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**COMPLIANCE COMMITTEE**

**CC/ERT/2007/6  
8 February 2007**

**Report of the centralized in-depth review of the fourth national  
communication of Greece**

**Note by the secretariat**

The report of the centralized in-depth review of the fourth national communication of Greece was published on 8 February 2007. For purposes of rule 10, paragraph 2, of the rules of procedure of the Compliance Committee (annex to decision 4/CMP.2), the report is considered received by the secretariat on the same date. This report, contained in the annex to this note, is being forwarded to the Compliance Committee in accordance with section VI, paragraph 3, of the annex to decision 27/CMP.1.



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**Report of the centralized in-depth review of  
the fourth national communication of Greece**

*According to decision 4/CP.8, Parties included in Annex I to the Convention are requested to submit to the secretariat, in accordance with Article 12, paragraphs 1 and 2, of the Convention, a fourth national communication by 1 January 2006. This report reflects the results of the in-depth review of the fourth national communication of Greece conducted by an expert review team in accordance with relevant provisions of the Convention and Article 8 of the Kyoto Protocol.*

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## I. Introduction and summary

### A. Introduction

1. Greece has been a Party to the UNFCCC since 1994 and to its Kyoto Protocol since 2002. Under the Kyoto Protocol, Greece committed itself to limiting the growth in its greenhouse gas (GHG) emissions to 25 per cent above base year level during the first commitment period from 2008 to 2012. Greece's base year under the Kyoto Protocol is 1995 for fluorinated gases and 1990 for all other GHGs.

2. This report covers the centralized in-depth review (IDR) of the fourth national communication (NC4) of Greece, coordinated by the UNFCCC secretariat, in accordance with decision 7/CP.11. The review took place from 15 to 21 October 2006 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Imran Habib Ahmad (Pakistan), Mr. Mohamed El Raey (Egypt), Mr. Domenico Gaudioso (Italy), Mr. Niklas Höhne (Germany), Mr. Normand Tremblay (Canada) and Mr. Paulus Agus Winarso (Indonesia). Mr. El Raey and Mr. Gaudioso were the lead reviewers. The review was coordinated by Mr. Harald Diaz-Bone (UNFCCC secretariat).

3. During the IDR, the expert review team (ERT) examined each part of the NC4. The ERT also evaluated the information contained in Greece's report demonstrating progress (RDP) in achieving its commitments under the Kyoto Protocol, and the supplementary information provided by Greece under Article 7, paragraph 2, of the Kyoto Protocol.

4. In accordance with relevant provisions for review under the Convention and the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1), a draft version of this report was communicated to the Government of Greece, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

### B. Summary

5. The ERT noted that Greece's NC4 complies with the UNFCCC reporting guidelines.<sup>1</sup> As required by decision 22/CP.8, the RDP provides information on the progress made by Greece in achieving its commitments under the Kyoto Protocol. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol<sup>2</sup> is provided in both the NC4 and the RDP.

#### 1. Completeness

6. The ERT noted that the NC4 covers all sections required by the UNFCCC reporting guidelines. The ERT also noted that Greece's RDP contains all parts stipulated by decisions 22/CP.7 and 25/CP.8. Furthermore, the ERT noted that Greece has provided the supplementary information required under Article 7, paragraph 2, except for two reporting elements (see section III.B below).

#### 2. Timeliness

7. The NC4 and the RDP were both submitted on 10 March 2006. Decision 4/CP.8 requested the submission of the NC4 by 1 January 2006, and decision 22/CP.7 set the same date for Parties to submit their RDPs.

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<sup>1</sup> "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications." Document FCCC/CP/1999/7, pages 80–100.

<sup>2</sup> Decision 15/CMP.1, annex, chapter II (FCCC/KP/CMP/2005/8/Add.2).

### 3. Transparency

8. The ERT acknowledged that Greece's NC4 is comprehensive and transparent. The NC4 provides clear information on all aspects of implementation. It is structured following the outline contained in the annex to the UNFCCC reporting guidelines. In the course of the review, the ERT formulated a number of recommendations that could help Greece to further increase the transparency of its reporting, for example, by providing a quantitative estimate of the total effect of its implemented policies and measures for 1995 and 2000 (see also section IV below). The ERT noted that the information contained in the NC4 and the RDP is consistent.

## II. Technical assessment of the reviewed elements

### A. National circumstances relevant to greenhouse gas emissions and removals

9. In its NC4, Greece has provided a description of its national circumstances, how these circumstances affect GHG emissions and removals in Greece, and how national circumstances and changes in these circumstances affect GHG emissions and removals over time. The ERT noted that the most important drivers of emission trends in Greece include overall economic activity (strong growth in gross domestic product (GDP) and private consumption, and the increasing share in the economy of the services sector, particularly tourism, and other transport-intensive sectors) and changes in primary energy use (a considerable increase in total primary energy supply (TPES), the introduction of natural gas since 1997, and the high share of petroleum products and lignite in TPES). Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

**Table 1. Indicators relevant to greenhouse gas emissions and removals for Greece**

	1990 <sup>a</sup>	1995	2000	2004	Change <sup>a</sup> 1990–2000 (%)	Change 2000–2004 (%)	Change <sup>a</sup> 1990–2004 (%)
Population (million)	10.3	10.6	10.9	11.1	5.6	1.3	7.0
GDP (billion 2000 USD PPP)	140.9	149.9	177.7	211.3	26.1	18.9	49.9
TPES (Mtoe)	22.2	23.5	27.8	30.5	25.4	9.5	37.4
GDP per capita (thousand USD 2000 PPP)	13.6	14.1	16.3	19.1	19.3	17.4	40.1
TPES per capita (toe)	2.1	2.2	2.5	2.8	18.8	8.1	28.4
GHG emissions without LULUCF (Tg CO <sub>2</sub> eq)	111.1	113.2	131.8	137.6	18.6	4.5	23.9
GHG emissions with LULUCF (Tg CO <sub>2</sub> eq)	107.9	108.8	128.8	132.2	19.4	2.7	22.6
CO <sub>2</sub> emissions per capita (Mg)	8.2	8.2	9.5	10.0	16.7	4.7	22.3
CO <sub>2</sub> emissions per GDP unit (kg per USD 2000 PPP)	0.60	0.58	0.59	0.52	-2.2	-10.8	-12.8
GHG emissions per capita (Mg CO <sub>2</sub> eq)	10.7	10.6	12.1	12.4	12.3	3.1	15.9
GHG emissions per GDP unit (kg CO <sub>2</sub> eq per USD 2000 PPP)	0.79	0.75	0.74	0.65	-5.9	-12.2	-17.3

*Sources:* GHG emissions data are from Greece's 2006 inventory submission; population, GDP and TPES data are from the IEA.

*Note 1:* The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

*Note 2:* For the abbreviations used, see annex II.

<sup>a</sup> For emissions, base year data are used instead of 1990 data, whereas GDP, TPES and population data are for 1990, which leads to some inconsistency in the calculation of GHG emissions per capita and per GDP unit (see paragraph 1).

10. Greece has provided summary information on GHG emission trends for the period 1990–2003. This information is consistent with the 2005 national GHG inventory submission. Summary tables, including trend tables for emissions in CO<sub>2</sub> equivalent (given in the common reporting format (CRF)), have also been provided in an annex to the NC4.

11. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 23.9 per cent between the base year and 2004, whereas total GHG emissions including net emissions/removals from LULUCF increased by 22.6 per cent (see table 2). This is mainly attributed to growth in CO<sub>2</sub> emissions, which increased by 30.8 per cent over this period, whereas emissions of CH<sub>4</sub> and N<sub>2</sub>O decreased, by 8.1 and 6.8 per cent, respectively. A major part of the increase in total GHG emissions was experienced during the second half of the 1990s (trend for

1995–2000: +16.5 per cent) and during the two years 2002–2003 (+3.2 per cent). Emissions of fluorinated gases accounted for 3.2 per cent of total GHG emissions in the base year for these gases (1995) and for 4.2 per cent in 2004. Table 2 provides an overview of GHG emissions by sector from the base year to 2004 (see also the discussion of sectoral trends in section II.B).

**Table 2. Greenhouse gas emissions by sector for Greece, 1990–2004**

	GHG emissions (Tg CO <sub>2</sub> equivalent)					Change (%)		Shares <sup>a</sup> by sector (%)	
	1990 <sup>b</sup>	1995	2000	2003	2004	1990 <sup>b</sup> –2004	2003–2004	1990 <sup>b</sup>	2004
1. Energy	81.8	84.6	101.5	107.8	108.1	32.3	0.3	75.2	78.6
A1. Energy industries	45.0	46.8	57.1	58.4	59.8	32.8	2.4	41.4	43.4
A2. Manufacturing industries and construction	10.9	10.3	11.1	10.5	9.8	-10.0	-6.8	10.0	7.1
A3. Transport	15.6	17.3	19.8	21.9	22.3	42.6	2.0	14.4	16.2
A4–5. Other	9.0	8.9	11.9	15.4	14.5	61.8	-5.6	8.3	10.6
B. Fugitive emissions	1.3	1.3	1.6	1.7	1.7	38.5	3.4	1.2	1.3
2. Industrial processes	11.2	11.5	13.8	13.9	14.1	26.8	1.4	8.1	10.3
3. Solvent and other product use	0.2	0.2	0.2	0.2	0.2	-8.2	0.2	0.2	0.1
4. Agriculture	13.5	12.5	12.4	12.0	11.9	-11.7	-0.5	12.4	8.7
5. LULUCF	-3.2	-4.4	-3.0	-5.5	-5.4	69.2	-2.3	-2.9	-3.9
6. Waste	4.4	4.4	3.9	3.4	3.3	-26.6	-3.1	4.1	2.4
GHG total with LULUCF	107.9	108.8	128.8	131.8	132.2	22.6	0.4	–	–
GHG total without LULUCF	111.1	113.2	131.8	137.3	137.6	23.9	0.3	–	–

*Note 1:* The changes in emissions and the shares by sector are calculated using the exact (not rounded) values and may therefore differ from values calculated with the rounded numbers provided in the table.

*Note 2:* For the abbreviations used, see annex II.

<sup>a</sup> The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions which was offset by GHG removals through LULUCF.

<sup>b</sup> Base year data are used instead of 1990 data (see paragraph 1).

## B. Policies and measures

12. In its NC4, Greece has provided comprehensive and well-organized information on its package of policies and measures implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. Each sector has its own textual description of the principal policies and measures, supplemented by summary tables on policies and measures by sector. Greece has also provided information on how it believes its policies and measures are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention.

13. The ERT acknowledged the concise presentation of the policies and measures that have been implemented, adopted or planned. This information greatly assisted the ERT in the review of the NC4. Table 3 provides a summary of the information reported on policies and measures of Greece.

**Table 3. Summary information on policies and measures**

<b>Major policies and measures</b>	<b>Examples / comments</b>
<b>Framework policies and cross-sectoral measures</b>	
2nd National Climate Change Programme (NCCP2)	Elaborated and adopted in 2002, the NCCP2 defines the additional policies and measures necessary for Greece to meet its Kyoto Protocol target during the first commitment period
Emissions trading	Implementation of the EU directive on emissions trading. In Greece, the trading system comprises 141 existing industrial installations and 27 new installations that are expected to start operation during the period 2005–2007 (new entrants) (5,000 Gg)
Operational Programmes "Competitiveness" and "Environment" under the 3rd European Community Support Framework	Financing mechanisms for the promotion of investments which among others contribute to the mitigation of GHG emissions. Total budget of the Operational Programme "Competitiveness": EUR 6.6 billion (2.06 billion from the EC, 1.29 billion from the Greek Government, 3.32 billion from private sector). The Operational Programme "Environment" promotes measures to reduce atmospheric pollution, e.g. traffic management, with a budget of EUR 21 million
<b>Energy sector</b>	
Promotion of natural gas	Regulatory measures and economic incentives to further increase the penetration of natural gas in all final-demand energy sectors as well as in power generation, including co-generation (22,049 Gg)
Promotion of RES for electricity and heat production	Implementation of the EU directive on the promotion of RES electricity (Greece has an indicative target for RES electricity production of 20.1 per cent by 2010) Investment-cost subsidies in combination with preferential buy-back tariffs for RES electricity; support for infrastructure projects to assist further exploitation of RES and RES investments in the private and public sectors (8,969 Gg)
Promotion of energy conservation in industry and in the residential–tertiary sectors	Regulatory measures and economic incentives to improve the thermal behaviour of existing buildings, ensure the systematic maintenance of central heating boilers, replace central heating boilers, increase the energy efficiency of air conditioners and other electric appliances, and replace incandescent bulbs by high-efficiency bulbs and advanced lighting control systems (2,277 Gg)
<b>Transport</b>	
Promotion of RES in transport	Implementation of the EU Biofuels Directive (national target: consumption of biodiesel and ethanol to reach 5.75 per cent of total fuel consumption in road transport by 2010) (1,194 Gg)
Shift towards less polluting modes of transport	Promotion of public transport (542 Gg)
Improved energy efficiency of cars	EU voluntary agreement with car manufacturers (446 Gg); age limitation for taxis. Economic incentives for the replacement of taxis
Use of natural gas in transport	Enlargement of natural gas bus fleet in greater Athens (7 Gg)
<b>Industrial processes</b>	
Recovery of HCFCs from final disposal of appliances	Implementation of EU Directive 2003/108/EC (reduction of ozone depleting substances), also applied to HFCs (718 Gg)
<b>Agriculture</b>	
Reduction in the use of mineral fertilizer	Promotion of organic farming (67 Gg)
Manure management	Introduction of wet systems for manure management for cattle and pigs (67 Gg)
<b>Waste</b>	
Waste management	Implementation of EU Landfill Directive: regulatory measures to reduce waste production, to foster recycling of materials, energy recovery, and collection and combustion of landfill gas, and to eliminate waste deposition on unmanaged sites (3,089 Gg)
<b>Forestry</b>	
Prevention and control of forest fires	Regulation by the Ministry of Rural Development (901 Gg)

Note 1: The GHG reduction estimates, given for some measures (in parentheses), are reductions in CO<sub>2</sub> or CO<sub>2</sub> equivalent for the year 2010.

Note 2: For the abbreviations used, see annex II.

### 1. Policy framework and cross-sectoral measures

14. The Ministry for the Environment, Physical Planning and Public Works (MEPPPW) is the main governmental body entrusted with the development and implementation of environmental policy in Greece. The MEPPPW is responsible, among other things, for the formulation of environmental policies, for the coordination of implementation efforts and for ensuring compliance with the current legislative framework. To this end, the MEPPPW cooperates both with other ministries and with regional, prefectural and local authorities. Other ministries are responsible for integrating environmental policy targets within their respective areas.

15. It should be noted that policies and measures and other issues and actions regarding mitigation are discussed in an inter-ministerial committee that includes officials from the MEPPPW; the Ministry of Foreign Affairs; the Ministry of the Interior, Public Administration and Decentralization; the Ministry of Economy and Finance; the Ministry for Development; the Ministry of Mercantile Marine; the Ministry of Transport and Communications; the Ministry of Rural Development and Food; and the Public Power Corporation. The final approval of policies and measures rests with the Council of Ministers.

16. The MEPPPW is developing a system which aims to improve the coordination of competent authorities and the provision of necessary information on the anticipated impacts of the policies and measures in place. This system is intended to address the following: information on policies and measures that have been implemented; indicators to evaluate and monitor the progress of the policies and measures implemented; and provisions to facilitate the compilation of national communications and other reports.

17. **Emissions trading.** Since 2005, Greece has been participating in the European Union (EU) emissions trading system (EU ETS). The ETS covers a number of industrial and energy sector installations which exceed specific capacity limits set by European Community (EC) Directive 2003/87/EC. The major objective of the EU ETS is to help the EU member States to achieve their Kyoto Protocol targets cost-effectively.

18. In Greece, the trading system comprises 139 existing industrial installations and 22 new installations that are expected to start operation during the first trading phase, 2005–2007 (known new entrants). An allowance reserve has also been created which is intended to cover possible unknown new entrants. According to the data presented in the National Allocation Plan (NAP) for the first trading phase, total CO<sub>2</sub> emissions from installations included in the EU ETS are estimated at 228.1 Mt CO<sub>2</sub> over that period, while the amount of total allowances that will be allocated during this period is fixed at 223.2 Mt CO<sub>2</sub>. (A decrease of emissions by 2.1 per cent is required of the enterprises participating in the system.)

19. **Other European Community directives.** A number of actions have also been taken by Greece in order to transpose other EU directives into the national legislative framework, such as Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources (RES) in the internal electricity market; Directive 2003/30/EC promoting the use of biofuels; and Directive 2002/91/EC on the energy performance of buildings.

20. The ERT noted that Greece has put in place a comprehensive approach when it comes to designing and implementing mitigation actions, including the establishment of a system which will evaluate and monitor the progress of the policies and measures implemented.

## 2. Policies and measures in the energy sector

21. The GHG emissions profile of Greece is dominated by the energy sector. In 2004, the energy sector accounted for 78.6 per cent of total national GHG emissions, comprising emissions from energy industries (43.4 per cent), transport (16.2 per cent), energy use in other sectors (10.6 per cent), energy use in manufacturing industries and construction (7.1 per cent) and fugitive emissions from fuels (1.3 per cent).

22. Between 1990 and 2004, energy-related GHG emissions increased by 32.3 per cent, largely due to increases in emissions from energy industries (of 32.8 per cent), transport (of 42.6 per cent) and energy use in other sectors (of 61.8 per cent). These trends broadly follow the increases in energy consumption and other activity indicators. For example, since 1990, the number of registered passenger cars in Greece has more than doubled, to over 3.5 million vehicles in 2003.



23. The strong growth in GDP (of 49.9 per cent over the period 1990–2004) resulted in an increase in electricity consumption in particular. Electricity generation increased continuously over the period 1990–2003, with an average annual growth rate of 4 per cent. As it was largely based on fossil fuels (lignite, 60 per cent; petroleum products, 15 per cent in 2003), this growth in electricity generation had a considerable impact on emissions from energy industries (combustion for electricity generation) and fugitive emissions from lignite mining. The NC4 also states that the limited penetration of energy conservation measures and RES technologies has been another factor behind the ongoing increase of emissions. The ERT noted that in addition per capita emissions from the residential sector almost doubled over the period.

24. Policies and measures implemented in the energy sector can be divided into three categories: the promotion of natural gas; the promotion of RES; and measures in the transport system.

25. **Promotion of natural gas.** The further penetration of natural gas into the Greek energy system is a high priority of Greek energy policy, and its introduction into the national energy system was one of the largest investments ever carried out in Greece – costing EUR 800 million for the period 2000–2006. The total effect of policies and measures so far implemented in this field is estimated at 18.6 Mt CO<sub>2</sub> eq in 2010 and at 24.0 Mt CO<sub>2</sub> eq in 2015. The list of further planned initiatives includes wider exploitation of natural gas combined-cycle power plant units, the installation of new co-generation units in the industrial and tertiary sectors, and further penetration in the sectors of final consumption for 2010. These planned measures are estimated to result in a further reduction of 3.5 Mt CO<sub>2</sub> eq in 2010.

26. The ERT noted that the promotion of natural gas is driven partly by the need to diversify the country's energy sources, including through the establishment of connections between the Greek network and Italy and Turkey. The ERT gained the impression that both the legislative framework and the resources provided seem adequate to ensure the implementation of current and planned actions to the extent required.

27. **Promotion of renewable energy sources.** The NC4 reports that efforts to increase the share of RES in TPES will continue to focus on five areas, including support for wind generation, small and large hydro plants, photovoltaic units, biomass and biofuels, and solar collectors. The total effect of (planned and implemented) policies and measures in this field is estimated at 9.0 Mt CO<sub>2</sub> eq in 2010.

28. **Measures in the transport system.** The transport-related policies and measures reported by Greece include the promotion of RES and natural gas in transport, a shift towards less polluting modes of transport, and enhancement of the energy efficiency of the passenger car fleet. The total effect of (planned and implemented) policies and measures in this field is estimated at 2.2 Mt CO<sub>2</sub> eq in 2010. The ERT noted that the description of measures in the transport sector does not adequately explain the obstacles to implementation. For example, the restrictions on the use of diesel passenger cars in the areas of Athens, Piraeus and Thessaloniki (Law no. 2052/92) may hinder the penetration of low CO<sub>2</sub> emission vehicles into the total fleet along the lines of the voluntary agreements between the European Commission and Japanese, Korean and European car manufacturers for the introduction of low-emissions vehicles. The ERT encourages the Party to provide further details on how it has estimated the effect of these EC agreements with car manufacturers in Greece.

29. The ERT noted that, even though transport-related measures were in place, sectoral emissions have continued to rise considerably (by 42.6 per cent) over the period 1990–2004. A similar observation was made for the residential sector. On the basis of the information included in the NC4, the ERT noted that Greece is aware of the existing potential for emission reductions in these end-user sectors, and steps are being taken to address this potential.

30. The ERT noted that most of the policies and measures reported in the NC4 are triggered, directly or indirectly, by EU legislation or EU financial support for specific tasks, for example through the structural and regional funds. In particular, Greece is to be commended for its progress in the

exploitation of RES, supported by the Operational Programme Energy within the 2nd Community Support Framework, over the period 1994–1999. The NC4 reports that EU legislation and EU financial support are expected to continue to play an important role in the promotion of energy efficiency and RES, but financial support will not be so readily available in future because of the enlargement of the EU. The ERT noted that this might delay the implementation of current programmes, in particular the promotion of RES or measures in the transport sector.

### 3. Policies and measures in other sectors

31. In 2004, the non-energy sectors accounted for 21.4 per cent of total GHG emissions, comprising emissions from industrial processes and solvent use (10.4 per cent), agriculture (8.7 per cent) and waste management (2.4 per cent). Net removals from LULUCF equalled 3.9 per cent of total GHG emissions. Between the base year and 2004, GHG emissions from industrial processes (including solvent and other product use) increased by 26.2 per cent, whereas emissions from agriculture and waste decreased by 11.7 and 26.6 per cent, respectively. Net removals from LULUCF increased by 69.2 per cent over the same period.

32. **Industrial processes.** The increase in emissions from industrial processes is mainly the result of an increase in the production of cement and HCFC-22. Main policies and measures in this sector are the gradual phasing out (on the basis of Regulation EC 2037/2000 for substances that deplete the ozone layer) of the production of HCFC-22, a process which is the main source of HFC-23 emissions, and the recovery of fluorinated gases from discarded air conditioning units (both stationary and mobile) and refrigeration equipment according to the provisions of Presidential Decree 15/2006 (which transposes Directive 2003/108/EC into national law) and actions promoted by the Operational Programme “Competitiveness”. The ERT encourages the Party to report on any effort to reduce GHG emissions from cement production, given that these emissions represented 4.6 per cent of total national GHG emissions in 2004.

33. **Agriculture.** N<sub>2</sub>O emissions from this sector have decreased in line with the reduction in the use of mineral fertilizers. Greece expects this trend to continue due to the promotion of organic farming. The introduction of wet systems for manure management for cattle and pigs is also expected to reduce N<sub>2</sub>O emissions from livestock breeding.

34. **Forestry.** Forest management practices are being strengthened through increased financial support, and measures for the prevention and control of forest fires have also been introduced.

35. **Waste.** Collection and flaring of landfill gas in major solid waste disposal sites has helped to reduce emissions from this sector. Common Ministerial Decision 50910/2727 aims to promote rational waste management at national and local level, also in line with EU directives. The short-term objective is the elimination of unmanaged waste disposal sites.

## C. Projections and the total effect of policies and measures

### 1. Projections

36. The GHG emission projections provided by Greece in the NC4 include a “with measures” scenario up to 2020 and a “with additional measures” scenario up to 2015, and they are presented relative to actual inventory data. Projections are presented on a sectoral basis, using the same sectoral categories as are used in the policies and measures section of the NC4, and on a gas-by-gas basis for all the GHGs – CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, HFCs and SF<sub>6</sub> (treating PFCs and HFCs collectively in each case). In addition, projections are provided in an aggregated format for each sector as well as for a national total, using global warming potential (GWP) values. During the review, Greece provided emission projections related to fuels sold for use in ships and aircraft engaged in international transport, which are reported separately. Table 4 and figure 1 provide a summary of GHG emission projections for Greece.

37. The ERT noted that the NC4 projections for Greece are based on various sources and methodologies. Energy-related emissions were estimated using the Energy and Power Evaluation Program (ENPEP), which is a non-linear equilibrium model. Non-energy emissions were projected by extrapolation of activity data and assumptions on the emissions factors.

**Table 4. Summary of greenhouse gas emission projections for Greece**

	GHG emissions (Tg CO <sub>2</sub> equivalent per year)	Changes compared to base year level (%)
Inventory data 1990 <sup>a</sup>	108.7	-2.1
Inventory data 2004 <sup>a</sup>	137.6	23.9
Kyoto Protocol base year <sup>b</sup>	111.7	-
Kyoto Protocol target	139.6	25.0
“With measures” projections for 2010 <sup>b</sup>	150.4	34.7
“With additional measures” projections for 2010 <sup>b</sup>	139.5	24.9

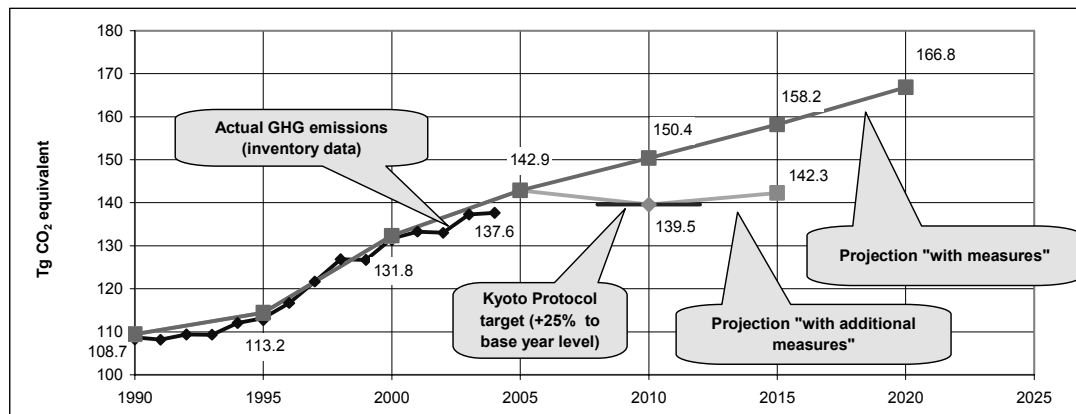
<sup>a</sup> Source: Greece’s 2006 GHG inventory submission; the emissions are without LULUCF.

<sup>b</sup> Source: Greece’s NC4; the projections are for GHG emissions without LULUCF.

Note: For the abbreviations used, see annex II.

38. The NC4 reports that Greece intends to achieve its Kyoto Protocol target through the implementation of domestic measures. According to the “with measures” scenario, implemented policies and measures are projected to reduce total GHG emissions to a level 9.7 per cent above the Kyoto Protocol target by 2010, whereas a set of additional (planned) measures are estimated to further reduce total GHG emissions to just below the Kyoto Protocol target. As already noted in the previous IDR, the aim of the “with additional measures” scenario was to demonstrate that the Kyoto Protocol target could be met by the implementation of domestic policies and measures.

**Figure 1. Greenhouse gas emission projections for Greece**



Source: Greece’s NC4; the projections are for GHG emissions without LULUCF.

39. The ERT recommends that the Party provide the following elements in its future national communications: emission projections related to fuel sold for use in ships and aircraft engaged in international transport; and more detailed information on the methodologies, references and assumptions used for non-energy emissions.

## 2. Total effect of policies and measures

40. The ERT noted that the NC4 does not contain a section on the assessment of aggregate effects of policies and measures, as stipulated by the UNFCCC reporting guidelines (paragraph 5 and annex). Furthermore it does not provide the following reporting elements required by the reporting guidelines: the estimated and expected total effect of implemented and adopted policies and measures (paragraph 39); and an estimate of the total effect of the policies and measures, in accordance with the “with measures”

definition, compared to a situation without such policies and measures, presented in terms of GHG emissions avoided or sequestered, by gas (on a CO<sub>2</sub> equivalent basis), in 1995 and 2000 (paragraph 40). However, in response to a question raised by the ERT during the review, Greece clarified that its estimate of the total effect is equal to the sum of the individual effects of its policies and measures, which are provided in table II.1 of the NC4. Table 5 provides an overview on the total effect of implemented and planned policies and measures as reported by Greece.

**Table 5. Projected effects of planned, implemented and adopted policies and measures in 2010**

	Effect of implemented and adopted measures (Tg CO <sub>2</sub> equivalent)	Relative value (% of base year emissions)	Effect of planned measures (Tg CO <sub>2</sub> equivalent)	Relative value (% of base year emissions)
Energy (without transport)	-25.0	-38	-9.2	-14
Transport	-0.4	-3	-0.6	-4
Industrial processes	0.0	-	-0.7	-7
Solvent	0.0	-	0.0	0
Agriculture	0.0	-	-0.1	-1
Waste	-2.8	-26	-0.2	-4
Total	-28.3	-25	-10.9	-10

Source: Greece's NC4.

Note 1: The total effect of planned policies and measures is defined as the difference between the "with measures" and "with additional measures" scenarios.

Note 2: The total effect of implemented policies and measures is calculated as the sum of individual measures as reported by the Party.

41. As shown in table 5, the total mitigation effect of policies and measures actually implemented is estimated at 28.3 Mt CO<sub>2</sub> equivalent in 2010. An additional effect of 10.9 Mt CO<sub>2</sub> equivalent is attributed to the implementation of planned policies and measures for the same time horizon. The ERT noted that about 90 per cent of these estimated effects are related to policies and measures in the energy sector (excluding transport).

42. The ERT recommends that Greece provide a complete section on the assessment of the aggregate effects of policies and measures, as stipulated by the UNFCCC reporting guidelines (paragraphs 5 and 39–41), in its future national communications.

#### D. Vulnerability assessment, climate change impacts and adaptation measures

43. In its NC4, Greece provides some information on the expected impacts of climate change in the country and on adaptation options. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC4.

**Table 6. Summary information on vulnerability and adaptation to climate change**

Vulnerable area	Examples / comments / adaptation measures reported
Electricity generation	<b>Vulnerability:</b> Significant increase in electricity demand, particularly during summer months, due to increased use of air conditioners <b>Adaptation:</b> NA
Agriculture and food security	<b>Vulnerability:</b> Significant decrease in the production of maize <b>Adaptation:</b> National programme to combat desertification
Biodiversity and natural ecosystems	<b>Vulnerability:</b> NA <b>Adaptation:</b> Protection and management of the natural environment through programmes, projects and actions for protected areas and species
Coastal zones	<b>Vulnerability:</b> Sea-level rise along coastal areas <b>Adaptation:</b> NA
Drought	<b>Vulnerability:</b> Extreme soil degradation <b>Adaptation:</b> National programme to combat desertification
Forests	<b>Vulnerability:</b> NA <b>Adaptation:</b> Combating desertification, especially actions to enhance fire prevention, reforestation, the improvement of degrading forest and forest pastures, and the development of a forest cadastre
Water resources	<b>Vulnerability:</b> Reduction in water quality and quantity <b>Adaptation:</b> Promoting sustainable water resource management and integrated protection of the aquatic environment and aquatic ecosystem

Note: For the abbreviations used, see annex II.

44. The ERT noted that the section of the NC4 on vulnerability and adaptation to climate change impacts reproduces most of the information contained in the previous national communication, except for the new vulnerability assessments for agriculture and coastal zones and description of adaptation options in the energy sector.

45. During 2004–2005, the National Observatory of Athens (NOA) carried out simulations of regional and long-term climate change, applying the PRECIS regional climate model for Greece, which is based on the latest version of the HadCM3 global climate model. The results obtained indicated a significant increase in mean maximum summer temperatures over the entire region. An increase in the order of 7–8°C is projected for the southern regions of Greece, and an increase of between 8 and 10°C in central and northern Greece, over the period 2071–2100. As a result of these temperature increases, demand for electricity is expected to increase by approximately 3.6–5.5 per cent, and yields of maize are expected to decrease by approximately 35–60 per cent over that period. An integrated study on the vulnerability of the coastal zones was not available at the time of the IDR.

46. The ERT noted that the description of vulnerability and adaptation options could be made more complete and transparent. The ERT therefore encourages the Party to develop a national adaptation strategy and to provide a summary of this strategy in its next national communication.

## **E. Financial resources and transfer of technologies**

### **1. Financial resources**

47. In the NC4, Greece provides details of measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5. Greece also provides detailed information on the assistance provided for the developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation to those adverse effects. Furthermore, Greece provides information on financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels. However, the ERT noted that Greece has not provided the following reporting elements required by the UNFCCC reporting guidelines: an indication of what “new and additional” financial resources it has provided pursuant to Article 4, paragraph 3; and clarification of how it has determined such resources as being “new and additional” (table 3 and paragraph 51 of the reporting guidelines).

48. In response to a question raised by the ERT during the review, Greece clarified that the financing of its participation in the Global Environment Facility (GEF) climate “window” is additional to existing commitments and payments to other international finance institutions and is therefore considered “new and additional”. The Greek Ministry of Foreign Affairs in collaboration with the ministries of Economy and Economic Affairs and Environment compiles annually a programme for the provision of official development assistance (ODA) and technical support assistance to developing countries, with emphasis in assisting countries in the Balkans, the Eastern Mediterranean and the Middle East, in which the environment in general and climate are eligible areas.

49. The enhancement of democratic practices and the promotion of sustainable economic development in the neighbouring regions (predominantly Southern and Eastern Europe) represent the main strategic orientation of Greece’s ODA. Greece’s contribution to bilateral development assistance is closely centred on its geographic region and on its own security and welfare, which are closely aligned with stability and economic prosperity in the countries of the Balkans, the Black Sea and the Eastern Mediterranean.

50. In response to a question raised by the ERT during the review, Greece clarified that its bilateral financial ODA is mainly directed to the Balkan countries (45 per cent of total financial support) and to the South-East Mediterranean countries (20 per cent of total financial support). Almost 65 per cent of total financial support is related to capacity-building activities (“soft” technologies), including among

other things water resources management, environmental research and waste management. Table 7 summarizes the information on financial resources provided by Greece.

**Table 7. Summary information on financial resources**

Official development assistance (ODA)	EUR 320 million in 2003
Climate-related aid in bilateral ODA	NA (climate-related bifurcation of ODA not provided)
Climate-related support programmes	USD 3 million
Contributions to GEF (USD million)	Assessment not possible since both pledges and contributions have been listed in the same table
Pledge for third GEF replenishment	EUR 5.73 million
Activities implemented jointly (AIJ)	Not provided
Jl and CDM under the Kyoto Protocol	Not provided
Other (bilateral/multilateral)	NA (climate-related bifurcation of ODA not provided)

*Note:* For the abbreviations used, see annex II.

51. According to the information provided in the NC4, Greece's total ODA, both bilateral and multilateral, in 2003 amounted to EUR 320 million. However, the ERT noted that the NC4 does not provide detailed information on the share of climate-related activities, projects and programmes in Greece's total ODA. The ERT was unable to assess Greece's climate-related projects and programmes.

52. As reported in the NC4, Greece contributed 1,531,700,000 Greek drachmas (GRD) to the second GEF replenishment and has pledged a further EUR 5.73 million to the third GEF replenishment.

53. In response to a question raised by the ERT during the review on Greece's contribution to the Adaptation Fund, Greece clarified that it is currently reviewing all its contributions to the various funds under the Convention and its Kyoto Protocol, including the Adaptation Fund.

54. The ERT recommends that Greece provide an estimate of its climate-related ODA and its contribution to the Adaptation Fund in its next national communication. In order to accurately capture Greece's GEF contributions, the ERT encourages the Party to include only actual contributions up to the reporting period, and indicate pledges to GEF replenishment cycles separately.

## 2. Transfer of technology

55. The ERT noted that Greece has not provided the following reporting elements stipulated by the UNFCCC reporting guidelines: activities related to technology transfer, including success and failure stories (paragraph 55); a clear distinction between activities undertaken by the public sector and those undertaken by the private sector (paragraph 54); its activities for financing access by developing countries to "hard" or "soft" environmentally sound technologies (paragraph 55); and information, in textual format, on the steps taken by the government to promote, facilitate and finance the transfer of technology and to support the development and enhancement of the endogenous capacities and technologies of developing countries (paragraph 56). However, in response to a question raised by the ERT during the review, Greece provided additional information on this matter.

56. Greece recognizes the need to promote, facilitate and finance technology transfer. To this end, the Hellenic International Development Cooperation Department was established in 1999 within the Ministry of Foreign Affairs. According to Presidential Decree no. 224/2000 this department is mainly responsible for the supervision, coordination, monitoring and promotion of assistance for the reorganization and restoration of the infrastructures of developing countries.

57. The ERT noted that Greece, through its membership of the International Energy Agency (IEA) and the EU, facilitates and finances the transfer of technology and supports the development and enhancement of the endogenous capacities and technologies of developing countries. Within the IEA, climate change-related activities are processed in the context of Implementing Agreements which provide

a forum for international cooperation to meet the pressing challenges of energy security, environmental protection, economic growth, and the need for clean energy technologies. Greece has joined several implementing agreements, including those for wind energy, demand-side energy management, and building and community systems.

58. The ERT recommends that Greece report on the steps it has taken to promote technology transfer in its future national communications.

#### **F. Research and systematic observation**

59. In its NC4, Greece provides some information on its actions relating to research and systematic observation, and addresses both domestic and international activities. The NC4 does not reflect action taken to support related capacity-building in developing countries. Furthermore, Greece provides summary information on its Global Climate Observing System (GCOS) activities in accordance with paragraph 64 of the UNFCCC reporting guidelines.

60. Climate-related research is mainly carried out by the NOA and the National Centre for Marine Research (NCMR). In addition, the majority of Greek universities, as well as a small research group in the Academy of Athens, carry out meteorological and climatological research that covers a wide range of research issues. The National Foundation for Agricultural Research of the Ministry of Rural Development and Food carries out some research on the impact of climate change on agricultural activities.

61. The ERT encourages the Party to provide more detailed information on research and systematic observation, including action taken to support related capacity-building in developing countries.

#### **G. Education, training and public awareness**

62. In the NC4, Greece provides some information on its domestic actions relating to education, training and public awareness, as required by the UNFCCC reporting guidelines (paragraph 65). However, the ERT noted that Greece's international activities which contribute to or support capacity-building programmes for developing countries are not reported. The ERT encourages the Party to provide information on its support to capacity-building programmes for developing countries in its next national communication.

### **III. Evaluation of information contained in the report demonstrating progress and of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol**

#### **A. Information contained in the report demonstrating progress**

63. Greece's RDP includes all the sections required by decisions 22/CP.7 and 25/CP.8. The ERT noted that information on Greece's programmes for domestic compliance and enforcement were limited. The ERT found the information contained in the RDP to be consistent to some extent with that provided in the NC4.

64. In the context of the ratification of the Kyoto Protocol in 2002 (Law no. 3017/2002), Greece developed the Second National Climate Change Programme (NCCP2) to achieve its Kyoto target; the programme was adopted by a decision of the Council of Ministers (DCM5/2003). Law no. 3017/2002 designated the MEPPPW as the governmental body responsible for coordination.

65. In recognition of the important role of the LULUCF sector in addressing the greenhouse effect, sustainable management of the Greek forests has been strengthened through government support to forest management activities. Furthermore, the Agricultural Land Forestation programme of the Ministry of

Rural Development and Food has been established, which targets the non-public sector, projects for afforestation of agricultural lands and the improvement of forest land. The ERT noted that 35,840 ha of agricultural lands were afforested during the period 1994–2001, while 4,835 ha were afforested over the two years 2002 and 2003.

### B. Supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

66. Greece has provided most of the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its NC4 and RDP. This information reflects the steps taken by Greece to implement the relevant provisions of the Kyoto Protocol. The supplementary information is placed in different sections of the NC4 and the RDP. Table 8 provides references to the NC4 and RDP chapters in which supplementary information is provided.

**Table 8. Overview of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol**

Supplementary information	Reference
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	RDP, p. 32
Policies and measures in accordance with Article 2	NC4, pp. 67–78; RDP, pp. 33–34
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	NC4, pp. 80–2 RDP, pp. 29–32
Minimization of adverse effects	RDP, pp. 96–97
Information under Article 10	RDP, pp. 34–35
Financial resources	NC4, p. 43

*Note:* For the abbreviations used, see annex II.

67. The ERT noted that Greece has not provided information on the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: a description of the national registry; and a description of national legislative arrangements and administrative procedures relating to the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

## IV. Conclusions

68. During 1990–2004, GHG emission trends in Greece were determined mainly by overall economic activity (strong growth in GDP and private consumption, the increasing share of the services sector, particularly tourism, and other transport-intensive sectors), and changes in primary energy use (a considerable increase in TPES, the introduction of natural gas since 1997, and the high share of petroleum products and lignite in TPES). The energy sector was responsible for 78.6 per cent of total national GHG emissions in 2004. Policies and measures in the energy sector are therefore crucial for Greece's mitigation efforts, and may be subdivided into three categories of policies: the promotion of natural gas; the promotion of renewable energy sources; and measures in the transport system.

69. The GHG emission projections provided by Greece in the NC4 include a “with measures” scenario up to 2020 and a “with additional measures” scenario up to 2015. Overall GHG emissions in 2010 are expected to be 34.7 per cent above the base year level in the “with measures” scenario and 24.9 per cent above the base year level in the “with additional measures” scenario. Greece intends to achieve its Kyoto Protocol target through the implementation of domestic measures. Nonetheless, preparatory activities have been started which could allow Greece to use credits from the Kyoto Protocol mechanisms, mainly as a way to improve the economic efficiency of mitigation efforts, since some of the planned policies and measures potentially involve significant mitigation costs. The ERT noted that Greece estimates that the LULUCF sector will contribute 0.7 Mt CO<sub>2</sub> to its emission reduction target for the first commitment period, but does not include the relevant measures in its 2nd National Climate Change Programme.



70. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Greece's reporting under the Convention and its Kyoto Protocol. The key recommendations<sup>3</sup> are that Greece:

- Provide, in its next national communication, emissions projections related to fuel sold for use in ships and aircraft engaged in international transport, and more information on the methodologies, references and assumptions used for non-energy emissions;
- Report the total effect of its implemented policies and measures;
- Provide, in its next national communication, an estimate of climate-related ODA, as well as its actual contributions to the GEF up to the reporting period, and indicate pledges to GEF replenishment cycles separately;
- Provide, in its next submission, all the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol.

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<sup>3</sup> For a complete list of recommendations, the relevant sections of this report should be consulted.

Annex I**Documents and information used during the review****A. Reference documents**

- UNFCCC. Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications of Annex I Parties. FCCC/SBSTA/1999/7. Available at <<http://unfccc.int/resource/docs/cop5/07.pdf>>.
- UNFCCC. Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol, decision 15/CMP.1. FCCC/KP/CMP/2005/8/Add.2. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>>.
- UNFCCC. Guidelines for review under Article 8 of the Kyoto Protocol, decision 22/CMP.1. FCCC/KP/CMP/2005/8/Add.3. Available at <<http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>>.
- UNFCCC. Report on the in-depth review of the third national communication of Greece. FCCC/IDR.3/GRC. Available at <<http://unfccc.int/resource/docs/idr/GRC03.pdf>>.
- UNFCCC. Synthesis of reports demonstrating progress in accordance with Article 3, paragraph 2, of the Kyoto Protocol. FCCC/SBI/2006/INF.2. Available at <<http://unfccc.int/resource/docs/2006/sbi/eng/inf02.pdf>>.
- UNFCCC. Report of the individual review of the greenhouse gas inventory of Greece submitted in the year 2005. FCCC/ARR/2005/GRC. Available at <<http://unfccc.int/resource/docs/2006/arr/GRC.pdf>>.
- Hellenic Republic. Greece's Fourth National Communication to the United Nations Framework Convention on Climate Change. Available at <<http://unfccc.int/resource/docs/natc/grenc4.pdf>>.
- Hellenic Republic. Greece's Report on Demonstrable Progress under the Kyoto Protocol. Available at <<http://unfccc.int/resource/docs/dpr/grc1.pdf>>.

**B. Additional information provided by the Party**

Responses to questions during the review were received from Ms. Elpida Politi (Ministry of the Environment, Physical Planning and Public Works), including projections of emissions from international transport.

Annex II.**Acronyms and abbreviations**

CDM	clean development mechanism	kg	kilogram (1 kg = 1 thousand grams)
CH <sub>4</sub>	methane	kWh	kilowatt hour
CHP	combined heat and power	LULUCF	land use, land-use change and forestry
CO <sub>2</sub>	carbon dioxide	MEPPPW	Ministry for the Environment, Physical Planning and Public Works
CO <sub>2</sub> eq	carbon dioxide equivalent	Mg	megagram (1 Mg = 1 tonne)
CRF	common reporting format	mg	milligram (1000 mg = 1 gram)
EC	European Community	Mtoe	millions of tonnes of oil equivalent
ERT	expert review team	N <sub>2</sub> O	nitrous oxide
ETS	emissions trading scheme	NA	not available
EU	European Union	NC4	fourth national communication
EUR	euro	NOA	National Observatory of Athens
GCOS	Global Climate Observing System	ODA	official development assistance
GDP	gross domestic product	PFCs	perfluorocarbons
GEF	Global Environment Facility	PPP	purchasing power parities
Gg	gigagram	RDP	Report demonstrating progress under the Kyoto Protocol
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the weighted sum of CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFCs, PFCs and SF <sub>6</sub> without GHG emissions and removals from LULUCF	RES	renewable energy sources
GWP	global warming potential	SF <sub>6</sub>	sulphur hexafluoride
ha	hectare	Tg	teragram (1 Tg = 1 million tonnes)
HCFCs	hydrochlorofluorocarbons	toe	tonnes of oil equivalent
HFCs	hydrofluorocarbons	TPES	total primary energy supply
IDR	in-depth review	UNFCCC	United Nations Framework Convention on Climate Change
IEA	International Energy Agency	USD	US dollar
IPCC	Intergovernmental Panel on Climate Change		
JI	joint implementation		

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