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Framework Convention on Climate Change

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Report of the in-depth review of the fifth national communication of Spain

Parties included in Annex I to the Convention are requested, in accordance with decision 10/CP.13, to submit a fifth national communication to the secretariat by 1 January 2010. In accordance with decision 8/CMP.3, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol shall include in their fifth national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. In accordance with decision 15/CMP.1, these Parties shall start reporting the information under Article 7, paragraph 1, of the Kyoto Protocol with the inventory submission due under the Convention for the first year of the commitment period. This includes supplementary information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. This report presents the results of the in-depth review of the fifth national communication of Spain conducted by an expert review team in accordance with the relevant provisions of the Convention and Article 8 of the Kyoto Protocol.

Contents

I. Introduction and summary

A. Introduction

1. For Spain, the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005. Within the burden-sharing agreement of the European Union (EU) for meeting commitments under the Kyoto Protocol, Spain committed itself to limiting the growth in its greenhouse gas (GHG) emissions to 15 per cent in relation to the base year[1] during the first commitment period from 2008 to 2012.

2. This report covers the in-country in-depth review (IDR) of the fifth national communication (NC5) of Spain, coordinated by the UNFCCC secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 18 to 23 October 2010 in Madrid, Spain, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Mr. Daniel H. Bouille (Argentina), Ms. Yamide Dagnet (United Kingdom of Great Britain and Northern Ireland), Ms. Erika Hasznos (Hungary) and Mr. Walter Oyhantçabal (Uruguay). Ms. Hasznos and Mr. Oyhantçabal were the lead reviewers. The review was coordinated by Ms. Barbara Muik and Mr. Roman Payo (UNFCCC secretariat).

3. During the IDR, the expert review team (ERT) examined each section of the NC5. The ERT also evaluated the supplementary information provided by Spain as a part of the NC5 in accordance with Article 7, paragraph 2, of the Kyoto Protocol. In addition, the ERT reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, which was provided by Spain in its 2010 annual submission under Article 7, paragraph 1, of the Kyoto Protocol.

4. In accordance with decision 22/CMP.1, a draft version of this report was communicated to the Government of Spain, which provided comments that were considered and incorporated, as appropriate, in this final version of the report.

B. Summary

5. The ERT noted that Spain's NC5 complies in general with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol[2] is provided in the NC5. Spain considered most of the recommendations provided in the report on the in-depth review of the fourth national communication of Spain.[3] The ERT commends Spain for its improved reporting.

6. The supplementary information on the minimization of adverse impacts referred to in paragraph 3 above broadly complies with the UNFCCC reporting guidelines and was provided on time, but was not completely transparent. During the review, Spain provided further relevant information for clarification.

[1] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for carbon dioxide, methane and nitrous oxide , and 1995 for perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

[2] Decision 15/CMP.1, annex, chapter II.

[3] FCCC/IDR.4/ESP.

1. Completeness

7. The NC5 covers all sections required by the UNFCCC reporting guidelines, and most of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol, except for information on the efforts Spain is making to implement policies and measures (PaMs) in such a way as to minimize adverse effects, and a description of the arrangements and procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources (see para. 113 below). Further information on these elements was provided by Spain during the review. The NC5 does not include some information required by the UNFCCC reporting guidelines on: emission projections for international aviation and shipping (see para. 73 below); how "new and additional" financial resources have been determined (see para. 96 below); and success and failure stories, including private initiatives, in the transfer of technology (see paras. 101 and 102 below). The ERT recommends that Spain enhance the completeness of its reporting by providing this information in its next national communication.

2. Transparency

8. The ERT acknowledged that Spain's NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, is broadly transparent. The NC5 provides clear information on all aspects of implementation of the Convention and its Kyoto Protocol. The ERT noted that the NC5 is structured following the outline contained in the annex to the UNFCCC reporting guidelines, and supplementary information submitted under Article 7, paragraph 2, of the Kyoto Protocol is easily identifiable. In the course of the review, the ERT formulated a number of recommendations that could help Spain to further increase the transparency of its reporting with regard to: projections and the total effect of PaMs (see paras. 71, 74 and 76 below); and financial resources and technology transfer (see para. 96 below). The ERT also noted that Spain could increase the transparency of its national communication by avoiding an over-lengthy report and by submitting a translation of its national communication into English, in line with the UNFCCC reporting guidelines.

3. Timeliness

9. The NC5 was submitted on 18 December 2009, before the deadline of 1 January 2010 mandated by decision 10/CP.13.

II. Technical assessment of the reviewed elements

A. National circumstances relevant to greenhouse gas emissions and removals, including legislative arrangements and administrative procedures

10. In its NC5, Spain has provided a description of its national circumstances and has elaborated on the framework legislations and key policy documents on climate change. Further technical assessment of the institutional and legislative arrangements for the coordination and implementation of PaMs is provided in chapter II.B.1 of this report.

1. National circumstances

11. In its NC5, Spain has provided a description of its national circumstances, and information on how these national circumstances affect GHG emissions and removals in Spain and how changes in national circumstances affect GHG emissions and removals over time. Information was provided on the government structure, population, geography, climate, economy and relevant economic sectors. The ERT noted that the main drivers of emission trends in Spain include population increase, economic growth, energy demand, growth in the transport sector, tourism and, on the other hand, the recent financial and economic crisis. The ERT encourages Spain to provide more explanatory information on the governance structure, as well as on competences and responsibilities, especially how actions by the Autonomous Communities fit into the national action framework, and to include more information on how national and regional actions are monitored and how feedback is used for developing new policies and for evaluating and strengthening the existing policies. The ERT also strongly encourages Spain to report in further detail on the indicators in key sectors (e.g. industry structure, building stock, forest management practices) and to further elaborate on the relationship between the national circumstances and historic/recent trends. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

12. Spain is a constitutional monarchy. The Spanish Constitution establishes a highly decentralized model of government, in which the Autonomous Communities' regional governments exercise significant powers in climate change related areas, such as transport, industry and the environment. The overall responsibility for climate change policymaking lies with the Ministry for the Environment, Rural Environment and Marine Affairs (MARM) and the Commission for Climate Change Policy Coordination (CCPCC), a body composed of the representatives of some ministries and Autonomous Communities, which is chaired by the State Secretary for Climate Change. In addition, a number of national institutions are also involved in the implementation of climate change policy.

13. The implementation of the Kyoto Protocol is underpinned by several strategic plans and instruments, including the 2007 Urgent Measures Plan, the Strategic Priorities to Address Climate Change and the Spanish Climate Change and Clean Energy Strategy, Horizon 2007–2012–2020 (EECCEL). Although a significant part of the implementation of PaMs is deferred to the regional level, the Autonomous Communities do not have individual emission reduction targets. Another important element of the legislative framework is the implementation by Spain of the EU legislation (regulations, directives and decisions), including those related to the EU emissions trading scheme (EU ETS). Further legislative arrangements and administrative procedures, including those for the national system and the national registry, are presented in chapters II.A.2, II.A.3 and II.B of this report.

14. The NC5 of Spain provides a summary of information on GHG emission trends for the period 1990–2007. This information is consistent with the 2009 national GHG inventory submission and includes trend tables for emissions in carbon dioxide equivalent (CO_2 eq), by sector and by gas. Summary tables for emissions (given in the common reporting format), are also provided in an annex to the NC5. During the review, the ERT assessed the emissions data from the Party's recently submitted 2010 annual submission and has reflected the findings in this report.

Table 1
Indicators relevant to greenhouse gas emissions and removals for Spain

	1990	*1995*	*2000*	*2005*	*2008*	*Change 1990–2000 (%)*	*Change 2000–2008 (%)*	*Change 1990–2008 (%)*
Population (million)	39.01	39.39	40.26	43.40	45.59	3.2	13.2	16.9
GDP (2000 USD billion using PPP)	651.50	702.08	858.54	1 008.17	1 095.37	31.8	27.6	68.1
TPES (Mtoe)	90.09	100.82	121.95	141.83	138.79	35.4	13.8	54.1
GDP per capita (2000 USD thousand using PPP)	16.70	17.82	21.32	23.23	24.03	27.7	12.7	43.9
TPES per capita (toe)	2.31	2.56	3.03	3.27	3.04	31.2	0.5	31.6
GHG emissions without LULUCF (Tg CO_2 eq)	285.12	314.97	380.80	435.11	405.74	33.6	6.6	42.3
GHG emissions with LULUCF (Tg CO_2 eq)	246.30	273.72	334.63	386.46	353.97	35.9	5.8	43.7
CO_2 emissions per capita (Mg)	5.85	6.47	7.63	8.46	7.40	30.3	–2.9	26.5
CO_2 emissions per GDP unit (kg per 2000 USD using PPP)	0.35	0.36	0.36	0.36	0.31	2.1	–13.8	–11.4
GHG emissions per capita (Mg CO_2 eq)	7.31	8.00	9.46	10.03	8.90	29.4	–5.9	21.8
GHG emissions per GDP unit (kg CO_2 eq per 2000 USD using PPP)	0.44	0.45	0.44	0.43	0.37	1.3	–16.5	–15.9

Sources: (1) GHG emissions data: Spain's 2010 GHG inventory submission; (2) Population, GDP and TPES data: International Energy Agency.

Note: 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.

Abbreviations: GDP = gross domestic product, GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, PPP = purchasing power parity, TPES = total primary energy supply.

15. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 42.3 per cent between the base year and 2008. Even though net removals from the LULUCF sector also increased during this period, this increase was too moderate to offset the growth in emissions from the other sectors and overall, the total net GHG emissions including the LULUCF sector increased by 43.7 per cent for the same period. The overall increase in emissions between 1990 and 2008 was mainly attributed to an increase in CO_2 emissions of 47.9 per cent; CO_2 was also the main gas in terms of its share during this period, which was generally greater than 80 per cent. Emissions of methane (CH_4) also increased, by 37.1 per cent due to a strong increase of emissions from waste, while emissions of nitrous oxide (N_2O) decreased by 7.1 per cent. A major part of the increase in emissions in all gases occurred in the period 1996–2007 (e.g. CO_2 emissions increased by 51.7 per cent). Emissions of fluorinated gases (F-gases) accounted for 1.8 per cent of total GHG emissions in 1995 and 1.7 per cent in 2008. Table 2 provides an overview of GHG emissions by sector from 1990 to 2008.

Table 2
Greenhouse gas emissions by sector in Spain, 1990–2008

	GHG emissions (Tg CO_2 eq)						*Change (%)*		*Shares[a] by sector (%)*	
Sector	*1990*	*1995*	*2000*	*2005*	*2007*	*2008*	*1990–2008*	*2007–2008*	*1990*	*2008*
1. Energy	212.23	240.18	288.65	345.40	345.41	318.35	50.0	–7.8	74.4	78.5
A1. Energy industries	77.70	86.67	105.71	126.10	123.15	105.80	36.2	–14.1	27.3	26.1
A2. Manufacturing industries and construction	46.67	53.35	58.48	72.35	70.54	67.39	51.1	–4.5	16.4	16.6
A3. Transport	57.37	66.74	86.36	103.11	110.03	103.51	80.4	–5.9	20.1	25.5
A4.–A5. Other	26.41	29.37	34.00	39.90	37.82	38.19	44.6	1.0	9.3	9.4
B. Fugitive emissions	4.08	4.04	4.10	3.94	3.87	3.46	–15.2	–10.6	1.4	0.9
2. Industrial processes	26.11	27.05	34.23	33.70	34.38	31.34	20.0	–8.8	9.2	7.7
3. Solvent and other product use	1.39	1.34	1.67	1.62	1.58	1.53	10.0	–3.3	0.5	0.4
4. Agriculture	37.74	36.57	44.00	40.57	42.35	38.96	3.2	–8.0	13.2	9.6
5. LULUCF	–38.82	–41.25	–46.17	–48.65	–49.94	–51.77	33.3	3.7	–13.6	–12.8
6. Waste	7.65	9.83	12.24	13.82	14.96	15.57	103.4	4.0	2.7	3.8
7. Other	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GHG total with LULUCF	**246.30**	**273.72**	**334.63**	**386.46**	**388.74**	**353.97**	**43.7**	**–8.9**	**NA**	**NA**
GHG total without LULUCF	**285.12**	**314.97**	**380.80**	**435.11**	**438.68**	**405.74**	**42.3**	**–7.5**	**100.0**	**100.0**

Note: 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.

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry, NA = not applicable.

[a] 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 that was offset by GHG removals through LULUCF.

16. Trends of total GHG emissions were underpinned by GHG emission trends in the energy sector, corresponding to almost 80 per cent of total GHG emissions, driven by the increase in energy demand that was especially noticeable in the transport sector. This increase led to a noticeable change in the share of emissions from transport, from 20.1 per cent in 1990 to 25.5 per cent in 2008, while the share of emissions from agriculture decreased from 13.2 per cent to 9.6 per cent for the same period and the shares of the remaining sectors remained broadly the same. In the period 1990–2008, the growth in emissions from waste was the most pronounced (103.4 per cent), followed by transport (80.4 per cent), manufacturing industries and construction (51.1 per cent) and other energy sectors including residential and commercial (44.6 per cent). An analysis of the key drivers of GHG emission trends in each sector is provided in chapter II.B of this report. Within the energy sector, energy industries accounted for 26.1 per cent of emissions, closely followed by transport (25.5 per cent).

17. The main factors influencing emission trends are the strong population growth (between 2000 and 2008 the population increased by more than 5 million people mostly due to immigration) and the strong economic growth that Spain has experienced since joining the European Economic Community in 1986 and the European Monetary Union in 1999. Between 1994 and 2007, the annual growth in gross domestic product (GDP) varied between 2.4 and 5 per cent. Energy demand has also experienced a high growth rate, and fossil fuels dominated the primary energy supply (around 80 per cent in 2008). Other important drivers were the fast growth of the construction and tourism sector. These factors outweighed the effect of improvements in the energy intensity and the effects of PaMs, in particular those aimed at the promotion of renewable energy. Since 2008, the financial and economic crisis has strongly affected GDP growth (only 0.9 per cent in 2008), and led to a decrease in final energy consumption (–2.3 per cent in 2008 compared to 2007), and together with the strengthened climate change policy to a decrease of GHG emissions (in 2008 and 2009 (provisional data) compared to 2007).

2. National system

18. In accordance with decision 15/CMP.1, Spain has provided in its NC5 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1 (decision 19/CMP.1). The description includes all elements as required in decision 15/CMP.1.

19. In its NC5, Spain did not provide a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contribute to the conservation of biodiversity and the sustainable use of natural resources. During the review, Spain explained that the Spanish Forestry Plan (2003–2032) identifies the following main objectives: the increase of the forest territory through reforestation and afforestation; the improved conservation of the forest territory and the fight against desertification; and the improvement of the carbon absorption capacity of forests, while complying with the principles of sustainability. The Forestry Plan also sets various targets for the conservation of biodiversity, and refers to the network of Natura 2000 protected areas and National Parks as the major elements for protection. The ERT recommends that Spain include this information in its next national communication.

20. During the review, Spain provided additional information on the national system, elaborating on the arrangements for inventory planning and preparation, and the cooperation between various agencies and regional organizations. The ERT concluded that the national system continues to perform its required functions as set out in decision 19/CMP.1.

3. National registry

21. In its NC5, Spain has provided information on its national registry, including a description of how its national registry performs the functions defined in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and how it complies with the requirements of the technical standards for data exchange between registry systems.

22. During the review, Spain provided additional information on the measures put in place to safeguard, maintain and recover registry data, the security measures employed in the registry to prevent unauthorized manipulations and the test procedures related to the performance of the current version of the national registry and on the recording of the changes. The ERT noted that updates of applications, security measures and changes to the national registry software are documented on a regular basis by the MARM and the contracted company responsible for the technical management of the registry (Iberclear).

23. The ERT took note of the conclusion of the standard independent assessment report (SIAR), which recommends that the Party extend the scope of publicly accessible information. During the review, the ERT learned that Spain plans to address this recommendation. The ERT also learned that Spain is planning to improve the security and the public interface of the registry. The ERT recommends that Spain implement the recommendations of the SIAR and report this information in its next national communication.

24. The ERT concluded that Spain's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with decisions 16/CP.10 and 12/CMP.1.

B. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

25. As required by the UNFCCC reporting guidelines, Spain has provided in its NC5 comprehensive information on its package of PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. The information provided was generally complete and improvements have been made since the Party's fourth national communication (NC4). Each sector has its own textual description of the principal PaMs, supplemented by a summary table on PaMs by sector. Spain has also provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals consistent with the objective of the Convention.

26. The NC5 contains, with a few exceptions, a similar set of PaMs to those reported in the NC4. The ERT noted that, since the NC4, the status of some policies has changed from "planned" to "implemented" and some new measures have also been implemented. However, the descriptions in the NC5 are sometimes confusing, because the status of the measures is not described using consistent terms. To enhance transparency, the ERT recommends that Spain provide a consistent set of definitions of the status of the PaMs, in line with the UNFCCC reporting guidelines.

27. The ERT noted that Spain did not provide a description of how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects. During the review, Spain provided information and many examples to illustrate how this issue has been taken into account. The ERT recommends that Spain include such information in its next national communication. The ERT also noted that quantitative estimates of the impacts of PaMs were only partially provided, and that the effects reported were not consistently provided for the same year. Such information on impacts is missing, in particular in the residential, transport and industry sectors, and in general very few estimates of impacts are provided by gas. In many cases, there are no indicators of the progress made so far in the implementation of the PaMs. The ERT encourages Spain to enhance reporting on the effects of PaMs and to include these effects and details of the methodologies used in its next national communication, highlighting, where possible, the overlap between PaMs.

28. Since 2004, climate change has become increasingly important in the agenda of the Spanish Government. To strengthen the institutional arrangements for climate change policy, the Inter-ministerial Group for Climate Change (GICC), headed by the State Secretary of the Ministry of Economy and Finance, was established in 2004 to prepare, assess and follow up climate change decisions and strategies. In 2008, the Government-Delegated Commission for Climate Change (CDGCC), chaired by the Vice-President of the

Government with the participation of 10 ministers, was also created. Since its NC4, Spain has adopted a number of new plans, in addition to its Sustainable Development Strategy, in order to ensure that its Kyoto Protocol target will be met. Furthermore, Spain has in place sizeable and growing support for research and development, in particular on wind and solar power and carbon dioxide capture and storage (CCS). Spain took account of the encouragements of the ERT during the in-depth review of its NC4 by, for example, making efforts to design a set of PaMs specifically for reducing GHG emissions in the waste sector and implementing the necessary monitoring procedures.

29. The Renewable Energy Plan 2005–2010 (PER) and the Spanish Strategy for Energy Savings and Efficiency 2004–2012 ("E4") have contributed substantially to the objectives of the climate change policy of Spain. Spain successfully implemented the PER, which set an ambitious target for the share of renewable energy sources (RES) in primary energy consumption projected to deliver emission reductions of 27.3 Mt CO_2 by 2010. According to the latest figures for 2009 provided by Spain during the review, this target is close to being met (especially with regard to the share of renewables in electricity generation), owing to a comprehensive system of economic support, based on feed-in tariffs and subsidies for innovative projects, which is backed by relevant legislation (see also paras. 45–46 below).

30. In addition, the "E4" has been implemented through two action plans. While the first action plan (for the period 2005–2007) delivered savings of 4.6 Mt CO_2 in 2006, the second plan (for the period 2008–2012) is expected to achieve total emission reductions of 210 Mt CO_2, which equates to 42 Mt CO_2 annually. It is foreseen that the emissions reduction target will be achieved through setting up funds, providing subsidies and enacting relevant legislation and, importantly, the participation of the Autonomous Communities in the management of these funds. (see also paras. 48–49 below) The ERT noted that the expected emission reductions for the second action plan are extremely ambitious considering that the first plan delivered only one tenth of these expected annual reductions.

31. Spain provided some information on the implementation costs of selected PaMs in its NC5. Nevertheless, this information is limited to figures relating to total investment or public funds for mitigation strategies or plans. For example, the "E4" strategy envisages a total investment of EUR 24,098 million, including a public investment of EUR 2,011 million, and the PER envisages EUR 23,599 million for the period 2005-2010, including public investment of EUR 8,492 million. Although the NC5 includes information on the respective estimated emission reductions, there is no discussion of the cost-effectiveness of the PaMs. The ERT noted that Spain's climate change policy could benefit from the consideration of the cost-effectiveness of PaMs during both the planning and the implementation stages, and encourages Spain to report on such considerations in its next national communication, as appropriate. The ERT also noted that Spain was heavily affected by the financial and economic crisis in 2008–2010, which may somewhat limit the possibility to increase funding for climate policies within the next few years. Table 3 provides a summary of the reported information on the PaMs of Spain.

Table 3
Summary of information on policies and measures

Major policies and measures	*Examples/comments*
Policy framework and cross-sectoral measures	
Spanish Climate Change and Clean Energy Strategy, Horizon 2007–2012–2020 (EECCEL)	Includes the strategic framework for climate change action in Spain
Urgent Measures Plan (2007)	Defines urgent actions to strengthen the implementation of climate policy and action, in particular in the areas of energy efficiency and renewable energy among others, to achieve the Kyoto Protocol targets for the first commitment period in 2008–-2012. (2008–2012: 60.45 Mt CO_2 eq)
Strategic Priorities to Address Climate Change	Incorporates the priorities to fulfil the objective of curbing emissions in the most relevant sectors, including transport, waste, residential, energy and forestry
Renewable Energy Plan 2005–2010 (PER)	Aims to boost renewable energy production to reach 30 per cent of electricity production and 12 per cent of primary energy supply by 2010 (27.3 Mt CO_2 eq)
Spanish Strategy for Energy Savings and Efficiency 2004-2012 (“E4”)	Aims to increase energy efficiency in various sectors (2004–2012: 190 Mt CO_2 eq)
Supplementary Measures to the “E4” 2008–2012 (“PA E4+”)	Includes additional measures to those included in the “E4” strategy. (2008–2012: 28 Mt CO_2 eq)
European Union emission trading scheme (EU ETS)	Applies to over 1,000 Spanish installations in the electricity and industry sector, whose emissions account for almost 45 per cent of total greenhouse gas (GHG) emissions (28.04 Mt CO_2 eq)
Policies and measures by sector	
Energy	
Gas and Electricity Plan 2008–2016	Aims to increase the contribution of renewable technologies in the overall energy technology mix and to meet the increasing demand for gas, cogeneration and combined cycle.
Technical Code for Buildings (Royal Decree 314/2006)	Sets the basic requirements for energy savings in buildings
Energy Certification of Buildings (Royal Decree 47/2007)	Defines an energy classification system for new and renovated buildings
Transport	
Strategic Plan for Infrastructure and Transport (PEIT)	Sets the framework for infrastructure planning in the medium and long term and promotes the most efficient modes of transportation (2020: 30 Mt CO_2 eq)
Sustainable Mobility Strategy 2009	Establishes guidelines and measures regarding land-use planning, transport and infrastructure, with special attention given to alternatives to private vehicles use and the use of more efficient and sustainable modes of transport
Automotive Integral Plan	Promotes research and development and financial measures which, among others, support the renewal of the vehicle fleet and promote hybrid electric vehicles
Industrial processes	
Integrated Pollution Prevention and Control (IPPC)	Defines the best available technologies for manufacturing industries
EU regulation on certain fluorinated GHGs (Regulation 842/2006/EC)	Aims to create provisions which prevent and minimize emissions from fluorinated GHGs covered by the Kyoto Protocol

Major policies and measures	*Examples/comments*
Agriculture	
EU Common Agricultural Policy (CAP)	Bans the burning of crop residues (2005: 0.06 Mt CO_2 eq)
Decreased use of nitrogen fertilizers	Includes (a) the substitution of mineral fertilizers with organic fertilizers (manure, compost); and (b) the optimization of nitrogen fertilizer use (2005: 2.34 Mt CO_2 eq)
Liquid manure biodigestion plan	Aims to reduce GHG emissions from manure management at centralized treatment facilities and individual farms by promoting the application of technical processes (2009–012: 8.9 Mt CO_2 eq)
Forestry	
Spanish Forestry Plan 2003-2032	Promotes reforestation and sustainable forest management. (5.8 Mt CO_2)
Waste	
National Waste Plan 2008-2015 (PNIR)	Aims to decrease waste generation and improve waste management by promoting reuse, recycling and other forms of recovery

Note: The greenhouse gas emission reduction estimates, given for some measures (in parentheses), are reductions in CO_2 or CO_2 eq for the year 2010, unless stated otherwise.

1. Policy framework and cross-sectoral measures

32. The legal framework of the Climate Change and Clean Energy Strategy attributes functions to several participatory and coordination bodies: (a) the National Council on Climate Change, whose functions include the preparation, assessment and follow-up of the Climate Change Strategy; (b) the CCPCC, which regulates GHG emissions trading and works as a coordination and cooperation agency between the State General Administration and the Autonomous Communities; (c) the CDGCC, composed of several ministers; (d) the GICC, which coordinates climate change policies among the different ministries (see para. 28 above); and (e) the Spanish Climate Change Office, which is the body at the national level that is in charge of coordinating the different groups and formulating the national policy on climate change, and proposing regulations, administrative and planning instruments to attain the national policy objectives.

33. The NC5 did not include a description of how Spain is monitoring and evaluating the progress of PaMs to mitigate GHG emissions over time. During the review, Spain explained that a monitoring and evaluation process, including a technical and political review of the individual policies, is set up and driven by the CCPCC, involving ministries, Autonomous Communities, technical experts, policymakers, the private sector and trade unions. This process and review are reflected in two documents, which are prepared on a regular basis. The first is a document that summarizes every two months the degree of implementation of the Strategic Priorities to Address Climate Change, and the second is the projections report with recommendations on necessary additional measures that is published annually after being approved by the CDGCC. In order to enhance transparency, the ERT encourages Spain to provide, in its next national communication, a more detailed description of the institutional framework for domestic monitoring, reporting and evaluation of PaMs, with clear timelines.

34. The ERT noted the important role of the Autonomous Communities for the implementation and delivery of Spain's mitigation actions and targets. Spain recognizes this role and the strengthening of the coordination with the Autonomous Communities on climate change policies through the establishment of coordinating institutions such as the GICC and the CDGCC as a very important element in its climate change policymaking process. During the review, Spain explained that while the national target is not split into

individual targets for each of the Autonomous Communities, each Autonomous Community must implement the national measures and has the competency to set up its own additional measures. In this context, nearly all Autonomous Communities have in place strategies or plans and the necessary administrative arrangements for implementing PaMs.

35. The EECCEL establishes the guiding principles and framework for PaMs at the national level and at the level of the Autonomous Communities. Within this framework, Spain developed: the Urgent Measures Plan, which was approved in 2007; the Strategic Priorities to Address Climate Change, developed by the CDGCC in 2008 and involving a wide range of sectors such as transport, waste, residential, energy and forestry; and various plans and strategies set up by the Autonomous Communities. The Urgent Measures Plan identified the initiatives of the EECCEL that could already be implemented in 2007 in order for them to become effective during the first commitment period of the Kyoto Protocol. One major element of this plan is the new Strategy for Energy Savings and Efficiency 2008–2012 ("PA E4+") which is projected to deliver additional emissions savings of 27.71 Mt CO_2 eq during the period 2008–2012. Together with the other urgent measures identified in the plan, the total estimated effect equates to emissions savings of 60.45 Mt CO_2 eq during that period.

36. As a member State of the EU, Spain is obliged to implement EU policy and legislation, including in the areas of energy and environment. In this context, the most prominent is the 2008 EU Climate and Energy Package that sets emission reduction targets for 2020, including targets for the member States' non-ETS sectors. Under the EU effort-sharing decision (decision 406/2009/EC), Spain has agreed to reduce its emissions from the non-ETS sector by 10 per cent between 2005 and 2020. The EU Climate and Energy Package is linked to: the EU Directive on the Promotion of the Use of Energy from Renewable Sources (directive 2009/28/EC), which sets for Spain a target of a 20 per cent share of energy from RES in gross final energy consumption by 2020; the EU-wide reduction of primary energy use by 20 per cent compared with projected levels, which is to be achieved through energy-efficiency improvements; and the third trading period of the EU ETS (2013–2020), which establishes a single EU-wide cap on emission allowances, reducing the number of allowances to 21 per cent below the 2005 level in 2020.

37. The ERT noted that Spain is yet to elaborate its plans on how to meet its 2020 emissions reduction target, and the relevant targets for renewable energy and energy efficiency. To that end, Spain informed the ERT during the review of an ongoing study to evaluate the progress made by its mitigation actions in the different sectors, expected effects in 2020 and identification of sectors where additional measures will be necessary in order to meet the 2020 targets. The ERT appreciates this additional information and encourages Spain to include it in its next national communication.

38. The EU ETS and the use of Kyoto mechanisms play an important role in Spain's ability to meet its Kyoto Protocol target. The National Allocation Plan, established for the first trading period (2005–2007), was implemented using free allowances allocations in all sectors. At the end of that period, the carbon price was so low that it did not create the necessary incentives for the participants to generate the expected emission reductions. Nevertheless, this experience enabled participating companies to improve their emission intensity, to diversify the energy mix and to get ready for the second phase, which coincides with the first commitment period of the Kyoto Protocol. The second National Allocation Plan (2008–2012) was implemented by applying more stringent criteria for allowances allocation. This is also reflected in the expected annual emission reduction of 28.04 Mt CO_2 eq compared to 1.86 Mt CO_2 eq in the first trading period. However, the 2008 global economic crisis had a significant negative effect on the EU ETS sector in Spain as many plants emitted less CO_2 than they were allocated. During the review, Spain

acknowledged that, due to the lower production rates of some plants, the emission intensity in many industrial sectors actually worsened between 2008 and 2009.

2. Policies and measures in the energy sector

39. The energy sector accounted for by far the largest share of total emissions in Spain (78.5 per cent in 2008). Between 1990 and 2008, GHG emissions from the energy sector increased by 50.0 per cent (106,124 Gg CO_2 eq), mainly driven by increases in transport (80.4 per cent or 46,139 Gg CO_2 eq), other including residential and commercial (44.6 per cent or 11,787 Gg CO_2 eq), energy use in industry (44.4 per cent or 20,718 Gg CO_2 eq) and energy industries (36.2 per cent or 28,101 Gg CO_2 eq). The ERT noted that the recent decrease in energy emissions (7.8 per cent between 2007 and 2008) is likely to have been triggered by the effect of the financial and economic crisis rather than by policies and fuel switching alone.

40. Between 1990 and 2008, there was a steady growth in distances travelled in interurban, rural and urban areas, increasing almost twofold, from a total of 182,414 million kilometres in 1990 to 380,000 million kilometres in 2008. By type of vehicle, the light-duty vehicles experienced the most substantial increase for the same period (131 per cent), followed by passenger cars (114 per cent) and heavy-duty vehicles (57 per cent). In the residential and services sector, increase in thermal insulation in buildings and the use of solar energy has not yet outweighed the effect on energy consumption and emission trends from the growing number of dwellings (despite a halt following the economic crisis), the improved standard of living and the increasing floor area of commercial premises.

41. ***Energy supply***. The Spanish energy policy is based on three pillars: security of supply, competitiveness and sustainability. In 2008, total primary energy supply (TPES) was still dominated by fossil fuels, which accounted for 80 per cent of TPES. The power generation sector continues to be dominated by fossil fuels and despite the increase in the share of renewables, fossil fuels continue to be the fuel of choice for around 60 per cent of electricity generation. Consequently, in 2008, energy industries was still the major source of GHG emissions in Spain (105,803 Gg CO_2 eq or 26.1 per cent of total GHG emissions).

42. Power generation almost doubled between 1990 and 2008, with major structural changes in the fuel mix. While the amount of coal and nuclear energy used for power generation remained broadly constant since 2000, the growing demand for electricity was increasingly met by natural gas, which in 2008 accounted for the bulk of electricity production, and RES. As a result, in 2008, natural gas accounted for 39 per cent of electricity production, followed by coal and oil (22 per cent), renewable energy including hydro, geothermal/solar/wind and biomass/waste (21 per cent) and nuclear (19 per cent). The PER, together with feed-in tariffs, and the supply and demand rules contributed substantially to the promotion of renewables for electricity generation and to an increase in the installed capacity of cogeneration plants from 488 MW in 1991 to 6063 MW in 2007.

43. The period 2007-2008 was marked by a decline in emissions, which was the result of a combination of two very significant events: (a) the dramatic change in the fuel and technology mix for electricity generation (strong fall in coal consumption on account of an increase in natural gas and renewables, and an increase in cogeneration output); and (b) the financial and economic crisis reflected in a decrease in TPES.

44. With regard to the energy mix in 2020, during the review Spain presented figures that foresee: a stable share of coal and nuclear energy; a doubling of renewable energy; a further increase of natural gas; and a decrease of oil by 30 per cent. This forecast reflects the energy policy of the Government, which has a strong emphasis on the extension of renewable energy, especially wind and solar energy; a minimization of the energy supply

risk by decreasing its dependency on oil while subsidizing domestic coal; and the still uncertain commitment to the future of nuclear energy.

45. ***Renewable energy sources***. RES play a major role in Spain's effort to reduce its energy emissions. The use of renewable energy and related technologies have been boosted by the PER and the new Gas and Electricity Plan 2008–2016, which aims at increasing electricity generation from renewable sources in order to meet the expected increased demand for electricity from renewable sources and also from natural gas, using cogeneration and combined cycle gas turbines. The objectives of the PER for 2010 are to ensure: that at least 12.1 per cent of the primary energy consumption comes from renewables; that electricity produced from RES reaches a share of 30.3 per cent of total electricity consumption; and that the share of biofuels in total diesel and petrol consumption in transport equates to 5.83 per cent. At EU level, the EU directive 2001/77/EC requires 29.4 per cent of Spain's electricity consumption in 2010 to come from electricity produced by renewables.

46. In 2008, RES accounted for 7.8 per cent of primary energy consumption, compared to only 5.9 per cent in 2000, and 19.7 per cent of electricity production compared to 16.5 per cent in 2000. This impressive increase in the share of renewable energy (in particular, for solar and wind energy the share increased from 0.4 to 2.2 per cent of TPES within just eight years) resulted from targeted support and the comprehensive portfolio of policy instruments, including subsidies, put in place by the Government. During the review, Spain provided recent figures on the share of RES for 2009, which are 9.4 per cent of primary energy consumption and 24.7 per cent of electricity production. This suggests that Spain might be able to attain its renewable targets. Among all RES in primary energy consumption in 2009, biomass and waste have the highest share (3.9 per cent), followed by wind energy (2.4 per cent), hydroenergy (1.7 per cent), biofuels (0.8 per cent) and solar energy including photovoltaic and thermoelectric (0.5 per cent).

47. With regard to the objectives for 2020, the PER integrates the renewable target from EU directive 2009/28/EC of a 20 per cent share of RES in final energy consumption, compared to the share of 12.3 per cent in 2009 (applying the methodology of the European Commission for this calculation). At the time of the review, Spain was finalizing its national renewable energy action plan that includes measures to achieve the 20 per cent target.

48. ***Energy efficiency***. The Ministry of Industry, Tourism and Trade has the competency to identify and coordinate the implementation of plans and actions on energy efficiency in close collaboration with the relevant departments of the State General Administration. The "E4" strategy provides the national framework for promoting energy efficiency. It sets an overall savings target of 69,950 ktoe primary energy in 2012, and was developed and implemented with the two action plans for the periods 2005–2007 and 2008–2012 (see para. 30 above). The second action plan (2008–2012), consolidating the efforts in promoting energy efficiency that have been already undertaken, pays special attention to sectors such as transport, residential and services, and agriculture, and identifies a set of 59 measures in all sectors to achieve the above-mentioned target. The most stringent targets are set for the transport sector, followed by those for industry, buildings, household and office equipment, the public sector and agriculture.

49. The Institute for Diversification and Energy Savings, in cooperation with the Autonomous Communities, plays a key role in the management of public support and the implementation of the relevant measures. So far, six measures were implemented that accounted for 70 per cent of the total public support, including: the modernization plan for home appliances; energy-efficiency improvements in the heating systems of buildings; the thermal insulation of buildings; the renovation of public outdoor lighting; urban mobility plans; and public support programmes for industry. The action plan for the period 2008–

2012 is enhanced by the Activation Plan 2008–2011, which includes a total of 31 further measures in the following areas: transport and mobility; buildings; and energy savings.

50. ***Residential and commercial sectors***. Emissions from the residential and commercial sectors accounted for 9.4 per cent of total GHG emissions in 2008. Since its NC4, Spain has set up and implemented a range of PaMs affecting emissions in the residential and commercial sectors with the major target of improving energy efficiency in both new and existing buildings. Several measures were implemented in the context of the "E4" strategy, which address energy efficiency in and emissions from the residential and commercial sectors (see also paras. 48–49 above), including a 2009 campaign for distributing energy saving lamps and measures to fulfil the targets of the Energy Efficiency Plan for Buildings of the General State Administration.

51. Spain also strengthened the legal framework to promote energy efficiency in buildings by adopting the new building code in 2006. The code sets new efficiency standards for buildings and regulates the use of solar energy in new or renovated buildings. In addition, the new regulations for thermal installations and the energy certification of buildings were approved in 2007, which aimed at increasing insulation, promoting renewable energy and increasing the efficiency of hot water systems and boilers when renovating buildings.

52. ***Transport sector***. Transport accounted for 40 per cent of the national energy consumption and 25.5 per cent of total GHG emissions in 2008. Emissions from transport increased significantly since 1990 following the growing demand for transportation and even outpaced the economic development. Key PaMs in transport include promotion of public transport through the enhancement of infrastructure, public awareness-raising, modal shift measures, the subsidized renewal of the vehicle fleet and public information (car labelling).

53. The 2009 Spanish Strategy for Sustainable Mobility is the most recent strategy to promote sustainable transport. It establishes the guidelines and measures on land-use planning, transport and infrastructure, climate change, and reducing energy dependence, and pays special attention to fostering alternatives to private vehicle use and the use of more efficient and sustainable modes of transport. Within the framework of this strategy, several programmes and plans have been developed, including the update of the Strategic Plan for Infrastructure and Transport 2005–2020 (PEIT), the Automotive Integral Plan and specific measures related to the "E4" strategy.

54. In particular, the updated PEIT seeks to prioritize more sustainable modes of transportation such as rail and shipping through an increase in investment in railway transport, which will receive almost 50 per cent of total investment of the PEIT, with a view to transforming it into the key element of the goods and passenger transport system.

55. To promote electric and hybrid vehicles, Spain launched the project MOVELE, with a target of introducing 2,000 electric vehicles into the market, and the installation of 500 charging points in 2009 and 2010. The project is supported by a total budget of EUR 10 million. The ultimate goal of the Government is to have 2.5 million hybrid and electric vehicles by 2020 (1 million by 2014); this is to be achieved through the Automotive Integral Plan, which includes, among its priorities, the financing of training activities, process engineering and production systems for electric vehicles. The ERT noted that potential barriers to the overall transport strategy could include conflicting policies and priorities, uncertainty of funding, and deployment.

56. In its NC5, Spain has included information on its actions addressing GHG emissions from international bunker fuels (aviation and shipping). International aviation will be included in the EU ETS from 2012 onwards, when the EU ETS will be extended to include emissions from all flights with an initial or final destination in one of the EU member

States, regardless of the origin of the airline operator. This common and coordinated EU-wide measure is intended to stabilize emissions from air transport at the average level of emissions achieved during the period 2004–2006. With regard to international shipping, Spain has reported on its continuing support for the International Maritime Organization (IMO) and its active participation in the IMO's committees of marine environment protection.

57. ***Industrial sector.*** According to the NC5, Spain's, actions in the industrial sector are mainly driven by the law on Integrated Pollution Prevention and Control (IPPC) and the EU ETS. During the review, Spain provided additional information on specific measures of the "E4" strategy aimed at reducing emissions from energy use in industry, including voluntary agreements, energy audits, and the provision of public subsidies. The objectives of the respective action plans of the "E4" strategy are an emissions reduction in the industrial sector of 2,44 Mt CO_2 eq, supported by a total investment of EUR 489 million in the period 2005–2007, and an emission reduction of 26,93 Mt CO_2 eq, supported by a total investment of EUR 1,671 million in the period 2008–2012. The ERT noted that these are challenging objectives to be achieved with what could be considered as 'soft' measures.

3. Policies and measures in other sectors

58. Between 1990 and 2008, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste increased by 19.9 per cent (14,493 Gg CO_2 eq), mainly driven by a strong increase in emissions from the waste sector, due to an increase of CH_4 emissions from landfills, and from the industrial processes sector, due to an increase in CO_2 emissions from mineral products and emissions from the use of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6).

59. ***Industrial processes***. GHG emissions from industrial processes (including solvent and other product use) increased by 19.5 per cent (5,367 Gg CO_2 eq) between 1990 and 2008. The trend in GHG emissions from the consumption of halocarbons and SF_6 and mineral products showed notable increases (6,009 and 3,485 Gg CO_2 eq, respectively), which were only partly compensated for by decreases in emissions from chemical industry and the production of halocarbons and SF_6 (2,074 and 1,733 Gg CO_2 eq, respectively). In general, emissions from industrial processes are closely linked to the production and use of products. This applies to emissions from mineral products that increased as a result of the booming construction industry, and halocarbon emissions that increased due to the use of these chemicals as substitutes for ozone-depleting substances. However, for chemical industry and production of halocarbons, emissions decreased, due to a decrease in production and implemented abatement measures.

60. Similarly to the industrial sector within energy (see para 57 above), reductions of emissions in the industrial processes sector have been mainly driven by the IPPC standards, through energy audits, voluntary accords and the adoption of best technologies, implemented by the Autonomous Communities. To address the large increase in F-gases, Spain has been implementing the EU regulation 842/2006 on certain fluorinated GHGs together with the EU directive 2006/40/EC relating to emissions from air-conditioning systems in motor vehicles. More recently, a royal decree was approved, establishing a certification system aimed at reducing emissions from the installation and maintenance of related equipment and limiting the trading of the F-gases. Future measures, which could result from the revision of EU regulation 842/2006, could cover additional F-gases. During the review, Spain explained that mitigation potentials, except for F-gases, are limited in this sector, since the majority of the industry has already adopted the best technologies and practices.

61. ***Agriculture***. Agriculture accounted for 9.6 per cent of total GHG emissions and increased by 3.2 per cent between 1990 and 2008. The main sources of emissions from this

sector are N_2O emissions from soils (44.5 per cent), CH_4 emissions from enteric fermentation (29 per cent) and CH_4 and N_2O emissions from manure management (25.4 per cent). The recent fall in emissions from this sector was driven by the decline in the amount of synthetic nitrogen (N) fertilizer applied and a fall in the number of agricultural farms and associated livestock.

62. Apart from the EU Common Agricultural Policy (CAP), which affects the level of activities in agriculture, already mentioned in previous national communications, the measures for climate change mitigation in agriculture described in the Party's NC5 are a mix of sectoral non-climate-specific PaMs aimed at reducing GHG emissions. These include the development of best available technologies, the biodigestion of liquid manure to reduce CH_4 emissions from manure management, the increase of areas for biomass production used as a substitute for fossil fuels and the decrease of the use of N fertilizers (replaced by compost), all of which are linked to monitoring and evaluation. The ERT noted that some of these measures could have been allocated to other sectors (i.e. energy and waste) and might even increase emissions from agriculture (e.g. biomass production).

63. ***LULUCF***. With forest land representing 51.4 per cent of the national surface area, the forestry sector plays a key role in the Spanish strategy to implement the Kyoto Protocol, with a contribution in the first commitment period estimated at an equivalent of 2 per cent of the base year emissions. Spain has elected to account for its forest management activities under Article 3, paragraph 4, of the Kyoto Protocol during that period.

64. The Spanish Forestry Plan 2002–2032 emphasizes the multi-functionality of forests as one of its basic principles and allocates EUR 2.2 billion for the promotion of 150 actions during the period 2002–2008. These actions include increasing the area of forests, protecting forests and increasing CO_2 removals through forest management. Urgent actions have also been undertaken for the restoration of forest hydrology in areas affected by forest fires or natural catastrophes. In addition, there is a plan to plant 45 million trees by 2012. Over the 30-year period covered, the Forestry Plan aims at the afforestation or reforestation of 3.8 million ha, leading to an estimated cumulative net removal of 200 Tg CO_2 during that period. The ERT noted that between 2002 and 2008, the net removal of the LULUCF sector increased by 4.5 Tg CO_2 eq; it considers that Spain has implemented an effective set of PaMs in the forestry sector.

65. ***Waste management***. This sector showed the largest proportional increase in emissions between 1990 and 2008 (103.4 per cent or 7,914 Gg CO_2 eq), which was mainly driven by the strong increase in solid waste disposal. Spain is one of the few Parties included in Annex II to the Convention with increasing emissions from waste. Since the NC4, the Spanish Government has made some efforts to design a set of measures specifically for the reduction of emissions in the waste sector, which were, however, not sufficient to slow down the growth in emissions from waste. It sets out an ambitious target to almost halve the amount of biodegradable municipal waste deposited by 2016 compared to 2006 levels, in line with the EU landfill directive 1999/31/EC, and to reduce it by a third by 2009. This objective will be met by several measures, including waste prevention and minimization; waste separation, recycling and reuse; and improving final waste disposal and monitoring. These measures are also part of the National Integrated Waste Plan 2008–2015 (PNIR).

66. During the review, Spain informed the ERT of two recently approved legislations (Royal Decree 1973/2008 and Royal Decree 1823/2009). The first, in line with the Urgent Measures Plan, commits EUR 5.1 million to the recovery and utilization of biogas from landfills, aiming at emissions savings of 7.7 Mt CO_2 eq over a 20-year period. The second foresees direct subsidies of EUR 55 million to the Autonomous Communities for the immediate implementation of measures in 2009–2010. These measures comprise

105 projects and target the closure of illegal landfills, landfill biogas recovery and other actions in line with the priorities of the PNIR.

4. Minimization of adverse effects in accordance with Article 2, paragraph 3, of the Kyoto Protocol

67. In its NC5, Spain did not report information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties. Further information on how Spain strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, as reported in the 2010 annual submission, is presented in chapter II.I of this report.

68. During the review, Spain elaborated on a set of measures aimed at minimizing the impact of its mitigation policies on other countries, and bilateral projects in which the Party is engaged. These include the removal of the market imperfections and subsidies associated with the use of unsustainable technologies. They also include: cooperation with developing countries for the diversification of energy use and production; development of technologies, in particular the use of CCS; implementing clean development mechanism (CDM) projects; and assessing the impact of biofuels.

69. The ERT recommends that Spain include the additional information it provided during the review in its next national communication and that the Party continue to investigate the impact of its measures and highlight the positive impacts of those measures on other countries, especially developing country Parties.

C. Projections and the total effect of policies and measures, and supplementarity relating to the Kyoto Protocol mechanisms

70. The GHG emission projections up to 2020 presented in the NC5 include a 'with measures', a 'with additional measures' and a 'without measures' scenario. During the review, Spain provided an update of the 'with measures' and the 'without measures' scenarios. This update was prepared in December 2009 by the MARM, based on the most recent inventory data and updated PaMs.

1. Projections overview, methodology and key assumptions

71. The 'with measures' and 'with additional measures' GHG emission projections provided by Spain in the NC5 are presented relative to actual inventory data for 2006 and cover future emissions until 2020. Projections are presented on a sectoral basis using more aggregated categories for the energy sector than those used in the PaMs section. Projections are also presented on a gas-by-gas basis for the following GHGs: CO_2, CH_4, N_2O, HFCs, PFCs and SF_6, and for national total emissions, using global warming potential values. To enhance transparency, the ERT strongly encourages Spain to present the emission projections for energy in a more disaggregated way (i.e. separately for energy industries, industry, transport and residential and commercial), consistent with the PaMs section (see also para. 84 below).

72. The ERT noted that emission projections related to fuel combustion from ships and aircraft engaged in international transport, also known as international bunkers, were not reported by Spain. During the review Spain provided emission projections and the main assumptions for the international bunkers. These projections are based on an expected increase of 52 per cent of passengers in international aviation and an increase of 33 per cent

in maritime transport between 2009 and 2020. The ERT recommends that Spain prepare for its sixth national communication (NC6) emission projections for international bunkers and, to the extent possible, report them separately from the national totals.

73. In the NC5, the 'without measures' scenario shows the emissions growth that would take place if no measures had been applied since the year 2000. The ERT noted that this scenario is 'frozen', in other words, no autonomous technology improvement is considered. The 'with measures' scenario assumes the full implementation of plans, measures and sectoral legislation adopted by 2008, including the urgent measures included in the EECCEL. The 'with additional measures' scenario includes additional measures that are necessary for Spain to comply with its international commitment, including the Kyoto target.

74. On transparency, the ERT noted that the PaMs that were included in the 'with additional measures' scenario in the NC4 but included in the 'with measures' scenario in the NC5 were not always clearly identified. In addition, it was not always clear in which scenario the PaMs referred to as "additional" or "urgent" in the NC5 were considered. A methodological change in the calculation of emissions was included as an "additional" measure in the agriculture sector, which is not consistent with the scenario definition in the UNFCCC reporting guidelines. To enhance transparency, the ERT recommends that Spain in its NC6 follow strictly the scenario definitions included in the UNFCCC reporting guidelines, and encourages the Party to use a clearer and more consistent nomenclature for the PaMs in the PaMs and the projections sections.

75. The methodology used for the projections included in the NC5 has not changed compared to the NC4. The methodology is broadly based on the ones developed by the European Environment Agency and the United States Environmental Protection Agency. Spain uses the CEP (Consistent Emission Projections) model and the software EmiPro, adapted to Spanish circumstances by the Polytechnic University of Madrid. The projections consider for each sector the level of activity, the emission factors and the control factors. The NC5 includes information on the strengths and weaknesses of the models used, as well as improvements with respect to the NC4. During the review Spain indicated that the approach used minimizes double counting of the effects of PaMs (e.g. an overlap between PaMs and emission reductions in sectors covered by the EU ETS).

76. The NC5 includes quantitative information for 2010, 2015 and 2020 of key underlying assumptions and variables, including GDP, population, primary and final energy consumption, production figures of energy-intensive industries, such as cement, aluminium and steel, and livestock numbers of the main animal categories. However, analysis and explanation to ensure consistency among different assumptions and changes thereof compared to the NC4, and quantitative information on drivers for each sector are not included. During the review detailed information on these matters was provided to the ERT. The ERT noted some noticeable deviations between trends and projections of key parameters, especially in the relation between the level of activity and energy consumption, which were not sufficiently explained during the review: the past trend shows an elasticity between the energy and GDP of 1–1.5, while the projected elasticity declines to 0.2 in 2020. To increase transparency and completeness, the ERT recommends that Spain include in its next national communication the relevant information mentioned in this paragraph.

77. The NC5 presents for each sector the results of quantitative sensitivity analyses on the main parameters of each sector. Some information on uncertainties for the 'with measures' scenario is also included. The ERT considers that a sensitivity analysis could provide Spain with the possibility of estimating the effect of potential deviations from key assumptions on emissions consistently across all sectors, but noted that such an approach was not taken in the NC5.

2. Results of projections

78. Table 4 and the figure below show that Spain's GHG emissions are expected to be higher than its Kyoto Protocol target in both the 'with measures' and the 'with additional measures' scenario. Both scenarios use 2006 as a starting point for projections, when emissions are nearly 50 per cent above the Kyoto Protocol base year level. Emissions in the 'with measures' scenario decrease until 2011 and grow slowly thereafter, even with the continuous population, GDP and activity level growth. For this scenario, the average annual emissions in the period 2008–2012, 405.0 Tg CO_2 eq, decrease from the 2006 level to a level 40 per cent higher than the Kyoto base year level, 289.8 Tg CO_2 eq.

Table 4
Summary of greenhouse gas emission projections for Spain

	Greenhouse gas emissions (Tg CO_2 eq per year)	*Changes in relation to base year level (%)*	*Changes in relation to 1990 level (%)*
Inventory data 1990[a]	285.1	-	-
Inventory data 2008[a]	405.7	40.0	42.3
Kyoto Protocol base year[b]	289.8	0.0	1.6
Kyoto Protocol target[b]	333.2	15.0	16.9
'Without measures' projections for 2010[c,e]	492.6	70.0	72.8
'With measures' projections for 2010[c,e]	405.0	39.8	42.1
'With additional measures' projections for 2010[c,e]	395.8	36.6	38.8
'Without measures' projections for 2020[c]	629.2	117.1	120.7
'With measures' projections for 2020[c]	425.2	46.7	49.1
'With additional measures' projections for 2020[c]	410.6	41.7	44.0
'Without measures' updated projections for 2010[d,e]	494.8	70.7	73.5
'With measures' updated projections for 2010[d,e]	389.6	34.4	36.6
'Without measures' updated projections for 2020[d]	628.2	116.8	120.3
'With measures' updated projections for 2020[d]	410.4	41.6	43.9

Data sources:
[a] Spain's 2010 greenhouse gas (GHG) inventory submission; the emissions are without land use, land-use change and forestry (LULUCF).
[b] Based on the initial review report contained in document FCCC/2007/IRR/ESP.
[c] Spain's fifth national communication.
[d] Updated projections provided by the Party during the in-depth review; the projections are for GHG emissions without LULUCF.
[e] Annual average 2008–2012.

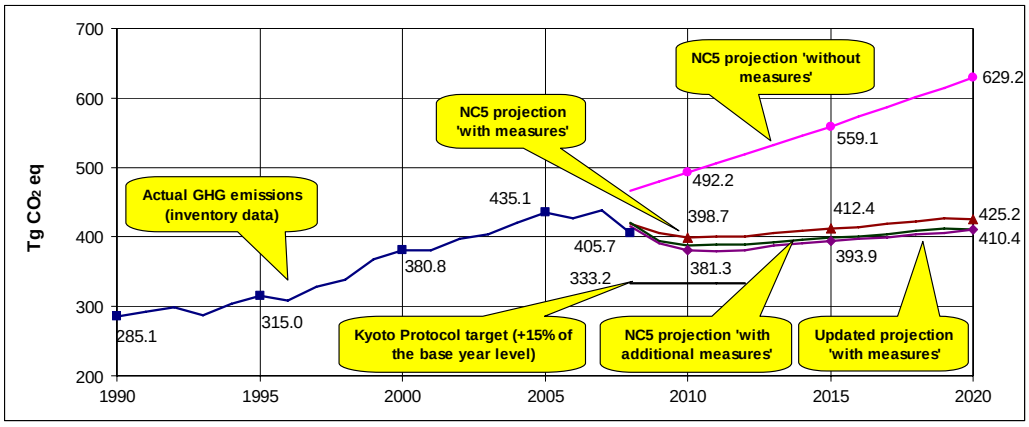
79. The additional measures included in the 'with additional measures' scenario have a minor impact as they are expected to bring the emissions down further to 395.8 Tg CO_2 eq,

37 per cent higher than the Kyoto base year. Therefore, the 'with additional measures' scenario projections match the compliance pathway described by Spain in its National Allocation Plan (Royal Decree 1370/2006), which assumes that average annual emissions in 2008–2012 should not exceed 37 per cent of base year emissions, or 22 percentage points above the +15 per cent target (333.2 Tg CO_2 eq) set within the EU burden-sharing agreement. This 22 percentage points difference is expected to be covered by Article 3, paragraphs 3 and 4, activities (2 percentage points) and the use of Kyoto mechanisms (20 percentage points).

80. On projections by gas, in the 'with additional measures' scenario, average annual emissions of CO_2 in 2008–2012 are expected to increase the most and be 43.4 per cent higher than the 1990 level. For CH_4 and N_2O, emissions are projected to be 22.0 per cent and 13.1 per cent higher, respectively, than in the level in 1990. F-gases are expected to increase most in relative numbers, by 69.9 per cent, but least in absolute numbers.

81. During the review, Spain provided updated projections, which indicated lower average 'with measures' emissions for 2008–2012 compared with those projected in the NC5 (389.6 and 405.0 Tg CO_2 eq, respectively). With regard to the PaMs, the 'with measures' scenario of the updated projections already include the PaMs that were included in the 'with additional measures' scenario of the NC5. In addition, the most recent inventory data and the effects of the economic crisis that were already visible have been incorporated, namely, reductions of production activities in industry, fuel consumption in the residential and commercial sectors, fuel consumption and crude oil input in oil refineries, total transport demand, and reductions of the waste generation rate.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2008: Spain's 2010 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry; (2) Data for the years 2008–2020: Spain's fifth national communication and updated projections provided by the Party during the in-depth review; both without land use, land-use change and forestry.

82. The EU Climate and Energy Package set targets for emission reductions, RES share and energy efficiency for 2020 (see para. 36 above). The ERT noted that Spain is developing a strategy to achieve its 2020 targets, but that at the time of the review the strategy was still under development and no results were presented (see para. 37 above). According to the updated projections provided during the review total GHG emissions in 2020 are expected to reach 410.4 Tg CO_2 eq, which corresponds to 44 per cent above 1990 levels or 6 per cent below 2005 levels. The ERT noted that these emissions are in general higher than the emission reduction targets for the Spanish non-ETS sector of 10 per cent and for the EU-wide ETS sector of 21 per cent between 2005 and 2020. Given the level of

ambition of the targets set for 2020, the ERT noted the urgent need for more clarity in the climate change and energy strategies of Spain as to how it will attain those targets.

3. Total effect of policies and measures

83. The NC5 presents the estimated total effect of implemented and adopted PaMs as well as the estimated total effect of its planned PaMs, compared with a situation without such PaMs. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a CO_2 eq basis) and by sector, for all years from 2007 to 2020. Spain calculates the total effect of implemented and adopted PaMs as the difference between the 'without measures' and the 'with measures' scenarios, and total effect of the planned PaMs as the difference between the 'with additional measures' and the 'with measures' scenario. The ERT noted that the 'without measures' scenario does not reflect economic and structural changes since 2000 (see para. 73 above) and as a result the reported total effect might have been overestimated.

84. The NC5 reports that the total estimated effect of adopted and implemented PaMs is 93.49 Tg CO_2 eq in 2010 and 204.05 Tg CO_2 eq in 2020. The total effect of planned PaMs is 11.87 Tg CO_2 eq in 2010 and 15.33 Tg CO_2 eq in 2020. The projections are presented by sector, which in the case of the energy sector means that it is not possible to separately identify the effect of PaMs in the energy subsectors such as transport or public electricity and heat production. Such disaggregated information by subsector for the energy sector was provided during the review. To increase transparency, the ERT encourages Spain to present the effect of its PaMs for the energy sector by subsector in its next national communication. The ERT noted that this increased level of detail can also facilitate the monitoring and evaluation of progress with PaMs described in paragraph 33 above.

Table 5
Projected effects of planned, implemented and adopted policies and measures in 2010 and 2020

Sector	*Effect of implemented and adopted measures[a] (Tg CO_2 eq)*	*Relative value[a,b] (% of 1990 emissions)*	*Effect of planned measures[a] (Tg CO_2 eq)*	*Relative value[a,b] (% of 1990 emissions)*	*Effect of implemented and adopted measures[a] (Tg CO_2 eq)*	*Relative value[a,b] (% of 2005 emissions)*	*Effect of planned measures[a] (Tg CO_2 eq)*	*Relative value[a,b] (% of 2005 emissions)*
	2010				*2020*			
Energy	64.04	22.5	11.68	4.1	147.95	34.0	14.85	3.4
Industrial processes	13.02	4.6	0.14	0.0	29.31	6.7	0.20	0.0
Solvents	0.47	0.2	0.00	0.0	0.71	0.2	0.00	0.0
Agriculture	11.99	4.2	NA		18.13	4.2	NA	
Waste management	3.97	1.4	0.05	0.0	7.95	1.8	0.29	0.1
Total	**93.49**	**32.8**	**11.87**	**4.2**	**204.05**	**46.9**	**15.33**	**3.5**

Sources:
[a] Spain's fifth national communication (elaborated from tables 53–86).
[b] Spain's 2010 inventory submission.
Abbreviation: NA = not available.

85. According to the information reported in the NC5, PaMs implemented in the energy sector will deliver the largest emission reductions, followed by the effect of PaMs in the industrial processes and agriculture sectors. According to the disaggregated projections for the energy sector provided during the review, the effect of PaMs in 2010 is expected to

come mostly from public electricity and heat production (around 55 per cent), followed by transport (around 25 per cent) and industry (around 20 per cent). The most effective PaMs and drivers behind GHG emission reductions are described in chapter II.B.1 and II.B.2. Table 5 provides an overview of the total effect of PaMs as reported by Spain in its NC5**.**

4. Supplementarity relating to mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

86. In its NC5, Spain has provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action, although it did not elaborate on supplementarity as such. Spain indicated that average annual emissions in 2008–2012 would be 70 per cent higher than base year emissions in the 'without measures' scenario. Domestic PaMs are projected to reduce those emissions by 33 percentage points, and Article 3, paragraphs 3 and 4, activities and the Kyoto mechanisms could contribute by 2 and 20 percentage points, respectively.

87. The updated projections presented by Spain during the review indicate that the average annual emissions in the period 2008–2012 in the 'with measures' scenario are expected to be 34.4 per cent above the base year level, or 19.4 percentage points higher than the Kyoto Protocol target. In addition, if at least 2 percentage points from Article 3, paragraphs 3 and 4, activities can be used for compliance, then the need to use the Kyoto mechanisms would be reduced to 17.4 percentage points (50.6 Mt CO_2 eq/year).

88. During the review Spain reaffirmed its commitment to comply with its Kyoto Protocol target by using the Kyoto mechanisms as much as needed to fill in the gap between the net total emissions and the target, taking into account Article 3, paragraphs 3 and 4, activities. To that end, in its NC5 Spain has estimated the overall use of Kyoto units at 289.4 Tg CO_2 eq for the five years of the first commitment period. The Government plans to purchase 55 per cent of these units, or 159.2 Tg CO_2 eq, which corresponds to the share of emissions not covered under the EU ETS, while the rest would be acquired by the companies participating in the EU ETS. However, these estimates may be revised downwards if the gap is reduced in view of the most recent emission trends.

89. The Spanish Government has started several initiatives to participate in the Kyoto mechanisms. It has established 23 memorandums of understanding with as many countries, 17 of them in Latin America. The Government has allocated EUR 404.8 million in several carbon funds to buy CDM/joint implementation units in 2008–2012. In addition, Spain has allocated EUR 70 million for the period after 2012. According to additional information provided during the review, Spain has also purchased 29 million assigned amount units from the Czech Republic, Estonia, Hungary, Lithuania, Poland and Ukraine.

D. Vulnerability assessment, climate change impacts and adaptation measures

90. In its NC5, Spain has provided the required information on the expected impacts of climate change in the country and on adaptation options, as well as information on and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. During the review, Spain provided additional information and documentation with regard to future activities related to its assessment of vulnerability to climate change and its adaptation measures. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC5.

Table 6
Summary of information on vulnerability and adaptation to climate change

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture and food security	*Vulnerability*: The negative effects of high temperatures and lower precipitation may be partially compensated by higher photosynthetic rates and milder winters; increased need for irrigation, further impacts of pest and disease on crops, significant impacts on animal health and decreased productivity in the Mediterranean region are expected. *Adaptation*: Ongoing research includes: (a) development of an atlas of agroclimatic areas under different climate change scenarios; (b) risks assessment for parasitic and other diseases; (c) evaluation of additional irrigation demands; (d) preparation of good practice for adaptation in the medium term; (e) identification of long-term adaptation strategies for fruit trees, olive trees and vineyards; and (f) an analysis of options for adaptation in the livestock sector.
Biodiversity and natural ecosystems	*Vulnerability*: The impacts on aquatic ecosystems include: (a) loss of habitat; (b) erosion of biodiversity; (c) risk of losses in emblematic conservation areas; and (d) impacts on biogeochemical cycles. The impacts on terrestrial ecosystems include: (a) warming and decreased water resources; (b) alteration of phenology; (c) more pests and invasive species; (d) changes in soils, fire patterns and sea level, which will affect plant biodiversity; and (e) changes in ecological relations and the displacement of species. *Adaptation*: Ongoing research for terrestrial ecosystems includes: (a) mapping of vulnerability; (b) consolidation of ecological monitoring networks (National Parks); (c) development of indicators; (d) evaluation of the potential of ex-situ conservation; (e) impact assessment of protected areas and of ecosystem goods and services under different climate change scenarios.
Coastal zones	*Vulnerability*: Changes in the coastal dynamics and an increase in the mean sea level are expected to impact deltas and confined beaches and lagoons in Cantabria, Cataluña, Murcia, Cabo de Gata, and the Gulf of Cádiz, among others. *Adaptation*: Ongoing research includes: (a) development of morphodynamic and ecological response models in different scenarios; (b) implementation of monitoring systems; (c) mapping of vulnerabilities; (d) abandonment, retreat and protection scenarios; and (e) evaluation of adaptation options in the framework of sustainable coastal management.
Fisheries	*Vulnerability*: Impacts on phytoplankton, zooplankton and seaweeds, changes in species diversity and a general decrease in productivity are expected. *Adaptation*: Ongoing research includes: (a) development of marine circulation models; (b) mapping marine biodiversity vulnerability; (c) consolidation of monitoring networks and marine-protected networks; (d) assessment of ex-situ conservation measures; (e) evaluation of marine invasive species; and (f) evaluation of carbon balance and pH in coastal and marine waters.
Forests	*Vulnerability*: Physiology of species, enhanced hydric stress, an increase in the frequency and intensity of fires, stronger impacts of pest and disease. *Adaptation*: Ongoing research includes: (a) preparation of good practice for adaptation in forest management; (b) development of forest growth models and evaluation of carbon balances under different climate scenarios; (c) assessment of vegetation response to drought and fire; and (d) development of early warning systems.
Human health	*Vulnerability*: Increase in morbimortality risk due to extreme temperature, especially during heatwaves, increase of diseases transmitted by contaminated water, effects of extreme events. *Adaptation*: Ongoing research includes: (a) assessment of the effects of climate change on health; (b) mapping vulnerable areas; and (c) development of early warning systems, surveillance and control programmes on vector-borne diseases.
Infrastructure and economy	*Vulnerability*: Negative synergies between the effects of climate change and current urban planning, including land consumption, transport infrastructure, energy supply, water needs, green areas and parks, and habitability of buildings. *Adaptation*: Promotion of bioconstruction; ongoing research includes: studies to adapt urban areas, construction, parks and other green areas and studies on the impact of extensive urban planning on transport infrastructure, energy and water resources.

Vulnerable area	*Examples/comments/adaptation measures reported*
Water resources	*Vulnerability*: The foreseen decrease in precipitation (–5 per cent) and increase in temperature (+1°C), are expected to reduce water supplies by 5–14 per cent until 2030. Impacts are expected to be especially severe in arid and semi-arid areas (30 per cent of the territory), where water resources may decrease by 50 per cent, and in the Atlantic basin due to floods. *Adaptation*: Ongoing research includes: (a) development of coupled climate-hydrology models; (b) assessment of water management options; (c) evaluation of impacts of foreseen hydrological scenarios on different sectors, in particular energy, agriculture and tourism; (d) identification of climate change indicators under the Water Framework Directive; and (e) development of guidelines and regulations to incorporate impacts of climate change into the Environmental Impact Assessment processes.

91. As table 6 shows, significant progress has been made in the assessment of climate change impacts and the characterization of vulnerable areas, whereas adaptation measures are still in the analysis phase or early implementation phase. This is also reflected in the first work programme (2006–2008) of the Spanish National Climate Change Adaptation Plan, whereas the second work programme, which started in 2009, exhibits a good balance between vulnerability assessment and adaptation measures. In this respect, regulations, coordination with the Autonomous Communities and mainstreaming adaptation in sectoral policies are the main goals of the second work programme.

92. The basic study on vulnerability was carried out in 2005, entitled "A Preliminary Assessment of the Impacts in Spain due to the Effects of Climate Change". This study is a thorough assessment of the impacts of climate change on a variety of socio-economic sectors and ecological systems, performed with the participation of all interested sectors. Other studies were subsequently carried out, research and development programmes were put in place and the Climate Change Research Institute was created in 2008. As a basis for its adaptation strategy and to evaluate impacts, vulnerability and adaptation measures, Spain has also developed long-term regional climate change scenarios for the national territory.

93. Spain identifies itself as significantly vulnerable to the effects of climate change in many sectors and ecosystems. Increasing temperatures, decreasing water resources, a rising sea level, changing rainfall patterns and the increasing frequency of extreme weather events are becoming more likely, and Spain has identified the need to implement adaptation measures for its most vulnerable areas, such as: biodiversity, water resources, coastal areas, agriculture, forests, health and tourism.

94. The NC5 reports on the progress made regarding the implementation of the second work programme of the National Climate Change Adaptation Plan. The core strategy of the plan is to mainstream adaptation to climate change in the planning processes of all relevant sectors or systems. The ERT recognized that this had been successfully implemented by strengthening the institutional arrangements, including coordination with the Autonomous Communities, national and regional actors of the political, academic and private sectors and civil society organizations. Other strategic elements include the incorporation of research and development, the enhancement of information flow, the promotion of participation, and the preparation of periodic reports on progress to feed planning and action processes. Some innovative and effective examples include the creation of a network to gather data on the impacts of climate change on biodiversity in National Parks, and the creation of the Climate Change and Health Observatory to monitor the impacts of climate change and create an information platform.

95. Spain focuses its collaboration on adaptation activities with Latin American and Mediterranean countries. In this context, Spain has promoted the creation of the Ibero-American Network of Climate Change Offices (*Red Iberoamericana de Oficinas de*

Cambio Climático) (RIOCC), which includes 19 countries from Latin America, Spain and Portugal. The Ibero-American Programme on Climate Change Adaptation (*Programa Iberoamericano de Evaluación de Impactos, Vulnerabilidad y Adaptación al Cambio Climático*) (PIACC), which was developed within the framework of RIOCC, aims to foster the development and implementation of adaptation strategies in the various regions, and to support members in assessing impacts, vulnerabilities and climate change adaption options. The ERT noted that, even though Spain is very active in its cooperation with developing countries, the information provided in the NC5 is limited. During the review, the Party provided further information on activities, actions and programmes of RIOCC to support vulnerability assessment and adaptation initiatives. The ERT recommends that Spain provide more detailed information on international cooperation regarding adaptation in its next national communication.

E. Financial resources and transfer of technology, including information under Articles 10 and 11 of the Kyoto Protocol

1. Provision of financial resources, including "new and additional" resources and resources under Article 11 of the Kyoto Protocol

96. The information provided in the NC5 covers most of the issues for which information is required under the Convention and its Kyoto Protocol. However, the ERT noted that Spain, in its NC5, did not provide a clarification of how it has determined resources as being "new and additional". The ERT recommends that Spain enhance the completeness of its reporting by including this information in its next national communication. To enhance transparency, the ERT encourages the Party to report the required information, as indicated in table 5 of the UNFCCC reporting guidelines, separately for the activities and sectors indicated in that table.

97. In its NC5, Spain has provided details on the measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention as required by the UNFCCC reporting guidelines and under Article 11 of the Kyoto Protocol, as required by the "Guidelines for the preparation of information required under Article 7 of the Kyoto Protocol". During the review, Spain further elaborated on the "new and additional" financial resources it has provided pursuant to Article 4, paragraph 3, of the Convention and clarified how it has determined such resources as being "new and additional". Spain considers that all financial flows dedicated to climate change in the period 2005–2008 that are listed in the NC5 are "new and additional", because they represent an increase of flows to climate change related activities, initiatives, new projects and programmes.

98. Spain has included general information on the assistance it has made available to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to those adverse effects. Nevertheless, the ERT noted that this information is very general and lacks sufficient detail. In order to increase transparency, the ERT encourages Spain provide further detail on this reporting item in its next national communication. Spain has also provided information on other financial resources related to the implementation of the Convention, including contributions to the Global Environment Facility (GEF) and bilateral and multilateral climate change related official development assistance (ODA).

99. Table 7 summarizes the information on the financial resources allocated by Spain as ODA and to different funds.

Table 7
Summary of information on financial resources for 2005–2008

Channel of financial resources	*Years of disbursement*			
	2005	2006	2007	2008
Official development assistance (ODA) (EUR million)	2 428.36	3 038.35	3 754.62	4 761.69
Climate-related aid in bilateral ODA (EUR million)	27.79	37.96	38.01	66.27
Climate-related aid in multilateral ODA (EUR million)	1.37	4.22	69.36	51.08
Contribution to UNFCCC funds (EUR million)	0.35	4.05	2.05	5.36
Contributions to GEF (EUR million)	16.22	23.45	4.44	[a]
Climate-related contributions to GEF (EUR million)	5.68	8.21	1.55	[a]
Contributions to the World Meteorological Organization (USD million)	0.17	0.84	1.71	3.99
JI and CDM under the Kyoto Protocol (EUR million)[b]		205.45	105.13	135.20
Other (bilateral/multilateral) (EUR million)[c]			25.00	79.80

Abbreviations: CDM = clean development mechanism, GEF = Global Environment Facility, JI = joint implementation.

[a] Total contributions to GEF-2, GEF-3 and GEF-4 were made prior to 2008.

[b] Contributions commitment to several carbon funds. Some contributions are disbursed over a period of years. Considering the CDM share of proceeds, 2 per cent of the certified emission reductions issued from these contributions will be transferred to the Adaptation Fund.

[c] This information includes bilateral agreements on Green Investment Schemes linked to emissions trading.

100. Total spending on climate change related ODA amounted to EUR 117 million in 2008, compared to EUR 107 million in 2007, EUR 42 million in 2006 and EUR 29 million in 2005. The NC5 did not include information on the overall amount of ODA of Spain to allow the ERT to assess the proportion of ODA directed at climate change related assistance. In response to questions raised by the ERT, Spain provided this information during the review. The numbers show that climate change related ODA amounted to 2.5 per cent of total ODA in 2008 compared to 1.2 per cent in 2005. The ERT encourages the Party to include this information in its next national communication.

2. Activities related to transfer of technology, including information under Article 10 of the Kyoto Protocol

101. In its NC5, Spain has reported that technology transfer is provided mainly through bilateral and multilateral initiatives. Information is also provided regarding initiatives and partnerships to overcome policy, regulatory and financing barriers to renewable energy and energy efficiency in support of developing countries' access to financing for clean technologies. The NC5 of Spain includes a long list of examples of programmes and projects that involve technology transfer that shows that most of the initiatives are related to energy efficiency and renewable energy, which involve 'hard' or 'soft' technology transfer. Spain has reported activities related to technology transfer, but has not included any success

and failure stories using table 6 of the UNFCCC reporting guidelines. The ERT recommends that Spain, where feasible, report activities related to technology transfer, including success and failure stories, using table 6 of the UNFCCC reporting guidelines.

102. In addition, the ERT noted that Spain did not provide the following reporting elements required by the UNFCCC reporting guidelines: (a) a clear distinction between activities undertaken by the public sector and those undertaken by the private sector; (b) its activities for financing access by developing countries to 'hard' or 'soft' environmentally sound technologies; and (c) information, in textual format, on steps taken by the Spanish Government to promote, facilitate and finance transfer of technology, and to support the development and enhancement of endogenous capacities and technologies of developing countries. The ERT recommends that Spain include this information in its next national communication.

103. The priorities of Spain in relation to technology transfer are focused on mitigation. Nevertheless, Spain has also provided information on technology transfer for adaptation and capacity-building activities.

104. In general, the ERT noted that the transparency of this section of the national communication could be improved and encourages the Party to enhance the level of detail on the reporting of technology transfer activities in its next national communication, including information on success and failure stories.

F. Research and systematic observation

105. Spain has provided information on its actions relating to research and systematic observation (RSO), and has addressed both domestic and international activities. During the review, the Party provided further information on cooperation in international programmes including the Global Climate Observing System (GCOS) and the Intergovernmental Panel on Climate Change (IPCC). The NC5 also reflects action taken to support related capacity-building in developing countries. The ERT encourages Spain to enhance the transparency of its reporting on elements in the RSO chapter by improving the structure of the chapter and by elaborating further on its cooperation in international programmes such as the IPCC and the GCOS. The ERT also encourages Spain to provide information on socio-economic studies concerning the impacts of climate change and a cost–benefit analysis of action against climate change, if appropriate, in its next national communication.

106. The ERT noted that in the period 2004–2007, action relating to RSO was carried out by Spain within the framework of the National Scientific Research, Development and Technological Innovation Plan, with a budget of EUR 32.7 million allocated to research topics on climate change, environmental impact and environment information systems. In 2008, the National Scientific Research, Development and Innovation Plan 2008–2011 came into effect in Spain. As part of this new plan, the overall responsibility for planning and funding of RSO activities was shifted from the various ministries to the Ministry of Research and Innovation, and new strategic objectives, including climate change related objectives, were formulated. During the review, Spain provided information on a number of ongoing research activities, including those on CCS and RES. Spain also takes part in EU strategies under the aegis of the 7th Framework Programme for Research and Technological Development 2007–2013.

107. In Spain, several organizations are responsible for the systematic observation of the climate system components. The Spanish State Agency on Meteorology (AEMET) is the principal agency responsible for atmospheric and meteorological observation, while the Spanish Institute of Oceanography is responsible for oceanographic observation.

108. In order to support RSO capacity-building, Spain has carried out a range of activities in developing countries, including the support of GCOS regional action plans through the RIOCC. Within the UNFCCC framework, Spain funds systematic observation related priorities in Latin America through the GCOS cooperation mechanism. Actions carried out by AEMET include activities implemented through the Directors of Ibero-American Network of Meteorological and Hydrological Services and activities in West Africa. Spain also contributes to systematic observation programmes, such as the European Organization for the Exploitation of Meteorological Satellites, by providing satellite data.

G. Education, training and public awareness

109. In its NC5, Spain has provided detailed information on its actions relating to education, training and public awareness, at both the domestic and the international levels. The information includes initiatives of the central, regional and municipal administrations, as well as activities concerning various non-governmental organizations (NGOs) and private organizations. The ERT commends Spain for the wide scope of institutions included in its reporting on education, training and public awareness.

110. Education on climate change has been incorporated or extended in both mandatory and high school education, and several subjects have been created in higher education. The training is aimed at different groups, including professional education and postgraduate studies. The ERT noted that Spain supports and cooperates in public awareness initiatives in developing countries, and it encourages the Party to report on the training of experts from developing countries in its next national communication.

111. An important study on public awareness was published in 2009, and new surveys are under way to update the results. In addition to the general public awareness-raising campaigns, specific information campaigns, publications and workshops were directed at journalists in order to improve the coverage of climate change in the media. Further, the central administration has established voluntary agreements with car manufacturers and energy industries to self-regulate the environmental messages in advertising. The public and NGOs participate in climate change policy through, among others, the National Council on Climate Change, and regional and municipal forums.

H. Evaluation of supplementary information under Article 7, paragraph 2, of the Kyoto Protocol

112. Spain has provided most of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol in its NC5. The supplementary information is placed in different sections of the NC5. Table 8 provides an overview of supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol as well as references to the NC5 chapters in which this information is provided.

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

Supplementary information	*Reference in NC5*
National registry	Chapter III.E
National system	Chapter III.D
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Chapter V.B
Policies and measures in accordance with Article 2	Chapter IV.C
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Chapter IV.B
Information under Article 10	Chapters III.D, IV.B, IV.C, VII and IX
Financial resources	Chapters VII.A–C

113. Spain has not reported the following elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol: information on the efforts Spain is making to implement PaMs in such a way as to minimize adverse effects, including the effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention; and a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol also contribute to conservation of biodiversity and the sustainable use of natural resources. During the review, Spain provided the missing information. The technical assessment of the information reported under Article 7, paragraph 2, of the Kyoto Protocol is contained in the relevant sections of this report. The ERT recommends that Spain include these reporting elements in its next national communication.

I. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

114. Spain has reported the information requested in section I.H. "Minimization of adverse impacts in accordance with Article 3, paragraph 14", of the annex to decision 15/CMP.1 as a part of its 2010 annual GHG inventory submission. However, the ERT considered that the description of how Spain gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14, was not sufficiently transparent. During the review, Spain provided the ERT with the additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT considers the additional information to be transparent. The ERT recommends that the Party include the additional information provided during the review in its next annual submission and encourages Spain to continue exploring and reporting on the minimization of adverse impacts.

115. The 2010 national inventory report and the additional information provided during the review presented several initiatives of Spain on how it gives priority to minimize adverse impacts, including avoiding market distortions in its National Allocation Plan; setting sustainability criteria in the promotion of the use of biofuels; cooperating in the

development of technologies for both non-energy use of fossil fuels and advanced fossil-fuel technologies; assisting developing country Parties which are highly dependent on the export of fossil fuels in diversifying their economies; and conducting relevant research.

III. Conclusions and recommendations

116. The ERT concludes that the NC5 generally provides a good overview of the national climate policy of Spain. The information provided in the NC5 includes most mandatory information required by the UNFCCC reporting guidelines and most elements of the supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol with the exception of information on the efforts Spain is making to implement PaMs in such a way as to minimize adverse effects and a description of national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol also contribute to conservation of biodiversity and the sustainable use of natural resources. During the review, the Party provided additional information in relation to the missing parts. The ERT appreciates the efforts made by Spain during the review to provide further relevant information for clarification. The ERT also concludes that the transparency of the national communication could be improved with regard to some aspects in most chapters, and that Spain could improve the provision of information on its climate change actions by avoiding an over-lengthy report and by providing a translation of the national communication into English.

117. Spain's emissions for 2008 were estimated to be 42.3 per cent above its 1990 level excluding LULUCF and 43.7 per cent above including LULUCF. Emission increases were driven by strong economic and population growth, both much higher than in many other European countries; continued reliance on fossil fuels for primary energy supply and electricity generation and substantial growth in energy demand, in particular in manufacturing industries and construction, and in transportation activities. These factors outweighed the effect of improvements in the energy intensity and the effects of PaMs, in particular those aimed at the promotion of renewable energy. In the near term, the economic crisis and associated activity decrease may reduce emissions without a decoupling from the drivers in the long term, and adopted measures may lead to further emission reductions.

118. In the NC5, Spain presents GHG projections for the period 2010–2020. Three scenarios are included: the baseline ('without measures') scenario; the 'with measures' scenario; and the 'with additional measures' scenario. The NC5 projected annual emissions, excluding LULUCF, for the period 2008–2012 for these scenarios to be, respectively, 70, 40 and 37 per cent above the base year emissions. Taking into account the contribution of Article 3, paragraphs 3 and 4, activities (estimated to deliver a 2 percentage point reduction), the projections indicate that Spain can meet its Kyoto Protocol target (which is a 15 per cent increase) only with the use of the Kyoto mechanisms. Emission growth under all scenarios is extended beyond 2012 up to 2020. While in accordance with the updated projections that reflect the impact of the economic crisis, emissions between 2008 and 2012 are expected to be around 2.2 percentage points lower than those reported in the NC5, the difference is small and does not suggest any major change in the way that Spain should attain to its Kyoto target.

119. The NC5 contains information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action, although it did not elaborate on supplementarity as such. Spain is planning to use the Kyoto Protocol mechanisms to fill in the gap between its emissions and the Kyoto Protocol target for the first commitment period, taking into account the contribution from Article 3, paragraphs 3

and 4, activities. According to the updated projections and the 2 percentage point contribution from Article 3, paragraphs 3 and 4, activities indicated in the NC5, Spain will need to offset 51 Mt CO_2 eq per year during the period 2008–2012 with Kyoto units.

120. In recent years, Spain strengthened substantially its institutional and policy framework on climate change. To that end, it implemented the Spanish Strategy of Climate Change and Clean Energy, which sets the basic guidelines for a medium- to long-term approach (2007–2012–2020). The recent Urgent Measures Plan and the Strategic Priorities to address Climate Change complement the national strategy in a number of sectors including transport, energy production and consumption, and waste. The Autonomous Communities add, at the local levels, their own PaMs to the overall climate change portfolio. The EU ETS is one of the major instruments through which Spain can reduce its emissions in the industrial and electricity sectors. It currently covers over 1,000 Spanish installations, which account for almost 45 per cent of total GHG emissions. Spain has been very successful in promoting renewable energy using an effective portfolio of policy instruments, including subsidies. As a result, its market for renewable electricity is sizeable and fast growing, in particular regarding wind power. The progress of Spain in promoting renewable energy and related mitigation effects is impressive.

121. During recent years, Spain significantly increased both the total ODA and the share of climate-related ODA; climate-related ODA was increased to EUR 117 million in 2008 compared to EUR 29 million in 2005. During the review Spanish authorities explained that all these contributions represent an increase of flows to new climate change activities, initiatives, funds, projects and programmes and can thus be considered as new and additional. The depth and coverage in the national communication of Spanish activities related to the transfer of technology could be improved.

122. The ERT noted that, in its NC5, Spain has reported on vulnerability and adaptation in a comprehensive, well-structured and concise way. The ERT acknowledges the efforts that Spain has made to: assess its vulnerability; mainstream adaptation in its relevant sectors; build institutional capacity; use participatory approaches as well as bottom-up approaches combined with top-down ones; and enhance the coordination with Autonomous Communities as key actors for the identification and implementation of adaptation measures.

123. In its NC5, Spain has provided information on its actions relating to education, training and public awareness at both the national and the international level. Regional, municipal and private initiatives are also covered. Climate change and other environmental issues are well integrated into the primary, secondary and higher education systems. Media coverage is addressed by actions targeted at journalists and voluntary agreements with car manufacturers and energy companies.

124. Spain has provided information on its actions relating to RSO and has addressed both national and international activities, including cooperation with developing countries, which, in the case of Spain, focuses on Latin America and West Africa.

125. The ERT concluded that Spain's national system continues to perform its required functions as set out in decision 19/CMP.1; that the national registry continues to perform the functions set out in decision 13/CMP.1 and decision 5/CMP.1, and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol.

126. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol provided by the Party in its 2010 annual submission is broadly complete but not sufficiently transparent. Additional information provided during the

review further contributed to completeness and transparency. The ERT encourages Spain to further enhance the reporting on Article 3, paragraph 14, including by indicating how it gives priority to the actions taken in implementing its commitments under Article 3.

127. In the course of the IDR, the ERT formulated several recommendations relating to the completeness and transparency of Spain's reporting under the Convention and its Kyoto Protocol. The key recommendations[4] are that Spain:

(a) Improve the completeness of its reporting by including in its next national communication the following information:

(i) The efforts Spain is making to implement PaMs in such a way as to minimize adverse effects in developing countries;

(ii) A description of the arrangements and procedures to ensure the conservation of biodiversity and the sustainable use of natural resources while implementing activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol;

(iii) Emission projections for the international aviation and shipping sector;

(iv) How "new and additional" financial resources have been determined;

(v) Success and failure stories, including private initiatives, in the transfer of technology;

(vi) Support to enhance endogenous capacities and technologies in developing countries;

(b) Improve the transparency of its reporting by:

(i) Providing relevant information on factors and activities for each sector in the projections chapter;

(ii) Providing more detail on its international cooperation for adaptation;

(iii) Adhering more strictly to the UNFCCC reporting guidelines when reporting on PaMs and projections.

128. The ERT encourages Spain to undertake a number of improvements regarding transparency and completeness of reporting; the most important of these are that the Party:

(a) Provide further information on:

(i) Governance structure, competences and responsibilities, especially how actions by the Autonomous Communities fit into the national action framework;

(ii) Indicators in key sectors (e.g. industry structure, building stock and forest management practices) and more detailed explanation of the relationship between national circumstances, historic/recent emission trends and the main drivers;

(iii) Quantitative estimates of PaMs and information on methods applied to estimate their effects;

(iv) Costs and cost-effectiveness of PaMs;

(v) The institutions responsible for monitoring, reporting and evaluating PaMs; and how national and regional PaMs are monitored and how feedback is used for preparing and updating policies;

(vi) The minimization of adverse effects and impacts in accordance with Article 2, paragraph 3, and Article 3, paragraph 14, of the Kyoto Protocol;

[4] The recommendations are given in full in the relevant sections of this report.

(vii) The financial assistance provided to developing countries, especially those vulnerable to the adverse effects of climate change;

(viii) The training of developing country experts;

(ix) RSO activities, including cooperation with developing countries;

(b) Improve the consistency of sectoral reporting between the PaMs and projections chapters;

(c) Enhance the level of detail of its reporting on the transfer of technology to developing countries.

IV. Questions of implementation

129. During the review, the ERT assessed the NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol and reviewed information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol, with regard to timeliness, completeness and transparency. No question of implementation was raised by the ERT during the review.

Annex

Documents and information used during the review

A. Reference documents

"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. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories". FCCC/CP/1999/7. Available at <http://unfccc.int/resource/docs/cop5/07.pdf>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

"Guidelines for review under Article 8 of the Kyoto Protocol". Decision 22/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=51>.

FCCC/SBI/2007/INF.6. Compilation and synthesis of fourth national communications. Available at <http://unfccc.int/resource/docs/2007/sbi/eng/inf06.pdf>.

FCCC/SBI/2007/INF.6/Add.1. Compilation and synthesis of NC4s, Add.1: Policies, measures, past and projected future greenhouse gas emission trends of Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2007/sbi/eng/inf06a01.pdf>.

FCCC/SBI/2007/INF.6/Add.2. Compilation and synthesis of NC4s, Add.2: Financial resources, technology transfer, vulnerability, adaptation and other issues relating to the implementation of the Convention by Parties included in Annex I to the Convention. Available at <http://unfccc.int/resource/docs/2007/sbi/eng/inf06a02.pdf>.

FCCC/SBI/2007/INF.7. Compilation and synthesis of supplementary information incorporated in fourth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol. Available at <http://unfccc.int/resource/docs/2007/sbi/eng/inf07.pdf>.

FCCC/ARR/2009/ESP. Report of the individual review of the greenhouse gas inventory of Spain submitted in 2009. Available at <http://unfccc.int/resource/docs/2010/arr/esp.pdf>.

FCCC/IRR/2007/ESP. Report of the review of the initial report of Spain. Available at <http://unfccc.int/resource/docs/2007/irr/esp.pdf>.

FCCC/IDR.4/ESP. Report on the in-depth review of the fourth national communication of Spain. Available at <http://unfccc.int/resource/docs/2008/idr/esp04.pdf>.

Fourth national communication of Spain. Available at <http://unfccc.int/resource/docs/natc/spanc4.pdf>.

2009 GHG inventory submission of Spain. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php>.

2010 GHG inventory submission of Spain. Available at <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Ms. Sara Aagesen Muñoz (*Oficina Española de Cambio Climático, Ministerio de Medio Ambiente, y Medio Rural y Marino*), including additional material on updated PaMs, GHG projections, the national registry and recent climate policy developments in Spain. The following documents[1] were also provided by Spain:

Direccion general de calidad y evaluacion ambiental, Ministerio de Medio Ambiente, y Medio Rural y Marino, Secretaria de Estado de Cambio Climatico. *Proyeccion de emisiones de contaminantes atmosfericos en Espana (Resumen) (Diciembre 2009).*

Secretaria de Estado de Cambio Climatico. *Lineas Estrategias contra el cambio climatico. Grado de aplicacion (Junio 2010).*

[1] Reproduced as received from the Party.