

Greece

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1. SUMMARY

Greenhouse gas projections for Greece are presented in the biennial Monitoring Mechanism (MM) submission, June 2008. The MM submission describes a “with existing measures” scenarios and three “with additional measures” scenarios with different assumptions about the energy supply sector (use of renewable energy and lignite plants). This Country Profile uses the intermediate scenario of these three as the “with additional measures” scenario.

Greece’s Kyoto Protocol commitment is a 25% increase in emissions relative to the base year. Under the “with existing measures” and “with additional measures” scenarios, emissions are projected to increase by 23.9% and 22.0% above the base year emissions respectively, against a target of a 25% increase. This means that Greece would meet and indeed overachieve its Kyoto target without the use of Kyoto Mechanisms, although the MM submission states that Greece is still investigating opportunities for their use.

The MM submission provides a good level of detail on both policies and measures and projections, with comprehensive quantification of the effect of policies and measures. Presentation of the effect of policies and measures was clear and detailed, providing useful information for analysis.

Projections were presented clearly and broken down further by sub-sector. However the MM submission provides a “with additional measures” breakdown by gas for the energy sector only. Future reporting could be improved by providing a full sectoral breakdown by gas and sector as well as base year figures alongside the projections (in some cases 1990 and 1995 figures are presented without the combined 1990/1995 base year).

2. GHG PROJECTIONS AND PROGRESS TO KYOTO TARGETS

Base-year emissions of greenhouse gases for Greece are calculated using 1990 emissions for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) and 1995 emissions for fluorinated gases (SF₆, HFCs and PFCs).

Emissions are projected to increase from the base year to 2010, 2015 and 2020.

In 2010 under the “with existing measures” and “with additional measures” scenarios, emissions are projected to increase by 23.9% and 22.0% above the base year emissions respectively. The increase is mostly driven by increases in the transport and energy sectors, with respective increases of 76% and 29% above 1990 emissions in the “with existing measures” scenarios. Emissions are also projected to increase in the industrial processes sector, by 31% above 1990 emissions.

Reductions of 44% and 14% below 1990 emissions are expected in the waste and agriculture sectors respectively in both the “with existing measures” and “with additional measures” scenarios. Policies and measures contributing to the reductions are described in section 3 of the Country Profile.

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 Greece;
- Historic emissions (in the “reference year”) as reported together with projections. For Greece, the reference year is 1990.

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 data¹. In the case of Greece, the correction factor is very small (1.00007).

¹ 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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Table 1. Summary of reported projections by sector and by gas in 2010 (Mt CO₂-eq.)

	Carbon dioxide			Methane			Nitrous oxide			F-gases			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
Energy (excl. transport)	NE	80.3	79.1	NE	0.1	0.1	NE	0.5	0.5	NA	NA	NE	77.6 *	80.9	79.3
Energy supply	NE	54.3	52.6	NE	0.0	0.0	NE	0.2	0.2	NA	NA	NE	NE	54.5	52.8
Energy – industry, construction	NE	10.5	11.1	NE	0.0	0.0	NE	0.1	0.1	NA	NA	NE	NE	10.6	11.2
Energy – other (commercial, residential, agriculture)	NE	15.6	15.4	NE	0.1	0.1	NE	0.2	0.2	NA	NA	NE	NE	15.9	15.7
Transport (energy)	NE	24.9	24.5	NE	0.2	0.2	NE	0.6	0.6	NA	NA	NE	NE	25.8	25.3
Industrial processes	6.9	8.6	NE	0.0	0.0	NE	0.7	0.3	NE	1.2	2.7	NE	8.8	11.6	11.6
Waste	0.0	0.0	NE	4.1	2.1	NE	0.3	0.4	NE	NA	NA	NA	4.4	2.5	2.5
Agriculture	NA	NA	NA	3.5	3.5	NE	10.1	8.1	NE	NA	NA	NE	13.5	11.6	11.6
Other	0.2	0.2	0.2	NE	NE	NE	NE	NE	NE	NE	NE	NE	0.2	0.2	0.2
Total (excl. LULUCF)	82.4	114.1	NE	9.0	5.9	NE	12.0	9.9	NE	1.2	2.7	NE	104.6	132.6	130.5

Key:

Reference year: 1990

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

* Energy **including** transport

Source: Greece's MM submission, June 2008.

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Table 2. Summary of projections by sector and by gas in 2010 compared to 1990 emissions (MtCO₂-eq.)

	Carbon dioxide			Methane			Nitrous oxide			F-gases			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
Energy (excl. transport)	60.9	80.3	79.1	1.3	0.1	0.1	0.7	0.5	0.5	0.0	0.0	NA	63.0	81.0	79.3
Energy supply	42.4	54.3	52.6	1.2	0.0	0.0	0.1	0.2	0.2	NA	NA	NA	43.7	54.5	52.8
Energy – industry, construction	10.4	10.5	11.1	0.0	0.0	0.0	0.1	0.1	0.1	NA	NA	NA	10.4	10.6	11.2
Energy – other (commercial, residential, agriculture)	8.1	15.6	15.4	0.1	0.1	0.1	0.6	0.2	0.2	NA	NA	NA	8.8	15.9	15.7
Transport (energy)	14.4	24.9	24.5	0.1	0.2	0.2	0.2	0.6	0.6	NA	NA	NA	14.7	25.8	25.3
Industrial processes	6.9	8.6	NE	0.0	0.0	NE	0.7	0.3	NE	1.2	2.7	NA	8.8	11.6	11.6
Waste	0.0	0.0	NE	4.1	2.1	NE	0.3	0.4	NE	NA	NA	NA	4.4	2.5	2.5
Agriculture	NA	NA	NA	3.5	3.5	NE	10.1	8.1	NE	NA	NA	NA	13.5	11.6	11.6
Other	0.2	0.2	0.2	NE	NE	NE	NE	NE	NE	NA	NA	NA	0.2	0.2	0.2
Total (excl. LULUCF)	82.4	114.1	NE	9.0	5.9	NE	12.0	9.9	NE	1.2	2.7	NA	104.6	132.6	130.5

Key:

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

Source: Greece's MM submission, June 2008, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

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

	Carbon dioxide			Methane			Nitrous oxide			F-gases			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
Energy (excl. transport)	100	131.8	129.2	100	8.5	8.3	100	68.5	68.5	100	NA	NA	100	128.6	126.0
Energy supply	100	127.9	123.9	100	1.2	1.2	100	171.9	166.1	100	NA	NA	100	124.6	120.6
Energy – industry, construction	100	100.8	106.0	100	60.0	63.3	100	192.6	203.9	100	NA	NA	100	101.2	106.4
Energy – other (commercial, residential, agriculture)	100	191.9	186.5	100	107.4	103.9	100	37.7	37.7	100	NA	NA	100	181.0	176.0
Transport (energy)	100	173.5	170.3	100	176.0	172.7	100	375.0	367.6	100	NA	NA	100	175.8	172.6
Industrial processes	100	124.5	NE	100	193.8	NE	100	39.6	NE	100	224.1	NA	100	131.1	131.1
Waste	100	NA	NE	100	51.7	NE	100	115.4	NE	100	NA	NA	100	56.5	56.5
Agriculture	100	NA	NA	100	100.0	NE	100	80.8	NE	100	NA	NA	100	85.7	85.7
Other	100	94.9	94.9	100	NE	NE	100	NE	NE	100	NA	NA	100	94.9	94.9
Total (excl. LULUCF)	100	138.4	NE	100	65.7	NE	100	82.6	NE	100	224.1	NA	100	126.7	124.7

Key:

WEM: 'with existing measures' projection

WAM: 'with additional measures' projection

Source: Greece's MM submission, June 2008, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

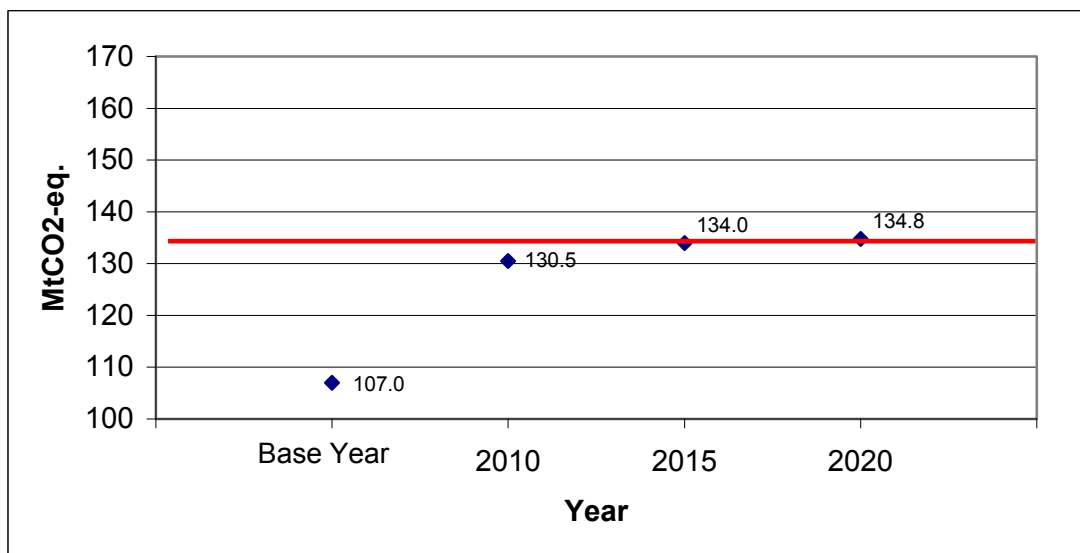
Table 4. Summary of projections in 2010 compared to base year emissions under the Kyoto Protocol

	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 ₂ -eq.	107.0	132.6	130.5
	Index (base-year emissions = 100)	100	123.9	122.0

Source: Greece’s MM submission, June 2008, and Annual greenhouse gas inventory 1990 – 2006, April 2008.

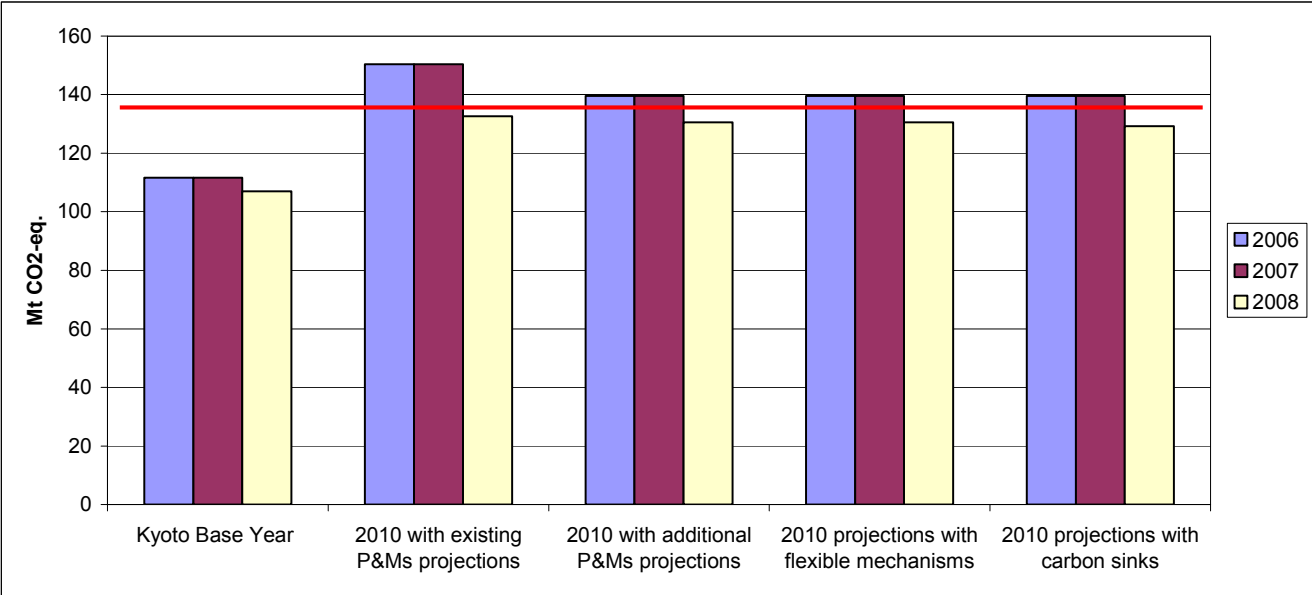
In Figure 1, the same correction factor used in Table 2 has been applied to the “with additional measures” projections for 2010, 2015 and 2020.

Figure 1. Greenhouse gas projections in 2010, 2015 and 2020 (Mt CO₂-eq.)



Source: Greece’s MM submission, June 2008.

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



Source: Greece’s MM submission, June 2008.

3. CLIMATE CHANGE MITIGATION POLICIES AND MEASURES

The MM submission describes a wide range of existing and planned policies and measures (PAMs), of which the largest emissions reductions are expected to be delivered in the **energy supply** sector. Measures include fuel switching to natural gas, and increasing the share of cogeneration (CHP) and renewable energy (including solar, wind and micro-hydroelectricity). Together, existing PAMs in the energy supply sector are expected to deliver 23.7 Mt CO₂-eq. emission reductions in 2010 with a further 4.2 Mt CO₂-eq. from planned PAMs.

The next most significant sector in terms of projected emission reductions savings is **waste**, where Greece's implementation of the EU Landfill Directive is expected to save 2.9 Mt CO₂-eq. in 2010.

Smaller emission reductions are expected in the **transport** sector, namely 1.6 Mt CO₂-eq. from existing PAMs (promotion of biofuels, and agreement with car manufacturers ACEA, KAMA, JAMA) and 0.6 Mt CO₂-eq. from planned PAMs (improvements in transport management and the promotion of public transport). It is noted that the largest increase in emissions to 2010 is projected to occur in the transport sector.

Relatively small savings are also projected from planned PAMs in the **industrial processes** sector from the recovery of F-gases from discarded air-conditioning and refrigeration equipment (0.7 Mt CO₂-eq.) and in the **agriculture** sector where manure management systems and organic farming are expected to reduce GHG emissions by 0.15 Mt CO₂eq

Three existing **cross-sectoral** economic PAMs, the EU ETS, Operational Programme Competitiveness and Operational Programme Environment, were identified in the MM submission but their effect in terms of emission reductions was not quantified.

Table 5. Summary of the effect of policies and measures included in the 2010 projections (Mt CO₂-eq.)

	Top down calculation		Bottom Up calculation	
	Existing Measures	Planned Measures	Existing Measures	Planned Measures
Energy (total, excluding transport)	NE	1.6	24.0	6.4
Energy supply	NE	1.7	23.7	4.2
Energy – industry, construction	NE	-0.5	0.3	0.3
Energy – other (commercial, residential, agriculture)	NE	0.4	0.0	2.0
Transport (energy)	NE	0.5	1.6	0.6
Industrial processes	NE	0.0	0.0	0.7
Waste	NE	0.0	2.9	0.2
Agriculture	NE	0.0	0.0	0.1
Cross-sectoral	NE	0.0	0.0	0.0
Total (excluding LULUCF)	NE	2.1	28.5	8.1

Note: The effects of measures detailed above are calculated firstly by determining the difference between total projections in each scenario ('top down calculation') and secondly by summing the reported effect of individual measures ('bottom up calculation'). A top down calculation of existing measures was not possible as a 'without measures' projection was not provided in Greece's MM submission.

Source: Greece's MM submission, June 2008, for the top down calculation; ECCP Policies and Measures database, June 2008, for the bottom up calculation.

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Table 6. Detailed information on Existing Policies and measures

Sector	Name	Type	GHG	Status	Absolute Reduction [kt CO ₂ eq. p.a.]		
					2005	2010	2020
Cross-cutting	<u>EU Emission trading</u>	Economic	CO ₂	implemented			
Cross-cutting	<u>Operational Programme Competitiveness (OPC)</u>	Economic	CH ₄ CO ₂ HFC N ₂ O PFC SF ₆	implemented			
Cross-cutting	<u>Operational Programme Environment</u>	Economic	CH ₄ CO ₂ HFC N ₂ O PFC SF ₆	implemented			
Energy consumption	<u>Biomass</u>	Economic Regulatory	CO ₂	implemented	288	266	
Energy supply	<u>Natural gas in electricity generation</u>	Economic	CO ₂	implemented	5,964	4,855	
Energy supply	<u>Natural gas in electricity generation from auto-producers</u>	Economic	CO ₂			2,105	
Energy supply	<u>Cogeneration</u>	Economic	CO ₂	implemented	192	165	
Energy supply	<u>Improvements in conventional power generation system</u>	Economic	CO ₂	implemented			
Energy supply	<u>Wind energy</u>	Economic Regulatory	CO ₂	implemented	1,083	947	
Energy supply	<u>Small hydroelectric units</u>	Economic Regulatory	CO ₂	implemented	93	81	

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Energy supply	<u>Large hydroelectric units</u>	Economic	CO ₂	implemented	369	
Energy supply	<u>Photovoltaic units</u>	Economic	CO ₂	implemented	3	2
Energy supply	<u>Solar energy in the residential sector</u>	Economic	CO ₂	implemented	1,227	1,167
Energy supply	<u>Solar energy in the tertiary sector and in industry</u>	Economic	CO ₂	implemented	4	4
Energy supply	<u>Value added tax</u>	Fiscal	CO ₂	implemented		
Energy supply	<u>Natural gas in residential/tertiary sector</u>	Economic	CO ₂	implemented	483	1,215
Energy supply	<u>Natural gas in electricity generation</u>	Economic	CO ₂		2,043	8,670
Energy supply	<u>Cogeneration</u>	Economic	CO ₂			674
Energy supply	<u>Wind energy</u>	Economic Regulatory	CO ₂		765	2,043
Energy supply	<u>Small hydroelectric units</u>	Economic Regulatory	CO ₂		93	343
Energy supply	<u>Natural gas in industry</u>	Economic Fiscal	CO ₂	implemented	592	904
Energy supply	<u>Natural gas in industry</u>	Economic	CO ₂			202
Transport	<u>ACEA Agreement</u>	Voluntary/ negotiated agreement	CO ₂	adopted		446
Transport	<u>Promotion of the use of biofuels</u>	Regulatory	CO ₂	adopted	372	1,194
Waste	<u>EU Landfill Directive</u>	Regulatory	CH ₄			2,888
Waste	<u>Solid waste disposal on land, Decision 50910/2727</u>	Regulatory	CH ₄	implemented		
Waste	<u>Wastewater</u>	Regulatory	CH ₄	implemented		

Source: Öko Institut, (accessed 25 June 2008), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php> and updated with information in Greece's MM submission, 2 June 2008.

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Table 7. Detailed information on Planned Policies and measures

Sector	Name	Type	GHG	Status	Absolute Reduction [kt CO ₂ eq. p.a.]			Costs [EUR/t]
					2005	2010	2020	
Agriculture	<u>Improved manure management systems</u>	Economic	CH ₄	planned		67	64	
Agriculture	<u>Organic farming</u>	Economic	N ₂ O	planned		67	88	
Energy consumption	<u>Improvement of the thermal behaviour of existing buildings</u>	Economic	CO ₂	planned		103	140	
Energy consumption	<u>Systematic maintenance of central heating boilers</u>	Economic	CO ₂	planned		181	191	
Energy consumption	<u>Replacement of central heating boilers</u>	Economic Regulatory	CO ₂	planned		63	104	
Energy consumption	<u>External shading of buildings, night ventilation and use of roof fans</u>	Economic Regulatory	CO ₂	planned		53	79	
Energy consumption	<u>Energy efficient air conditioning units</u>	Regulatory	CO ₂	planned		227	377	
Energy consumption	<u>Energy efficient electric appliances</u>	Regulatory	CO ₂	planned		260	357	
Energy consumption	<u>Replacement of incandescent bulbs by high efficiency ones</u>	Information	CO ₂	planned		1,085	1601	
Energy consumption	<u>Advanced lighting control systems</u>	Economic Regulatory	CO ₂	planned		23	49	
Energy consumption	<u>Energy conservation interventions</u>	Economic	CO ₂	planned		282	296	
Energy supply	<u>Geothermal energy units</u>	Economic	CO ₂	planned		0	52	
Energy supply	<u>Biomass</u>	Economic	CO ₂	planned		394	562	
Energy supply	<u>Natural gas in residential/tertiary sector (space heating and cooling)</u>	Economic	CO ₂	planned		168	252	
Energy supply	<u>Cogeneration</u>	Economic	CO ₂	planned		257	307	

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Energy supply	<u>Wind energy</u>	Economic	CO ₂	planned	1,535	1783
Energy supply	<u>Small hydroelectric units</u>	Economic	CO ₂	planned	581	1261
Energy supply	<u>Photovoltaic units</u>	Economic	CO ₂	planned	27	50
Energy supply	<u>Solar energy in the residential sector</u>	Economic	CO ₂	planned	1,001	1712
Energy supply	<u>Solar energy in the tertiary sector and in industry</u>	Economic	CO ₂	planned	208	206
Industrial Processes	<u>Recovery of F-gases from discarded equipment</u>	Economic	HFC	planned	718	1536
Transport	<u>Improvements in road signalling</u>	Economic	CO ₂	planned	67	148
Transport	<u>Promotion of public means of transport</u>	Economic	CO ₂	planned	542	921
Waste	<u>Flaring of landfill gas</u>	Regulatory	CH ₄	planned	201	149

Source: Öko Institut, (accessed 25 June 2008), ECCP Policies and Measures database, <http://www.oeko.de/service/pam/index.php> and updated with information in Greece's MM submission, 2 June 2008.

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 before CCPM was adopted	Efficiency of hot water boilers 92/42/EEC	Energy consumption
Existing national policies and measures reinforced by CCPM	Promotion of cogeneration 2004/8/EC	Energy supply
	Promotion of electricity from RE sources 2001/77/EC	Energy supply
	Energy performance of buildings 2002/91/EC	Energy consumption
	Eco-management & audit scheme (EMAS) EC 761/2001	Energy consumption
	Agreement with car manufacturers ACEA etc.	Transport
	Landfill directive 1999/31/EC	Waste
	New national policies and measures implemented after CCPM was adopted	Emissions trading 2003/87/EC
Directives on energy labelling of appliances		Energy consumption
Promotion of biofuels for transport 2003/30/EC		Transport
Status of national policy or measure not reported	Kyoto Protocol project mechanisms 2004/101/EC	Cross-cutting
	Integrated pollution prevention and control 96/61/EC	Cross-cutting
	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
	Ecodesign requirements for energy-using products 2005/32/EC	Energy consumption
	End-use efficiency and energy services 2006/32/EC	Energy consumption
	Energy labelling for office equipment 2422/2001	Energy consumption
	Efficiency fluorescent lighting 2000/55/EC	Energy consumption
	Motor challenge, voluntary EC programme	Energy consumption
	Transport modal shift to rail 2001/12/EC etc.	Transport
	Consumer information on cars 1999/94/EC	Transport
	Marco Polo programme on freight transport	Transport
	Integrated European railway area (COM(2002)18 final)	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

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	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
	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.

Greece has not reported the status of national policies and measures in relation to most of the CCPMs so it is difficult to make generalisations about implementation. It is noted that most of the national policies that were in place before related CCPMs or reinforced by CCPMs were in the energy supply and energy consumption sectors. Three CCPMs, namely the Emissions Trading Scheme, Directives on energy labelling of appliances and Promotion of biofuels for transport, introduced new national policies to Greece in the cross-sectoral, energy consumption and transport sectors, respectively.

4. METADATA

Sources of information

Greece's national report submitted to the European Commission under Article 3(2) of the Monitoring Mechanism, Decision 280/2004/EC. Report submitted 2 June 2008.

Greece's Annual greenhouse gas inventory 1990 - 2006 and inventory report, 7 April 2008.

Base-year emissions from the UNFCCC website,
http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php

European Climate Change Programme (ECCP), Database on Policies and Measures in Europe <http://www.oeko.de/service/pam/index.php>

Kyoto base-year emissions

Kyoto base-year emissions are presented throughout, except Table 1 which presents projections reference year emissions (see below). Kyoto base year emissions of greenhouse gases were calculated using 1990 emissions for carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) and 1995 emissions for fluorinated gases (SF₆, HFCs and PFCs).

Kyoto base-year emissions have now been reviewed and set for all EEA countries.

Projections reference year emissions

Projections reference year 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)

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- 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.
Balance between domestic action and flexible mechanisms	Regarding reductions required to meet Kyoto target, details proportion to result from domestic action and flexible mechanisms.

Category of Information	Example of good practice
Projection scenarios	"With existing 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 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 provided
Objectives of policies	++	Most objectives described
Types of policies	+++	
Which greenhouse gases?	+++	Described for all GHG
Status of Implementation	+++	
Implementation body	+++	
Quantitative assessment of emission reduction effect and cost of policies	+++	Comprehensive quantification of policies
Interaction with other national and EU level policies	++	Described for some policies
Measures implementing community legislation	++	Described for some policies
Arrangements for flexible mechanisms	++	Arrangements reported for flexible mechanisms through ETS; other arrangements not reported as Greece is still investigating opportunities to use JI and CDM.
Balance between domestic action and flexible mechanisms	++	

Table 10. Information provided on projections

Category of Information	Level of information provided	Comments
Projection scenarios	+++	“With existing measures” and “with additional measures” scenarios
Policies included in each projection	+++	Tables clearly separate implemented/ adopted and planned PAMs
Expressed relative to base year	++	Not always clear – in some cases 1990 and 1995 figures are presented without the combined 1990/1995 base year
Starting year	2005	Not clear
Split of projections	++	“With additional measures” breakdown by gas given for energy sector only
Presentation of results	+++	Both tables and figures given
Description of methodologies (approach, model and assumptions)	+++	Methods described and main assumptions and parameters given
Sensitivity analysis	+++	Three “with additional measures” scenarios with different energy assumptions
Discussion of uncertainty	+	Mentions certainty in terms of meeting Kyoto targets but not uncertainty range of models
Details of parameters and assumptions	++	Some parameters provided, with discussion of assumptions
Indicators for projections	++	All indicators provided, but without any numerators & denominators.

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Parameters for projections are presented in Table 11. Greece provided data for some of the parameters across the time series 2005, 2010, 2015, 2020.

Table 11. Parameters for Projections

1. Mandatory parameters on projections	2005	2010	2015	2020	average annual % increase 2005-2010	average annual % increase 2010-2015	average annual % increase 2015-2020
Assumptions for general economic parameters							
— GDP (average annual growth rate)					3.26	2.90	2.78
— Population (rate of increase)	0.326	0.334	0.214	0.065			
— International coal prices (Euros per GJ)	1.64	1.51	1.58	1.81			
— International crude oil prices (Euros per GJ)	7.71	8.63	8.99	11.13			
— International gas prices (Euros per GJ)	3.61	5.28	5.64	7.08			
Assumptions for the energy sector							
— Total gross inland consumption (ktoe) (split by oil,gas,coal,renewables,nuclear,other)							
— Total electricity production by fuel type (ktoe) (oil, gas, coal, renewables, nuclear, other)							
— Energy demand by sector split by fuel (average annual rate of increase)							
agriculture					2.45	1.81	1.79
industry - chemical industry production					2.99	2.44	2.29
industry - other					2.95	2.64	2.53
residential							
tertiary					3.00	2.81	2.78
transport					4.44	4.58	3.13
— Assumptions on weather parameters, especially heating or cooling degree days							
Assumptions for the industry sector							
<i>For Member States using macroeconomic models:</i>							
— The share of the industrial sector in GVA and growth rate							
<i>For Member States using other models:</i>							
— The production index for industrial sector							
Assumptions for the transport sector							
<i>For Member States using macroeconomic models:</i>							

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1. Mandatory parameters on projections	2005	2010	2015	2020	average annual % increase 2005-2010	average annual % increase 2010-2015	average annual % increase 2015-2020
— The growth of transport relative to GDP							
For Member States using other models:							
— The growth of passenger person kilometres (bil. P - km)							
— The growth of freight tonne kilometres							
Assumptions for buildings (in residential and commercial or tertiary sector)							
For Member States using macroeconomic models:							
— The level of private consumption (excluding private transport)							
— The share of the tertiary sector in GDP and the growth rate							
For Member States using other models:							
— The rate of change of floor space for tertiary buildings and dwellings							
— The number of dwellings and number of employees in the tertiary sector							
Assumptions in the agriculture sector							
For Member States using macroeconomic models:							
— The share of the agriculture sector in GDP and relative growth							
For Member States using other models:							
— Livestock numbers by animal type thousand							
Dairy cattle	220	215	211	207			
Non dairy cattle	384	393	385	377			
Sheep	8827	8790	8790	8790			
Goats	5509	5552	5721	5895			
Poultry	30587	32847	34522	36283			
— The area of crops by crop type (1000 ha)							
Trees and Vines	1149	1152	1161	1169			
Arable	1864	1869	1883	1896			
Rice	23	28	31	33			
Market gardening	118	118	119	120			
Fodder plants	320	321	323	325			
Fallow land	455	457	460	463			
— Emissions factors by type of livestock for enteric fermentn and manure management (t)							
Assumptions in the waste sector							
— Waste generation - tonnes of municipal solid waste (kg/cap/day)	1.25	1.41	1.57	1.73			

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1. Mandatory parameters on projections	2005	2010	2015	2020	average annual % increase 2005-2010	average annual % increase 2010-2015	average annual % increase 2015-2020
— The organic fraction of municipal solid waste landfilled (%)	64.2	48.8	33.9	25.7			
— Municipal solid waste disposed to landfills, managed sites (kt)	3178	3214	3153	3373			
— Municipal solid waste disposed to landfills, unmanaged sites (kt)	1505	596	225	1.24			
— Recycling (%)	8.7	35.2	48.9	53.7			
Assumptions in the forestry sector							
— Forest definitions							
Areas of:							
— managed forests							
— unmanaged forests							

2. Recommended parameters on projections	2005	2010	2015	2020	Units
Assumptions for general economic parameters					
GDP growth rates split by industrial sectors in relation to 2000					
Comparison projected data with official forecasts					
Assumptions for the energy sector					
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					
Assumptions for the industry sector					
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>					
Index of production for different sectors					
Rate of improvement or index of energy efficiency					

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Assumptions for buildings (in residential and commercial / tertiary sector)					
<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)					
Assumptions for the transport sector					
<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					
Assumptions for the agriculture sector					
<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:					

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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:					
Nitrogen inputs to soils from synthetic fertilizers (kt)	231	218	218	218	kt N
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					