>192.6</b>	<b>181.5</b>

### Key:

Reference year: 2004

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

Source: Source: Romania's MM submission, 2007.

**Table 2. Summary of projections by sector and by gas in 2010 compared to 1990 emissions (MtCO<sub>2</sub>eq)**

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF <sub>6</sub> , HFCs and PFCs)			Total		
	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM
<b>Energy (excl. transport)</b>	140.8	106.3	100.4	23.5	14.5	13.5	0.3	NE	0.5	NA	NA	NA	164.6	121.0	114.5
Energy supply	97.8	64.4	60.4	23.1	13.7	12.6	0.2	NE	0.5	NA	NA	NA	121.1	78.1	73.6
Energy – industry, construction	32.0	28.0	26.8	0.0	0.1	0.1	0.1	NE	NE	NA	NA	NA	32.1	28.1	26.9
Energy – other (commercial, residential, agriculture)	11.0	13.9	13.1	0.3	0.8	0.8	0.1	NE	NE	NA	NA	NA	11.4	14.7	13.9
Transport (energy)	7.6	18.7	17.2	0.0	0.1	0.1	0.0	0.7	NA	NA	NA	NA	7.7	19.3	17.3
Industrial processes	23.1	21.9	20.3	0.0	0.0	0.0	5.0	4.1	3.9	2.1	0.6	0.6	30.2	26.6	24.9
Waste	NA	0.1	0.1	6.7	8.1	8.0	0.6	0.6	0.6	NA	NA	NA	7.3	8.8	8.7

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Agriculture	NE	NA	NA	14.7	7.9	7.7	22.7	7.0	6.7	NA	NA	NA	37.4	14.9	14.4
Other	0.5	0.3	0.3	NA	NA	NA	NE	NA	NE	NA	NA	NA	0.5	0.3	0.3
<b>Total (excl. LULUCF)</b>	<b>172.0</b>	<b>147.4</b>	<b>138.3</b>	<b>44.9</b>	<b>30.7</b>	<b>29.2</b>	<b>28.6</b>	<b>12.4</b>	<b>11.8</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>247.7</b>	<b>190.9</b>	<b>180.0</b>

**Key:**

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

**Source:** Romania's MM submission, 2007, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

**Table 3: Summary of projections by sector and by gas in 2010 compared to 1990 emissions (index 100 = reference year)**

	Carbon dioxide			Methane			Nitrous oxide			F-gases (SF6, HFCs and PFCs)			Total		
	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM	1990	2010 WEM	2010 WAM
<b>Energy (excl. transport)</b>	100	75.6	71.4	100	61.9	57.4	100	0.0	149.8	100	NA	NA	100	127.9	120.6
Energy supply	100	65.9	61.9	100	59.2	54.7	100	NA	228.0	100	NA	NA	100	128.8	120.6
Energy – industry, construction	100	87.8	84.1	100	124.1	121.9	100	NA	NA	100	NA	NA	100	129.2	123.7
Energy – other (commercial, residential, agriculture)	100	126.2	119.1	100	7.3	7.2	100	NA	NA	100	NA	NA	100	121.3	114.7
<b>Transport (energy)</b>	100	245.2	225.1	100	284.2	277.7	100	NA	NA	100	NA	NA	100	128.9	118.3
<b>Industrial processes</b>	100	95.3	88.2	100	122.3	117.9	100	81.9	79.0	100	108.6	108.6	100	139.9	130.5
<b>Waste</b>	100	NA	NA	100	120.9	119.2	100	107.5	107.0	100	NA	NA	100	85.9	91.5
<b>Agriculture</b>	100	NA	NA	100	54.1	52.1	100	30.7	29.6	100	NA	NA	100	73.5	70.8
<b>Other</b>	100	53.2	53.2	100	NA	NA	100	NA	NA	100	NA	NA	100	103.7	103.7
<b>Total (excl. LULUCF)</b>	<b>100</b>	<b>85.8</b>	<b>80.5</b>	<b>100</b>	<b>68.3</b>	<b>65.0</b>	<b>100</b>	<b>40.8</b>	<b>NA</b>	<b>100</b>	<b>108.6</b>	<b>108.6</b>	<b>100</b>	<b>119.9</b>	<b>113.4</b>

**Key:**

WEM: 'with existing measures' projection

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WAM: 'with additional measures' projection

**Source:** Romania's MM submission, 2007, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

**Table 4: Summary of projections in 2010 compared to base year emissions under the Kyoto Protocol**

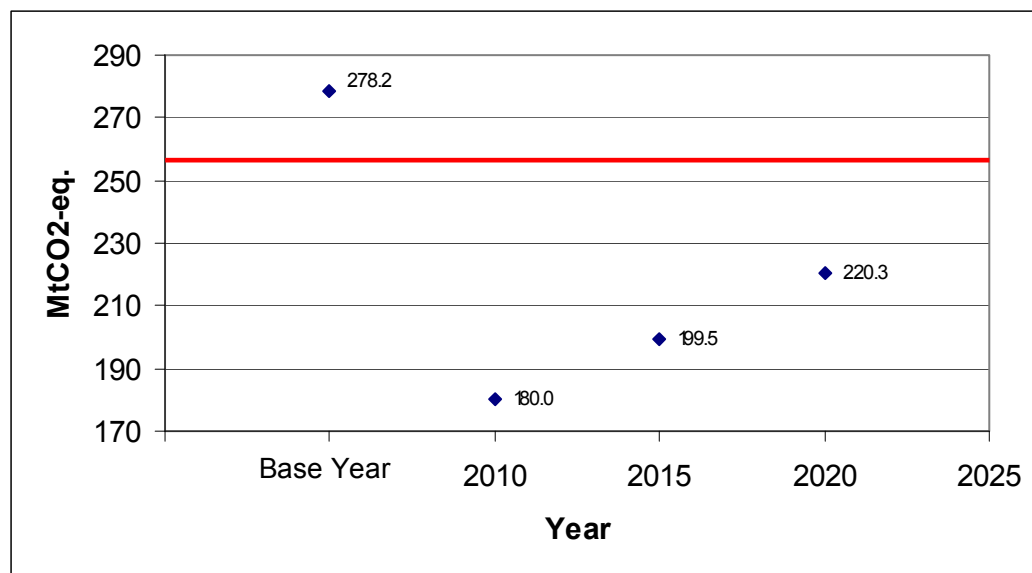
	Unit	Base-year emissions under the Kyoto Protocol	2010 projections 'with existing measures'	2010 projections 'with additional measures'
Total GHG emissions (excluding LULUCF)	Mt CO <sub>2</sub> -eq.	278.2	190.9	180.0
	Index (base-year emissions = 100)	100	68.6	64.7

**Source:** Romania's MM submission, 2007, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

**Note:** \*Kyoto base year is 1989, according to CRF submitted by Romania in 2008 the total GHG emission is 281.8949, which was revised by the Expert Review Team. The revised value is 278.225

**Figure 1. Greenhouse gas projections in 2010, 2015 and 2020 (Mt CO<sub>2</sub>-eq.)**

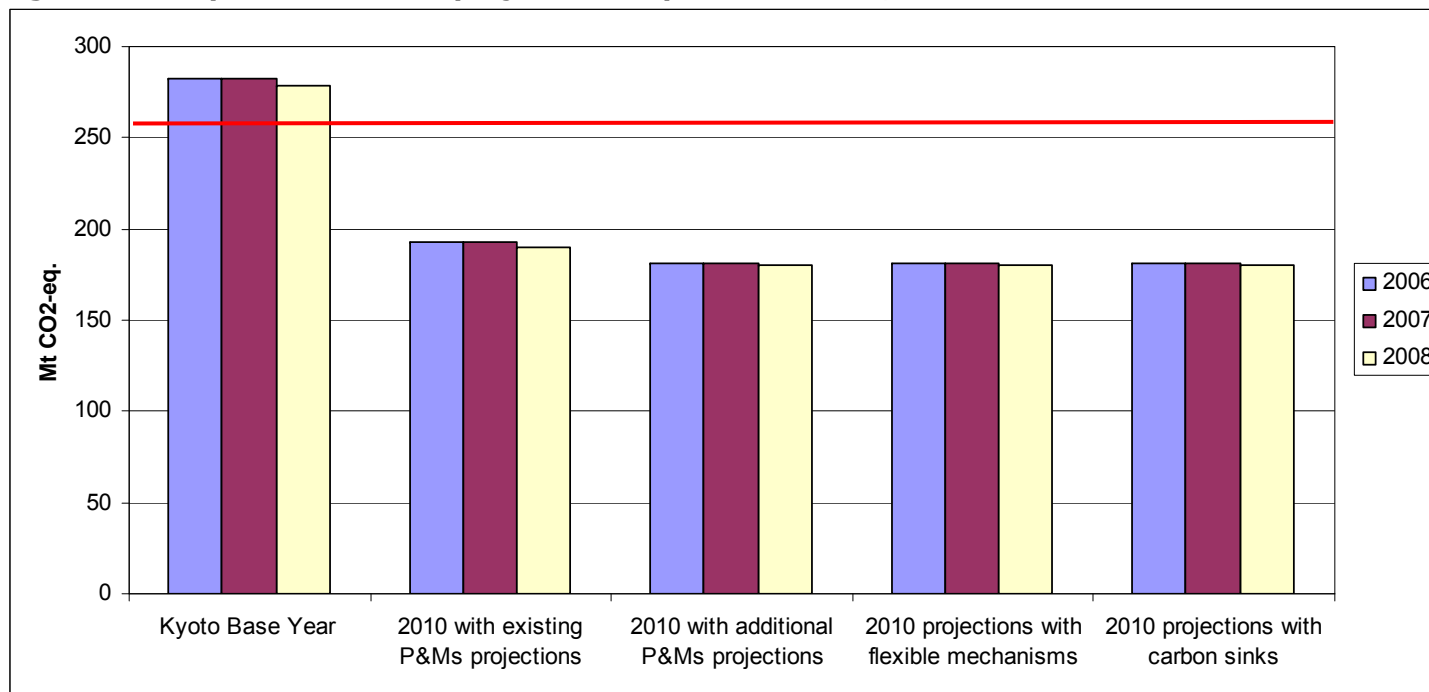
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Source: Romania's MM submission, 2007

In Figure 1, the same correction factor used in Table 2 has been applied to the projections for 2010, 2015 and 2020. The figure shows the WAM scenario.

**Figure 2. Comparison of 2010 projections reported in 2006, 2007 and 2008**



**Source:** Romania's MM submission, 2007.

In 2008 the Kyoto base year emission was revised (reduced compared to the earlier years). The MMS 2007 presents projection data showing no problem for compliance with Kyoto target without effect of flexible mechanisms and carbon sinks. Projected emissions for 2015 and 2020 will remain still very much below the Kyoto target.



### 3. CLIMATE CHANGE MITIGATION POLICIES AND MEASURES

MMS 2007 include very limited information on existing measures and additional measures. It presents several national policies and measures put into force to limit and reduce the GHG emissions in all the sectors, in particular in energy sector. Effects are not quantified, only in some limited case. Interaction with EC Directives is not described, however mentioned in some cease. (Source is MMS 2007, Oiko database)

**Table 5. Summary of the effect of policies and measures included in the 2010 projections (Mt CO<sub>2</sub>-eq.)**

	Top down calculation		Bottom Up calculation	
	Existing Measures	Planned Measures	Existing Measures	Planned Measures
<b>Energy (total, excluding transport)</b>	10.5	7.1	NE	NE
Energy supply	NE	NE	NE	NE
Energy – industry, construction	NE	NE	NE	NE
Energy – other (commercial, residential, agriculture)	NE	NE	NE	NE
<b>Transport (energy)</b>	0.9	1.6	NE	NE
<b>Industrial processes</b>	1.4	1.8	NE	NE
<b>Waste</b>	0.3	0.1	NE	NE
<b>Agriculture</b>	1.2	0.5	NE	NE
<b>Cross-sectoral</b>	NE	NE	NE	NE
Total (excluding LULUCF)	14.3	11.1	NE	NE

Note: The effects of measures detailed above are calculated by determining the difference between total projections in each scenario ('top down calculation'). No 'bottom up calculation' was possible since the effect of individual measures was not reported.

**Source:** Romania's MM submission, 2007, for the top down calculation.

**Table 6. Detailed information on Existing Policies and measures**

Sector	Name	Type	GHG	Status	Absolute Reduction [kt CO <sub>2</sub> eq. p.a.]			Costs [EUR/t]
					2005	2010	2020	
cross-cutting	Joint Implementation	Economic	CO <sub>2</sub>	implemented				

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cross-cutting	EU-Emission trading scheme	Economic	CO <sub>2</sub>	
cross-cutting	Green Investment Scheme Study	Economic	CO <sub>2</sub> ,CH <sub>4</sub> , HFC, N <sub>2</sub> O, PFC, SF <sub>6</sub> ,	expired
cross-cutting Energy consumption Energy supply	Increase Romania's participation in the "Intelligent Energy Europe" programme	Economic Regulatory	CO <sub>2</sub>	adopted
Energy supply	Green certificate system	Economic Regulatory	CO <sub>2</sub>	adopted
Energy supply	Strategy for renewable energy sources		CO <sub>2</sub>	adopted
Energy supply, waste	Promote energy recovery from landfills	Information, Planning, Regulatory	CH <sub>4</sub> , CO <sub>2</sub>	implemented
Energy consumption	Promote cogeneration and energy efficiency in district heating	Economic, Education, Regulatory	CO <sub>2</sub>	implemented
Energy consumption	UNDP/GEF's Energy Efficiency Financing Team in Romania (2003 – 2006)	Economic	CO <sub>2</sub>	expired
Energy consumption	Romanian Energy Efficiency Fund	Economic	CO <sub>2</sub>	implemented
Transport	Manage GHG emissions from transport	Education, Information, Planning	CO <sub>2</sub>	implemented
Transport	Transport strategies	Economic	CO <sub>2</sub>	adopted
Agriculture, Forestry	Introduce integrated land-use systems	Information, Research	CO <sub>2</sub>	implemented

**Source:** Öko Institut, (accessed 06/2008), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>

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**Table 7. Detailed information on Planned Policies and measures**

Sector	Name	Type	GHG	Status	Estimated savings (MtCO <sub>2</sub> -eq.)		Costs (EUR/t)
					2010	2020	
cross-cutting	"Reducers" database for GHG emissions reduction projects	Economic	CO <sub>2</sub> ,CH <sub>4</sub> , HFC, N <sub>2</sub> O, PFC, SF <sub>6</sub> ,	planned			
Energy consumption	Promote energy efficiency among energy end users	Economic Regulatory	CO <sub>2</sub>	planned			
Agriculture, Forestry	National Strategic Plan for Agriculture and Rural Development for 2007-2013		CO <sub>2</sub> ,CH <sub>4</sub> , N <sub>2</sub> O	planned			

**Source:** Öko Institut, (accessed 06/2008), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php>

**Table 8. Status of national policies and measures (PAM) in relation to European common and coordinated policies and measures (CCPM)**

Status	CCPM	Sector
National policies and measures already in force <b>before</b> CCPM was adopted		
Existing national policies and measures <b>re-enforced</b> by CCPM		
<b>New</b> national policies and measures implemented after CCPM was adopted	Kyoto Protocol project mechanisms 2004/101/EC	Crosscutting
	Emissions trading 2003/87/EC	Crosscutting
	Promotion of electricity from RE sources 2001/77/EC	Energy supply
Status of national policy or measure <b>not reported</b>	Integrated pollution prevention and control 96/61/EC	Cross-cutting
	Promotion of cogeneration 2004/8/EC	Energy supply
	Promotion of electricity from RE sources 2001/77/EC	Energy supply
	Taxation of energy products 2003/96/EC	Energy supply
	Internal electricity market 2003/54/EC	Energy supply
	Internal market in natural gas 98/30/EC	Energy supply
	Directives on energy labeling of appliances	Energy consumption
	Ecodesign requirements for energy-using products 2005/32/EC	Energy consumption
	Energy performance of buildings 2002/91/EC	Energy consumption
	End-use efficiency and energy services 2006/32/EC	Energy consumption
	Eco-management & audit scheme (EMAS) EC 761/2001	Energy consumption
	Energy labeling for office equipment 2422/2001	Energy consumption
	Efficiency fluorescent lighting 2000/55/EC	Energy consumption
	Efficiency of hot water boilers 92/42/EEC	Energy consumption
	Promotion of biofuels for transport 2003/30/EC	Transport

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Integrated European railway area (COM(2002)18 final)	Transport
Transport modal shift to rail 2001/12/EC etc.	Transport
Consumer information on cars 1999/94/EC	Transport
Agreement with car manufacturers ACEA etc.	Transport
Marco Polo programme on freight transport	Transport
Motor challenge, voluntary EC programme	Transport
HFCs in mobile air conditioning 2006/40/EC	Transport
F-gas regulation (842/2006)	Industrial Process
Support under CAP (1782/2003)	Agriculture
Support under CAP - amendment (1783/2003)	Agriculture
Rural development support and CAP(2603/1999, 1698/2005 and 1290/2005)	Agriculture
Support scheme for energy crops under CAP (795/2004)	Agriculture
Support for rural development from EAGGF (1257/1999)	Agriculture
Pre-accession measures for agriculture and rural development (1268/1999)	Agriculture
Nitrates directive 91/676/EEC	Agriculture
Landfill directive 1999/31/EC	Waste
Packaging and packaging waste (94/62/EC, 2004/12/EC, 2005/20/EC)	Waste
Directive on waste 2006/12/EC	Waste

Source: MS responses to the CCPMs questionnaire, 2005. Personal communications.

## 4. METADATA

### Sources of information

Romania's national report submitted to the European Commission under Article 3(2) of the Monitoring Mechanism, Decision 280/2004/EC. Report dated 2007.

Base-year emissions from the UNFCCC website,  
[http://unfccc.int/ghg\\_data/kp\\_data\\_unfccc/base\\_year\\_data/items/4354.php](http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php)

Annual greenhouse gas inventory 1990-2006 and inventory report, February 2008  
[http://unfccc.int/ghg\\_data/kp\\_data\\_unfccc/base\\_year\\_data/items/4354.php](http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php)

ECCP Policies and Measures database, Öko Institut, (accessed June 2008),  
<http://www.oeko.de/service/pam/index.php>

### Kyoto base-year emissions

Kyoto base-year emissions (1989) are presented throughout, except Table 1 which presents projections reference year emissions (see below). Kyoto base year emissions of greenhouse gases were calculated using 1989 emissions for carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and fluorinated gases (SF<sub>6</sub>, HFCs and PFCs).

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Kyoto base-year emissions have now been reviewed and set for all EEA countries, including Romania in 2008. It is equal to 278.225 Mt CO<sub>2</sub>eq.

### Projections reference year emissions

Projections reference year (2004) emissions are presented in Table 1.

Projections reference year emissions are defined as projections-consistent emissions data for a given historic year, as chosen by the Member State. Inventory recalculations from year to year may mean that latest inventory data cannot be compared with projections based on older inventory data. Where such an inconsistency has arisen, MS projections have been corrected by applying the following formula, in Table 2:

Corrected projection = reported projections \* latest inventory total GHG emissions / Table 1 reported total GHG emissions for the same reference year

### Quality of Reporting

Member State reporting in the sources detailed above was assessed semi-qualitatively. Scoring was attributed according to the level of detail and clarity: from 0 (representing not reported) to +++ (representing very detailed and/or clear reporting). Guidance used for this assessment included the reporting requirements laid down in:

EU legislation: Monitoring Mechanism (280/2004/EC) and Implementing Provisions (2005/166/EC)

UNFCCC reporting guidelines for national communications available in English, French, Spanish ("Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications - FCCC/CP/1999/7")

The following tables detail reporting considered to be best practice for the purposes of this assessment.

Information provided	Example of good practice
Policy names	Clear names and description provided with unique identifier.
Objectives of policies	Good description of objectives
Types of policies	Type of policy instrument specified e.g. regulatory, fiscal
Which greenhouse gases?	Specifies which gases each PAM affects
Status of Implementation	Clear for each PAM: planned, adopted, implemented, expired
Implementation body	Clear which authorities are responsible for implementation
Quantitative assessment of emission reduction effect and cost of policies	Almost all PAMs are actually quantified. Total effect of all PAMs specified. WOM projection provided.
Interaction with other national and EU level policies	Detailed discussion and analysis of policy interactions.
Measures implementing community legislation	Report details which national policies are implementing individual pieces of EU legislation.
Arrangements for flexible mechanisms	Details arrangements for use of flexible mechanisms.

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Balance between domestic action and flexible mechanisms	Regarding reductions required to meet Kyoto target, details proportion to result from domestic action and flexible mechanisms.
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Category of Information	Example of good practice
Projection scenarios	"With measures" and "with additional measures" projections required, "without measures projection" optional.
Policies included in each projection	Clear presentation of the policies included in each projections scenario.
Expressed relative to historic reference year data	Projections are presented alongside consistent historic emissions.
Starting year	Starting year and emissions used as basis for for projections is detailed.
Split of projections	Projection split by all 6 gases (or F-gases together), all sectors and years
Presentation of results	Clear, both tables and graphs provided and/or used excel reporting template.
Description of methodologies	Description of approach, model and assumptions
Sensitivity analysis	Was an analysis carried out to determine the sensitivity of projections to variance in the input parameters? Are high medium and low scenarios presented?
Discussion of uncertainty	Is an uncertainty range for the projections provided?
Details of parameters and assumptions	Are parameters as required under Monitoring Mechanism 280/2004/EC reported?
Indicators for projections	Are indicators for projections as required under Monitoring Mechanism 280/2004/EC reported?

**Table 9. Information provided on policies and Kyoto flexible mechanisms**

Information provided	Level of information provided	Comments
Policy names	+++	Clear names and description provided with unique identifier.
Objectives of policies	++	Description of objectives is not always clear
Types of policies	+++	Type of policy instrument specified e.g. regulatory, fiscal
Which greenhouse gases?	+++	Specifies which gases each PAM affects
Status of Implementation	+	Limited information on status given
Implementation body	++	Some are missing
Quantitative assessment of emission reduction effect and cost of policies	+	Impact is quantified for limited case
Interaction with other national and EU level policies	+	Very limited information on interaction with EU policies
Measures implementing community legislation	+++	Clear which authorities are responsible for implementation
Arrangements for flexible mechanisms	o	no information
Balance between domestic action and flexible mechanisms	o	no information

**Table 10. Information provided on projections**

Category of Information	Level of information provided	Comments
Projection scenarios	+++	"Without measures projection", "with measures" and "with additional measures" projections made.
Policies included in each projection	+	No clear policies are presented, but assumptions for the sectors
Expressed relative to historic reference year data	+	yes, but it is not clear
Starting year	+	Starting year and emission used is not clear
Split of projections	+++	Projection split by all 6 gases (or F-gases together), all sectors and years
Presentation of results	++	Tables are provided
Description of methodologies	++	For WEM and WAM scenarios both for energy and non-energy sectors
Sensitivity analysis	o	No analyses carried out
Discussion of uncertainty	o	No uncertainty range is provided
Details of parameters and assumptions	+	Very limited information on required parameters
Indicators for projections	o	No information on indicators for projections

**Table 11. Parameters for Projections**

1. Mandatory parameters on projections	2005	2010	2015	2020	Units
<b>Assumptions for general economic parameters</b>					
GDP (value at given years or annual growth rate and base year)	79.26	99.08	123.9	154.8	Billion EUR
Population (value at given years or annual growth rate and base year)	21.7	21.2	20.8	20.5	million
International coal prices at given years in euro per tonne or GJ (Gigajoule)					
International oil prices at given years in euro per barrel or GJ					
International gas prices at given years in euro per m3 or GJ					
<b>Assumptions for the energy sector</b>					
Total gross inland consumption (PJ) (split by oil, gas, coal, renewables, nuclear, other)	28.93	30.8	33	36.5	mtoe
Total electricity (production) consumption by fuel type (oil, gas, coal, renewables, nuclear, other)	50.23	50.05	61.43	69.56	TWh
Energy demand by sector split by fuel (delivered)					
Assumptions on weather parameters, especially heating or cooling degree days					
<b>Assumptions for the industry sector</b>					
<i>For Member States using macroeconomic models:</i>					
The share of the industrial sector in GDP and growth rate					
<i>For Member States using other models:</i>					
The production index for industrial sector					
<b>Assumptions for the transport sector</b>					
<i>For Member States using macroeconomic models:</i>					
The growth of transport relative to GDP					



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<i>For Member States using other models:</i>					
The growth of passenger person kilometres					
The growth of freight tonne kilometres					
<b>Assumptions for buildings (in residential and commercial or tertiary sector)</b>					
<i>For Member States using macroeconomic models:</i>					
The level of private consumption (excluding private transport)					
The share of the tertiary sector in GDP and the growth rate					
<i>For Member States using other models:</i>					
The rate of change of floor space for tertiary buildings and dwellings					
The number of dwellings and number of employees in the tertiary sector					
<b>Assumptions in the agriculture sector</b>					
<i>For Member States using macroeconomic models:</i>					
The share of the agriculture sector in GDP and relative growth					
<i>For Member States using other models:</i>					
Livestock numbers by animal type (for enteric fermentation beef, cows, sheep, for manure management pigs and poultry)					
The area of crops by crop type					
Emissions factors by type of livestock for enteric fermentation and manure management (t)					
<b>Assumptions in the waste sector</b>					
Waste generation per head of population or tonnes of municipal solid waste					
The organic fractions of municipal solid waste					
Municipal solid waste disposed to landfills, incinerated or composted (in tonnes or %)					
<b>Assumptions in the forestry sector</b>					
Forest definitions					
Areas of:					
managed forests					
unmanaged forests					

<b>2. Recommended parameters on projections</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>Units</b>
<b>Assumptions for general economic parameters</b>					
GDP growth rates split by industrial sectors in relation to 2000					
Comparison projected data with official forecasts					
<b>Assumptions for the energy sector</b>					
National coal, oil and gas energy prices per sector (including taxes)					
National electricity prices per sector as above (may be model output)					
Total production of district heating by fuel type					
<b>Assumptions for the industry sector</b>					
Assumptions fluorinated gases:					
Aluminium production and emissions factors					
Magnesium production and emissions factors					
Foam production and emissions factors					
Stock of refrigerant and leakage rates					
<i>For Member States using macroeconomic models:</i>					
Share of GDP for different sectors and growth rates					
Rate of improvement of energy intensity (1990 = 100)					
<i>For Member States using other models:</i>					

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Index of production for different sectors					
Rate of improvement or index of energy efficiency					
<b>Assumptions for buildings (in residential and commercial / tertiary sector)</b>					
<i>For Member States using macroeconomic models:</i>					
Share of tertiary and household sectors in GDP					
Rate of improvement of energy intensity					
<i>For Member States using other models:</i>					
Number of households					
Number of new buildings					
Rate of improvement of energy efficiency (1990 = 100)					
<b>Assumptions for the transport sector</b>					
<i>For Member States using econometric models:</i>					
Growth of transport relative to GDP split by passenger and freight					
Improvements in energy efficiency split by vehicle type					
Improvements in energy efficiency split by vehicle type, whole fleet/new cars					
Rate of change of modal split (passenger and freight)					
Growth of passenger road kilometres					
Growth of passenger rail kilometres					
Growth of passenger aviation kilometres					
Growth of freight tonne kilometres on road					
Growth of freight tonne kilometres by rail					
Growth of freight tonne kilometres by navigation					
<b>Assumptions for the agriculture sector</b>					
<i>For Member States using econometric models:</i>					
Agricultural trade (import/export)					
Domestic consumption (e.g. milk/beef consumption)					
<i>For Member States using other models:</i>					
Development of area of crops, grassland, arable, set-aside, conversion to forests etc					
Macroeconomic assumptions behind projections of agricultural activity					
Description of livestock (e.g. by nutrient balance, output/animal production, milk production)					
Development of farming types (e.g. intensive conventional, organic farming)					
Distribution of housing/grazing systems and housing/grazing period					
Parameters of fertiliser regime:					
Details of fertiliser use (type of fertiliser, timing of application, inorganic/organic ratio)					
Volatilisation rate of ammonia, following spreading of manure on the soil					
Efficiency of manure use					
Parameters of manure management system:					
Distribution of storage facilities (e.g. with or without cover):					
Nitrogen excretion rate of manures					
Methods of application of manure					
Extent of introduction of control measures (storage systems, manure application), use of best available techniques					
Parameters related to nitrous oxide emissions from agricultural soils					
Amount of manure treatment					