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National communications and greenhouse gas inventory data from Parties included in Annex I to the Convention
Compilation and synthesis of supplementary information incorporated in fifth national communications from Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol and submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol

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Note by the secretariat

Summary

This document contains a compilation and synthesis of supplementary information incorporated in the fifth national communications submitted to the secretariat by Parties included in Annex I to the Convention in accordance with Article 7, paragraph 2, of the Kyoto Protocol. It provides information on a range of issues relating to the implementation of the Kyoto Protocol, such as: national systems and registries under the Kyoto Protocol; policies and measures (PaMs) in accordance with Article 2 of the Kyoto Protocol; trends in greenhouse gas emissions; projections and evaluation of the aggregated effect of PaMs; domestic and regional legislative arrangements and enforcement and administrative procedures to meet commitments under Articles 6, 12 and 17 of the Kyoto Protocol; and information under Articles 10 and 11 of the Kyoto Protocol.

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Contents

I. Executive summary

1. This report presents the summary information provided in fifth national communications (NC5s) necessary to demonstrate Parties' compliance with their commitments under the Kyoto Protocol, in accordance with part II of the "Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol", "Reporting of supplementary information under Article 7, paragraph 2" (decision 15/CMP.1) (hereinafter referred to as the reporting guidelines). This includes information on: national systems in accordance with Article 5, paragraph 1, of the Kyoto Protocol; national registries; domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures; supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol; policies and measures (PaMs) in accordance with Article 2 of the Kyoto Protocol; trends in greenhouse gas emissions; projections and evaluation of the aggregated effect of PaMs; information under Article 10 of the Kyoto Protocol; and information on financial resources.

2. This document contains information compiled and synthesized from the NC5s of 39[1] Parties included in Annex I, as defined in Article 1, paragraph 7, of the Kyoto Protocol (hereinafter referred to as an Annex I Parties)[2]. Although Turkey and Kazakhstan are Annex I Parties to the Kyoto Protocol, they do not have commitments inscribed in Annex B to the Kyoto Protocol; they have not submitted information under Article 7, paragraph 2, of the Kyoto Protocol and, therefore, are not covered in this report, except for in the sections on emission trends. Belarus submitted in its NC5 under the Convention some of the information required under Article 7, paragraph 2, of the Kyoto Protocol; this information and information on emission trends is included in this report. Since the amendment to the Kyoto Protocol with an emission reduction target for Belarus (decision 10/CMP.2) has not yet entered into force, information on Belarus as a Party to the Convention that is also Party to the Kyoto Protocol with commitments inscribed in Annex B to the Kyoto Protocol (Annex B Party) is not provided in this report. Total GHG emissions for the base year refer to total aggregate greenhouse gas (GHG) emissions used for the calculation of assigned amounts pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol. The definition of base year under the Kyoto Protocol differs from the base year definition under the Convention, which is used in document FCCC/SBI/2011/INF.1/Add.1.

A. Greenhouse gas emission trends

3. From the base year[3] to 2008, total aggregate **GHG emissions, excluding land use, land-use change and forestry (LULUCF), for all Annex I Parties taken together decreased by 16.2 per cent**, from 13.3 to 11.1 thousand teragrams of carbon dioxide equivalent (Tg CO_2 eq).[4] Between the base year and 2000, emissions decreased by 18.5 per

[1] This compilation and synthesis report covers the NC5s submitted by Parties to the Kyoto Protocol by 26 March 2011.

[2] All references to Parties in this document are to Annex I Parties that are also Parties to the Kyoto Protocol, unless otherwise indicated.

[3] Base year refers to 1990 for all Annex I Parties except for Bulgaria (1988), Hungary (average of 1985–1987), Poland (1988), Romania (1989) and Slovenia (1986). Annex I Parties may choose to use 1995 as its base year for fluorinated gases for the purpose for calculating its assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol. For details on the base year, see <http://unfccc.int/ghg_data/kp_data_unfccc/base_year_data/items/4354.php>.

[4] The estimates provided in this document for Iceland do not take into consideration the provisions of decision 14/CP.7 that Iceland intends to implement in meeting its commitments under Article 3, paragraph 1, of the Kyoto Protocol, since the way in which the decision will be implemented can be

cent, to a large extent because of the steep decline in emissions in Annex I Parties with economies in transition (Annex I EIT Parties). With the recovery of the economies of EIT Parties, emissions from this group of Parties increased, contributing to the increase in emissions of all Annex I Parties over the period 2000–2008 (by 2.8 per cent). From the base year to 2008 emissions from Annex I Parties that do not have economies in transition (Annex I non-EIT Parties) remained quite stable.

4. For **Annex B Parties**, GHG emissions in 2008 amounted to 10.4 thousand Tg CO_2 eq, which is 17.3 per cent lower than the base year level (12.6 thousand Tg CO_2 eq). From the base year to 2000, emissions decreased by 18.5 per cent for all Annex B Parties taken together. A small increase in emissions is observable between 2000 and 2008 (by 1.4 per cent). These numbers suggest that **the target under the Kyoto Protocol (Kyoto target) of a 5 per cent emission reduction for the group in the first commitment period of the Kyoto Protocol (2008–2012) is achievable** (see para. 74 below).

5. GHG emissions from **EIT Parties decreased sharply** in the 1990s, mainly due to the economic restructuring. For **Annex I Parties that do not have economies in transition (Annex I non-EIT Parties), only a small change in emissions** is observed during the period base year–2008. From the base year to 2008, **emissions of all GHGs and from all sectors decreased,** with nitrous oxide (N_2O) emissions and GHG emissions from agriculture displaying the largest decreases.

B. Projections and the total effect of policies and measures

6. Total aggregated GHG emissions, excluding LULUCF, under **the 'with measures' scenario for Annex B Parties taken together, decreased** from 12.6 thousand Tg CO_2 eq in the base year to 10.4 thousand Tg CO_2 eq in 2008, or by 17.3 per cent. The decrease is projected to continue further to 10.1 thousand Tg CO_2 eq in the annual average for the period 2008–2012, leading to a 20.0 per cent overall decrease in GHG emissions from Annex B Parties between the base year and the annual average for the period 2008–2012, or a 18.2 per cent decrease compared to the 1990 level.

7. The expected 20 per cent emission reduction under the 'with measures' scenario according to the NC5s is almost double the expected emission reduction of 10.8 per cent for the same scenario according to the fourth national communication (NC4) data (see FCCC/SBI/2007/INF.7). The higher emission reduction for the period 2008–2012 reported in the NC5s compared to the NC4s reflects both a **substantial strengthening of the PaMs in some key areas and some slowdown in economic growth in many Annex B Parties in the late 2000s.**

8. According to the projections, **Annex B Parties as a group are expected to exceed the Kyoto target for overall reductions of GHG emission**s in the first commitment period of the Kyoto Protocol, of at least 5 per cent below the 1990 levels, as inscribed in Article 3, paragraph 1, of the Kyoto Protocol (see Figure 1). Annual average total aggregated GHG emissions under the 'with additional measures' scenario for Annex B Parties as a group in the period 2008–2012 are projected to decrease by 21.0 per cent from the base year level. If, in addition, the expected use of LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (hereinafter referred to as LULUCF activities) and of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol (emissions trading, including green investment schemes (GIS), joint implementation (JI) and the clean

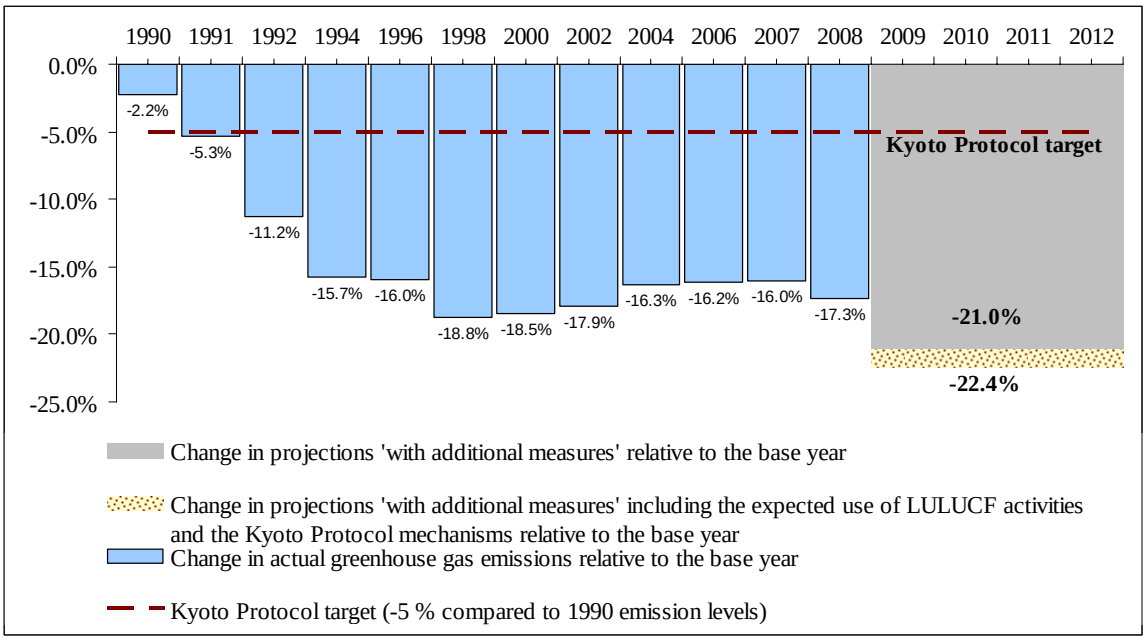
defined only after GHG inventory data have been reported for the last year of the first commitment period of the Kyoto Protocol**.**

development mechanism (CDM)) (hereinafter referred to as the Kyoto mechanisms) is taken into account, the level of GHG emissions is projected to be 22.4 per cent below the base year level.

9. Estimates suggest that **implemented domestic PaMs are likely to deliver emission savings of 6.8 per cent** of total GHG emissions of Annex B Parties annually in the period 2008–2012 compared to the base year emission levels. **When additional measures are considered, the emission savings increase to 9.4 per cent** for the same period.

10. Overall, **the total effect from the expected use of LULUCF activities and the Kyoto mechanisms by Annex B Parties as a group** for meeting their Kyoto targets during the first commitment period **appears to be very small** (170.6 Tg CO_2 eq annually on average for the period 2008–2012, or about 1.4 per cent compared to the base year emission level).[5]

Figure 1
Progress of Annex B Parties as a group towards its target under the Kyoto Protocol



Abbreviation: LULUCF = land use, land-use change and forestry.

11. The reported GHG projections allow the following preliminary[6] conclusions to be drawn on whether and how Annex I Parties are expected to adhere to their Annex B targets: **18 out of 38 Annex B Parties are expected to meet their Kyoto targets under the 'with measures' scenario**, which includes the effects of implemented and adopted PaMs; the European Union (EU) expects to meet its Kyoto target using additional measures; **a number of Parties expect to meet their Kyoto targets by using LULUCF activities, the**

[5] This is the preliminary assessment of the expected use of LULUCF activities and the Kyoto mechanisms by Parties, which reflects the initial plans of Parties available in 2009. The actual use of the Kyoto mechanisms for meeting the Kyoto target will be determined in Parties' true-up period reports, expected in 2015.

[6] These conclusions, drawn on the basis of data on the annual average emissions for the period 2008–2012 or for 2010, are preliminary since the true picture of a Party's GHG emissions and its holdings of Kyoto units and removal units (RMUs) for the commitment period and its use thereof for for meeting its Kyoto target will become clear only at the end of the first commitment period.

Kyoto mechanisms or a combination of both; **a few Parties may need to implement further measures** and/or use the Kyoto mechanisms beyond the plans reported in their NC5s in order to attain their Kyoto targets; and **Canada did not indicate whether and how it plans to attain its Kyoto target**.

C. Policies and measures in accordance with Article 2 of the Kyoto Protocol

12. The Parties reported on over 1,000 implemented, adopted and planned mitigation PaMs in their NC5s. In large part, the types of PaMs reported in the NC5s are similar to those reported in the NC4s. However, since the NC4s, some Parties have made major overhauls to their climate change policy portfolios. This has resulted in **PaMs in some key areas being substantially strengthened** through more stringent requirements, wider coverage and increased resource expenditures.

13. The provisions of the Kyoto Protocol have stimulated the development and implementation of new and more stringent climate change policy instruments in a number of Parties. Between 2004 and 2010, most Parties to the Kyoto Protocol made the most substantial changes to their PaMs, in order to deliver the emission savings needed to achieve their Kyoto targets. Their **mixes of PaMs show a pronounced move towards greater use of broad carbon pricing frameworks, based on emissions trading schemes (ETS), and stronger mandatory regulations**.

14. Despite the diversity and complexity of Parties' climate change strategies and PaMs, eight general trends are apparent:

(a) Most Parties now treat **climate change mitigation as a core top-level issue in the national policy agenda** and have developed greater policy capacity as well as legal and institutional frameworks – including top-level inter-ministerial coordinating groups – to reduce emissions;

(b) Parties are making **great use of multilevel governance** – across multiple scales of government (e.g. local to regional) and non-governmental actors – on climate change issues;

(c) Parties, in the context of the global economic crisis and shifts in global economic and energy flows, **are looking for climate change PaMs that can align the goals of emission reductions, energy security, job creation and economic competitiveness**, as well as air and water quality. To that end, integrated energy and climate packages have been developed by several Parties, and emphasis is being put on research and development (R&D) in relation to new technologies and innovative solutions, such as carbon capture and storage;

(d) Some Parties have progressed through one or more policy cycles and are now implementing **second- and third-generation policy strategies and PaMs**, which reflect lessons learned and are likely to be more effective in reducing emissions than previous efforts;

(e) Many Parties have established or are planning multisectoral (cross-cutting) **ETS as a foundation element** upon which climate change mitigation strategies are based;

(f) Many Parties are **supplanting voluntary programmes with mandatory regulations**, including mandatory ETS, in the key emissions sectors of electricity generation, emission-intensive industry, transport energy supply and road vehicle transportation;

(g) Parties are **continuing to make great use of the relatively low-cost options of mitigating non-carbon dioxide (CO_2)** (i.e. methane (CH_4), N_2O, perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride (SF_6)) emissions in the industrial processes and waste sectors, but there is little remaining room for further emission reductions in these areas;

(h) Several Parties are **developing long-term strategies (e.g. to 2050)**, with corresponding research and development (R&D) programmes, for decoupling GHG emissions and economic growth and establishing low-carbon societies.

15. Parties **reported on the steps taken to promote and/or implement decisions of the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO)** in order to limit or reduce GHG emissions from aviation and marine bunker fuels. The Parties defined their positions on the scope, principles and design of a possible global climate regime to regulate GHG emissions from international bunker fuels.

16. **Parties reported approaches to minimize the adverse effects of PaMs on climate change and international trade, and the social, environmental and economic impacts on other Parties.** The Kyoto Protocol was adopted in pursuit of the ultimate objective of the Convention, and hence its full implementation by Annex I Parties should contribute to preventing dangerous anthropogenic interference with the climate system. Ambitious mitigation goals that are necessary to ascertain a future for all countries are being undertaken. More than half of the Parties that reported information related to social, environmental and economic impacts in the NC5s indicated that **before the decisions to implement PaMs are taken, impact assessments are carried out.** Also noted was the possibility of negative impacts on developing countries from the promotion of biofuel use in Annex I Parties and the need to minimize this impact. A number of Parties noted their technical and financial support for adaptation activities in developing countries vulnerable to climate change.

D. Domestic and regional legislative arrangements and enforcement and administrative procedures to meet commitments under the Kyoto Protocol

17. Since the NC4s, **all Parties have continued enhancing their comprehensive approaches to addressing climate change, strengthening the coordination and monitoring of national efforts, and advancing the implementation of national climate change strategies**. When reporting domestic and regional legislative arrangements and enforcement and administrative procedures to meet commitments under the Kyoto Protocol, Parties **focused on cross-sectoral legal, regulatory and institutional frameworks** for implementing mitigation PaMs under the Kyoto Protocol, institutions and systems to account for emissions and assigned amounts, and relevant arrangements for implementing the Kyoto mechanisms. Also, all Parties provided elaborated information on their national registry and national system for GHG inventory preparation and management.

18. Most Parties have made notable efforts to improve and strengthen their national system for GHG inventory preparation and management since 2006 when these systems were set up. The efforts include **further institutionalizing the national systems** by strengthening the arrangements for the single national entity, enhancing administrative arrangements for inventory preparation and management, improving quality assurance/quality control (QA/QC) procedures, methodologies, activity data (AD), emission factors (EFs) and uncertainty analysis. The most important evidence of the strengthening of national systems is the demonstration of major improvements in the quality of the GHG inventory (improved time-series consistency, the use of higher-tier

methods and country-specific EFs, more accurate AD and the reduction of uncertainty) presented in the NC5s and relevant annual inventory submissions compared to that presented in the NC4s.

19. Since the publication of the NC4s, **significant progress has been made in improving operations and in further institutionalizing the national registries** of the holdings and transactions of units generated by the Kyoto mechanisms (Kyoto units). Most Parties passed the initial test to allow them to connect to the international transaction log (ITL) in 2007. By 2008, the national registries of most Parties were successfully connected to the ITL and could perform transactions of Kyoto units. Compliance with technical standards for data exchange between registry systems has been improved considerably since 2006, resulting in the more reliable processing of transactions of Kyoto units. Also, the reporting and review of national registries has been significantly improved, including through the use of tools such as the standard electronic format (SEF) submission tool and procedures such as the standard independent assessment report (SIAR), whereby registry system administrators assess the national registries of other Parties.

20. For some Parties, participation in the Kyoto mechanisms is essential in meeting their Kyoto targets. **Ten Parties expect to meet their targets by using a combination of additional measures, the Kyoto mechanisms and LULUCF activities in addition to their domestic efforts.** A few Parties may need to implement further PaMs and/or use the Kyoto mechanisms beyond the plans reported in the NC5s in order to reach their Kyoto targets.

21. Most of the Parties that reported the use or the intention to use the Kyoto mechanisms have established the necessary institutional arrangements and procedures in accordance with eligibility requirements. Several Parties have established a legislative and institutional framework for emissions trading. A few Parties that intended to sell assigned amount units (AAUs) have established GIS, which aim to ensure that revenues from sales of surplus AAUs are spent on emission-reducing activities. These schemes have been developed in a number of EIT Parties.

22. Parties that plan to use the Kyoto mechanisms for compliance with their Kyoto target (17 Parties) reported in their NC5s or provided an indication therein that the use of the Kyoto mechanisms is supplemental to domestic action to reduce GHG emissions. However, supplementarity is defined differently from Party to Party, mostly because of the use of different baseline assumptions to estimate the total effect of domestic action. Information reported in the NC5s broadly suggests **that Parties that are using the Kyoto mechanisms to meet their Kyoto targets are striving to adhere to the supplementarity criteria** but final determination of the Kyoto units used will be reported in the true-up period report in 2015.

23. Activities under Article 3, paragraphs 3 (afforestation, reforestation and deforestation) and 4, (forest management, cropland management, grazing land management and revegetation) of the Kyoto Protocol play a significant role in the implementation of the Kyoto Protocol for a number of Parties. Most Parties **enhanced their estimation of emissions and removals from LULUCF activities**. As regards the conservation of biodiversity and the sustainable use of natural resources, the majority of Parties reported that their **forest is managed according to the principles of sustainable forest management** and that their forest regulations and programmes contain requirements for biodiversity conservation and the sustainable use of natural resources.

E. Information under Articles 10 and 11 of the Kyoto Protocol

24. All Annex II Parties reported on the financial flows mobilized during the reporting period **through bilateral and multilateral institutions**, as well as through contributions to the Global Environment Facility **(GEF) Trust Fund**, the Least Developed Countries Fund (**LDCF**) and the Special Climate Change Fund (**SCCF**). Further, some Parties reported for the first time their contributions to the **Adaptation Fund** under the Kyoto Protocol.

25. In the area of **mitigation**, support was again mainly provided for projects and programmes aimed at promoting renewable energy technologies and supply, followed by transport and forestry. Several Parties also reported active participation in carbon finance schemes, such as carbon funds, in order to channel financial resources for mitigation activities in recipient countries.

26. In the area of **adaptation**, support was provided mainly for water management, supply and sanitation. Funding for adaptation under the Convention was channelled through the **SCCF** and **LDCF**, whereas many Parties highlighted the role of the **Adaptation Fund** under the Kyoto Protocol to catalyze funding for adaptation. Nonetheless, bilateral and multilateral institutions clearly remained the preferred channels through which to mobilize most climate finance. The **Climate Investment Funds (CIF)** were highlighted by many Parties, which have one specific window for climate-resilient development.

27. Several Parties specifically reported on the use of mechanisms and institutions under the Kyoto Protocol for the provision of financial support. Most of the examples and cases provided refer to **the development of emission reduction projects in developing countries in the context of the CDM**. Nearly all Parties reported information on how they have encouraged private-sector activities and public–private partnerships, including examples of initiatives to stimulate private-sector participation in climate change action.

28. Most Parties reported increased attention to **capacity-building** needs under the Kyoto Protocol since their NC4. Most examples refer to **awareness raising** and **training activities** for stakeholders, such as government agencies, the private sector and civil society organizations, in order to share information on the CDM process and to increase their effective participation in the international carbon market.

29. Most Parties have generally **continued to strengthen** their cooperation and participation in regional, international and intergovernmental **efforts on activities related to climate change science and systematic observation.** Many Parties also reported on support provided in the form of capacity-building activities in developing countries, including the development and improvement of regional research networks and climate projections, the identification of regional research projects and the gathering of climate-related information through strengthened systematic observation systems.

II. Mandate and approach

30. Article 7, paragraph 2, of the Kyoto Protocol requires each Annex I Party to incorporate in its national communication, submitted under Article 12 of the Convention, the supplementary information necessary to demonstrate compliance with its commitments under the Kyoto Protocol, in accordance with the reporting guidelines.

31. The reporting guidelines request each Annex I Party to include the necessary supplementary information to demonstrate compliance with its commitments under the Kyoto Protocol in its national communication submitted under Article 12 of the Convention, within the time frames for the obligations established by the Kyoto Protocol and by the relevant decisions of the Conference of the Parties (COP) and the Conference of

the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). The COP, by its decision 10/CP.13, paragraph 2, requested Annex I Parties to submit to the secretariat, in accordance with Article 12, paragraphs 1 and 2, of the Convention, an NC5 by 1 January 2010.

32. The CMP, by its decision 10/CMP.6, paragraph 1, requested the secretariat to prepare the compilation and synthesis of supplementary information incorporated in NC5s submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol, for consideration by the CMP at its seventh session.

33. This document contains information compiled and synthesized from the NC5s of 39[7] Annex I Parties which had submitted their NC5s by the time of preparation of this report. Although Turkey and Kazakhstan are Annex I Parties to the Kyoto Protocol, they do not have commitments inscribed in Annex B to the Kyoto Protocol; they have not submitted information under Article 7, paragraph 2, of the Kyoto Protocol and, therefore, are not covered in this report. The exception is the reference to emission trends of Annex I Parties, where emissions from Turkey and Kazakhstan are included to better represent the emission trends of Annex I Parties as a group. Belarus,[8] in its NC5 under the Convention, submitted elements of the information required under Article 7, paragraph 2, of the Kyoto Protocol; those elements are included in this report, but information for Belarus as an Annex B Party is not provided in this report.

34. In order to avoid an overlap between the compilation and synthesis of NC5s,[9] which covers all Annex I Parties to the Convention, and this report, the latter provides a brief summary of and makes reference to the information contained in the former report on emission trends, projections, PaMs, financial resources, transfer of technology and capacity-building, and research and systematic observation. The chapter on emission trends provides information on total GHG emissions of Annex I Parties (excluding the United States of America, but including Belarus, Kazakhstan and Turkey). This report also provides an overview of the progress of individual Parties towards achieving their Kyoto targets, including the contribution of domestic PaMs, accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, and accounting for Kyoto units.

35. This report presents the summary information provided in the NC5s in accordance with the requirements of the reporting guidelines, namely information on: national systems in accordance with Article 5, paragraph 1, of the Kyoto Protocol; national registries; domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures; supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol; PaMs in accordance with Article 2 of the Kyoto Protocol; information under Article 10 of the Kyoto Protocol; and information on financial resources.

III. Overview

36. **All Parties provided the supplementary information** under Article 7, paragraph 2, of the Kyoto Protocol in their NC5s (hereinafter referred to as the supplementary information). This includes information on: the national system in accordance with Article

[7] This compilation and synthesis report covers the NC5s submitted by Parties to the Kyoto Protocol by 25 March 2011.

[8] Since the amendment to the Kyoto Protocol to include an emission reduction target for Belarus in Annex B (decision 10/CMP.2) has not yet entered into force, and since Belarus has submitted information on emission trends under the Convention, the information on those trends is included in this report.

[9] FCCC/SBI/2011/INF.1 and Add.1 and 2.

5, paragraph 1, of the Kyoto Protocol; the national registry; supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol; PaMs in accordance with Article 2 of the Kyoto Protocol; domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures; information under Article 10 of the Kyoto Protocol; and information on financial resources.

37. The supplementary information **is placed in different sections of the NC5** depending on the substantive requirements for such information. For example, information on PaMs under Article 2 of the Kyoto Protocol is reported in the same section of the NC5 as where Parties reported information on such PaMs under the Convention. Table 1 provides an overview of the supplementary information reported by Parties as well as examples of documents and sections of the NC5 in which this information is provided. The table shows references to the national inventory reports (NIRs) of the Parties' 2009 annual submissions, to which many Parties referred for further information on their national systems and registries.

38. All reporting Parties provided **detailed information on domestic PaMs** to mitigate GHG emissions under Article 2 of the Kyoto Protocol. Also, Parties that intend to use the Kyoto mechanisms to meet their Kyoto targets provided information on how the use of those mechanisms is supplemental to domestic action, and how their domestic action thus constitutes a significant element of the efforts made to meet their targets. Most Parties reported some information on steps taken to limit emissions from aviation and marine bunker fuels and on ways to minimize the adverse effects of the implementation of PaMs under Article 2 of the Kyoto Protocol, and they included this information in the section of the NC5 on PaMs.

39. A description of **institutional arrangements and decision-making procedures aiming to implement activities under Articles 6, 12 and 17 of the Kyoto Protocol in a coherent way** was provided by all Parties, mostly in the section of the NC5 on PaMs. This information includes the elaboration of inter- and intragovernmental institutional arrangements, legislative frameworks and rules and procedures for the use of the Kyoto mechanisms.

40. Supplementary information on **technology transfer, capacity-building and provision of financial resources** was provided by all reporting Parties included in Annex II to the Convention (Annex II Parties) in the sections of the NC5 on financial resources and technology transfer and on education, training and public awareness. A few Annex I Parties (Czech Republic, Poland and Slovakia) which are not Annex II Parties and thus have no obligation to report this information in their national communication still provided information on their development assistance in the context of climate change.

Table 1

Overview of supplementary information submitted under Article 7, paragraph 2, of the Kyoto Protocol and incorporated in fifth national communications

Supplementary information	*Examples of references*
National system	NC5, section on GHG inventory, separate chapter for information under Article 7, paragraph 2, of the Kyoto Protocol NIR of 2009 annual submission Initial report under the Kyoto Protocol
National registry	NC5, section on GHG inventory NIR of 2009 annual submission Initial report under the Kyoto Protocol

Supplementary information	*Examples of references*
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol (joint implementation, the clean development mechanism and emissions trading)	NC5, section on projections
Policies and measures (PaMs) in accordance with Article 2 of the Kyoto Protocol, including: - Information on steps taken to promote and/or implement any decisions of the International Civil Aviation Organization and the International Maritime Organization in order to limit or reduce GHG emissions from aviation and marine bunker fuels; - Information on the minimization of adverse effects, effects on international trade, effects of climate change and adverse social, economic and environmental impacts	NC5, section on GHG inventory and section on PaMs
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures, including: - Description of regional/domestic legislative arrangements and enforcement and administrative procedures the Party has in place to meet its commitments under the Kyoto Protocol, including the legal authority for such programmes, for example procedures for non-compliance; - Provisions to make information on the above-listed procedures publicly accessible; - Description of institutional arrangements and decision-making procedures in place to coordinate activities under Articles 6, 12 and 17 of the Kyoto Protocol; - Description of legislative/administrative procedures for implementation of activities under Article 3, paragraph 3 and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol that contribute to the conservation of biodiversity and the sustainable use of natural resources	NC5, section on GHG inventory, section on PaMs, section on projections, and section on climate change vulnerability and adaptation
Information under Articles 10 and 11 of the Kyoto Protocol, including on: - Assistance to developing country Parties that are particularly vulnerable to climate change, including activities related to transfer of technology, capacity-building, and research and systematic observation; - Provision of "new and additional" financial resources; - Provision of financial resources, including those for the Adaptation Fund	NC5, section on climate change vulnerability and adaptation, section on financial resources and technology cooperation, and section on research and systematic observation

Abbreviations: GHG = greenhouse gas, NC5 = fifth national communication of Annex I Parties, NIR = national inventory report.

41. With regard to cooperation in the area of scientific and technical **research and systematic observation**, as referred to in Article 10(d) of the Kyoto Protocol, Parties generally reported related activities in the section of the NC5 on research and systematic observation under the Convention.

42. Several Parties **acknowledged challenges** in: reporting supplementary information on how they strive to implement PaMs in such a way as to minimize adverse effects on other Parties; elaborating on supplementarity pursuant to Articles 6, 12 and 17 of the Kyoto Protocol; and reporting on activities that address GHG emissions from bunker fuels. In particular, Parties faced difficulties in providing detailed information on how they strive 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 (see paras. 195–198 below). Several Parties identified the lack of specific reporting guidance and assessment methodologies as the main obstacles. A few Parties found it challenging to clearly explain how their use of the Kyoto mechanisms is supplemental to their domestic actions (see para. 242 below) and what steps they have taken to implement decisions of the ICAO and the IMO (see paras. 188–194 below).

IV. Greenhouse gas emission trends

A. Objective and scope

43. This chapter presents GHG emissions data for Annex I Parties based on information in the Parties' 2010 national GHG inventory submissions under the Kyoto Protocol[10] as at 31 March 2011. It contains data on total aggregate GHG emissions excluding emissions/removals from LULUCF, emissions by sector and by gas, and emission trends for individual Annex I Parties.

44. In addition, this chapter provides information on the emission trends of the 37 Annex B Parties as a group. Those Parties are: Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine and United Kingdom of Great Britain and Northern Ireland.

B. Total aggregate greenhouse gas emissions

45. From the base year to 2008, total aggregate **GHG emissions for all Annex I Parties taken together decreased by 16.2 per cent**, from 13.3 thousand to 11.1 thousand Tg CO_2 eq (see Figure 2). Between the base year and 2000, emissions decreased by 18.5 per cent, to a large extent because of the steep decline in emissions from Annex I EIT Parties (by 41.2 per cent). With the recovery of the economies of Annex I EIT Parties, emissions from this group of Parties increased, contributing to the increase in emissions from all Annex I Parties over the period 2000–2008 (by 2.8 per cent).

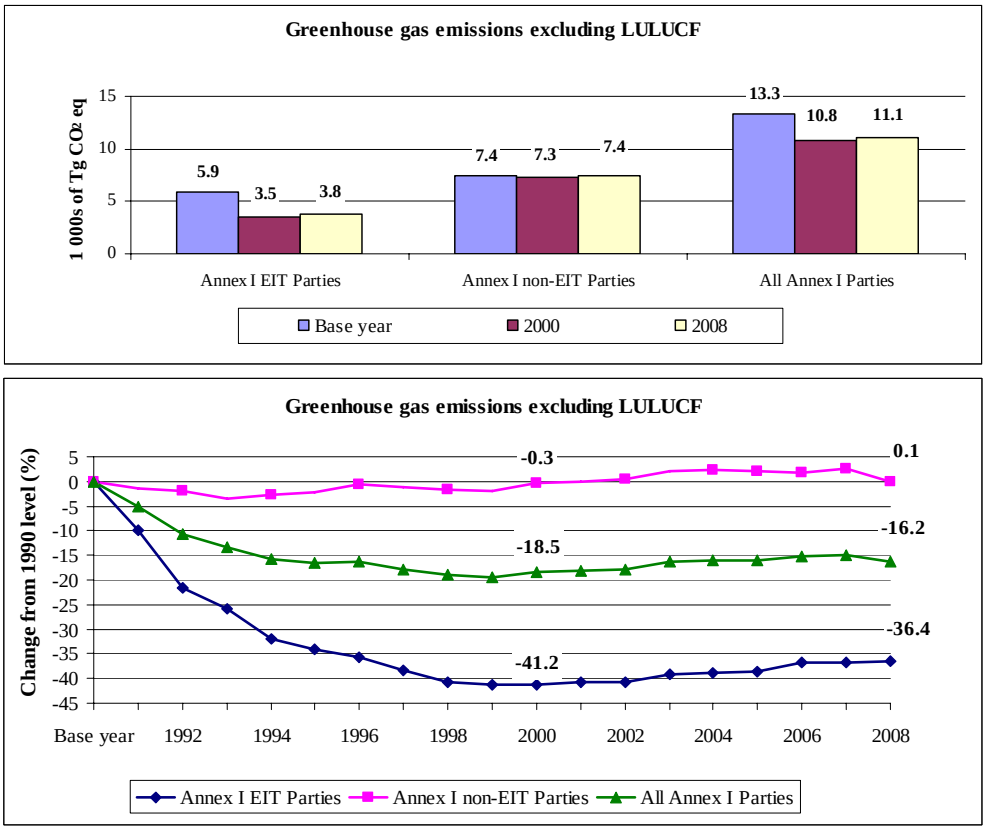
46. GHG emissions from **Annex I EIT Parties sharply decreased, by 36.4 per cent**, from the base year to 2008. From the base year to 2000, emissions decreased even further (by 41.2 per cent), owing mainly to the economic restructuring in the 1990s. However, over the period 2000–2008, emissions increased by 8.2 per cent, driven by the economic growth in these countries after 2000.

47. For **Annex I non-EIT Parties, only a small increase in emissions** is observable (by 0.1 per cent) from the base year to 2008. From the base year to 2000, emissions decreased by 0.3 per cent, whereas in the period 2000–2008 emissions increased by 0.3 per cent.

48. For **Annex B Parties**, GHG emissions in 2008 amounted to 10.4 thousand Tg CO_2 eq, which is 17.3 per cent lower than the base year level (12.6 thousand Tg CO_2 eq) (see Figure 3). From the base year to 2000, emissions decreased by 18.5 per cent for all Annex B Parties taken together. A small increase in emissions is observable between 2000 and 2008 (by 1.4 per cent). These numbers suggest that **the Kyoto target for the overall reduction of GHG emissions from Annex B Parties as a group of at least 5 per cent below 1990 levels in the first commitment period is achievable**.

[10] For the dates of submission, see <http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php>.

Figure 2
Greenhouse gas emissions from Annex I Parties, base year, 2000 and 2008[a]

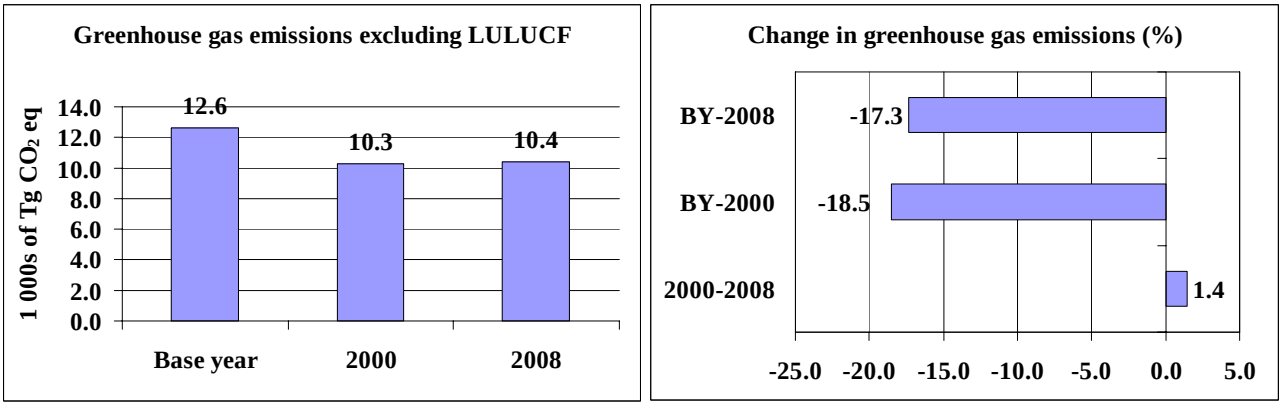


Note: The base year emissions include net emissions from deforestation of six Parties.

Abbreviations: EIT Parties = Parties with economies in transition, LULUCF = land use, land-use change and forestry, non-EIT Parties = Parties that do not have economies in transition.

[a] The sum of the values for Annex I EIT Parties and Annex I non-EIT Parties may differ slightly from the values provided for all Annex I Parties because of rounding.

Figure 3
Greenhouse gas emissions from Annex B Parties, base year, 2000 and 2008



Abbreviations: BY = base year, LULUCF = land use, land-use change and forestry.

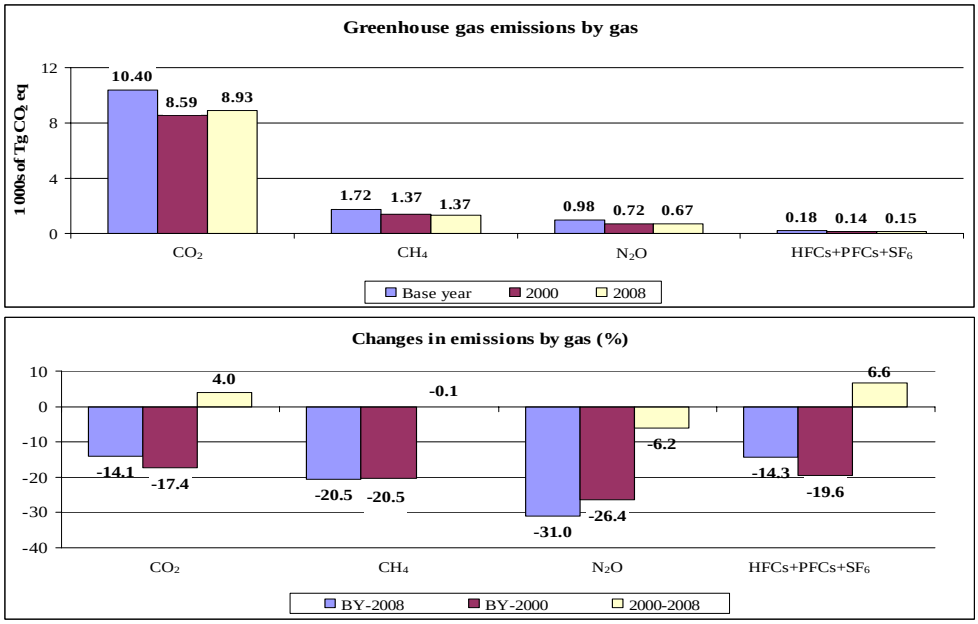
C. Greenhouse gas emissions by gas

49. **CO_2[11] is the predominant GHG throughout the entire time series**, contributing about 79 per cent of the total emissions of all Annex I Parties taken together. The shares of CH_4 and N_2O in the total emissions are approximately 13 per cent and 7 per cent, respectively. About 1 per cent of the total emissions come from HFCs, PFCs and SF_6 taken together.

50. From the base year to 2008, **emissions of all GHGs decreased**, with N_2O showing the largest decrease (by 31.0 per cent). Similarly, emissions of all GHGs decreased in 2000 compared with the base year; N_2O emissions also show the largest decrease over that period. Between 2000 and 2008, CO_2 emissions increased by 4.0 per cent, while CH_4 and N_2O emissions decreased by 0.1 and 6.2 per cent, respectively. Emissions of HFCs, PFCs and SF_6 taken together increased by 6.6 per cent, owing mainly to the more than 30 per cent increase in HFC emissions used as substitutes for some gases controlled by the Montreal Protocol.

51. The emissions of each gas in absolute terms for the base year, 2000 and 2008, as well as the percentage changes in the emissions of the gases for the periods base year to 2008, base year to 2000 and 2000–2008, are shown in Figure 4.

Figure 4
Greenhouse gas emissions from Annex I Parties, by gas



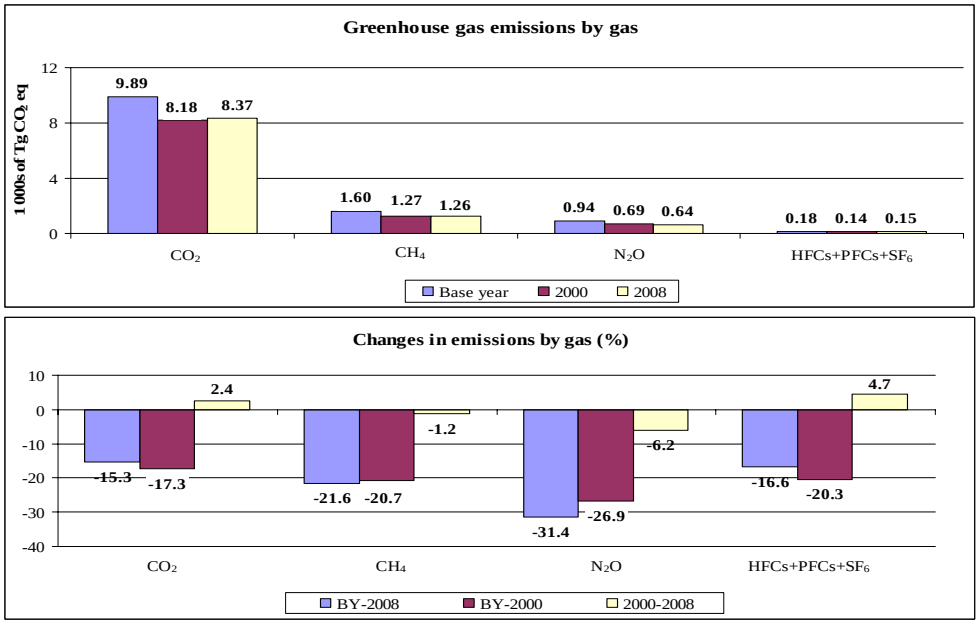
Abbreviation: BY = base year.

52. For Annex B Parties, there was a decrease in emissions for each gas in 2008 compared with the base year (see Figure 5). From the base year to 2000, substantial decreases in the emissions of each GHG can be observed: by 17.3 per cent for CO_2, 20.7 per cent for CH_4, 26.9 per cent for N_2O and 20.3 per cent for HFCs, PFCs and SF_6 taken

[11] The total for CO_2 emissions in the base year includes net emissions from deforestation of the following Parties: Australia, the group of European Union fifteen member States (EU-15), Ireland, Netherlands, Portugal and United Kingdom.

together. Compared with the 2000 level, CO_2 emissions increased in 2008, while CH_4 and N_2O emissions continued to decrease. Over the same period, emissions of HFCs, PFCs and SF_6 taken together increased by 4.7 per cent.

Figure 5
Greenhouse gas emissions from Annex B Parties, by gas



Abbreviation: BY = base year.

D. Greenhouse gas emissions by sector

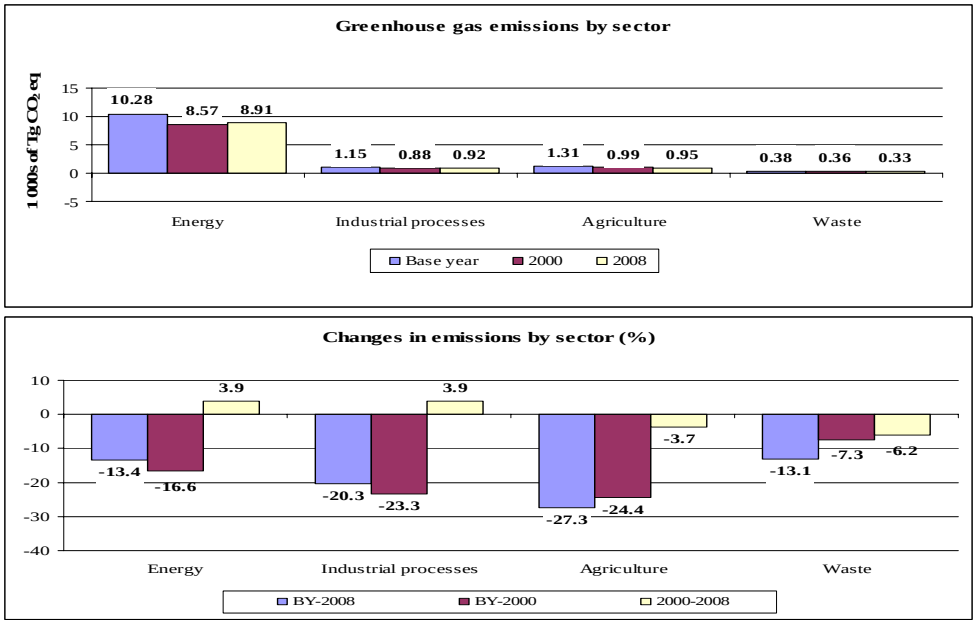
53. For all Annex I Parties taken together, **emissions from all sectors decreased** from the base year to 2008, with the largest decrease in emissions occurring in the agriculture sector (by 27.3 per cent). Emissions from industrial processes dropped by 20.3 per cent, from energy by 13.4 per cent and from waste by 13.1 per cent. Also, from the base year to 2000 there was a decline in emissions from all sectors. The agriculture sector had the largest decrease in emissions over this period (by 24.4 per cent), followed by the industrial processes, energy and waste sectors. However, the trends in emissions between 2000 and 2008 were different. While emissions from the agriculture and waste sectors continued to decrease, emissions from both the energy and industrial processes sectors increased by 3.9 per cent. The trends in emissions by sector are presented in Figure 6.

54. Also, for Annex B Parties, there was a decrease in emissions for all sectors in 2008 compared with the base year (see Figure 7). The trends in emissions by sector were similar to the trends observed for all Annex I Parties taken together.

E. Emissions data for individual Annex I Parties

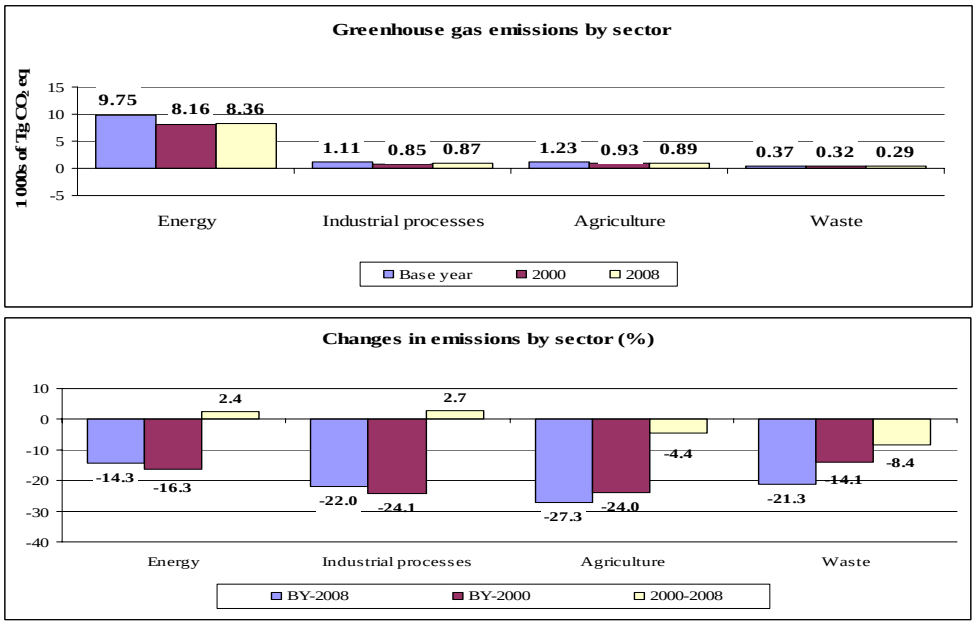
55. The **changes in total aggregate GHG emissions from the base year to 2008 varied considerably among Parties**, with a maximum decrease in emissions of 53.9 per cent (Latvia), followed by Ukraine and Estonia, to a maximum increase of 96.0 per cent (Turkey), followed by Iceland and Spain. Emissions decreased in almost all EIT Parties (except Slovenia), as well as in 12 non-EIT Parties, including the European Union.

Figure 6
Greenhouse gas emissions from Annex I Parties, by sector



Abbreviation: BY = base year.

Figure 7
Greenhouse gas emissions from Annex B Parties, by sector



Abbreviation: BY = base year.

56. Contrary to emissions between the base year and 2000, **emissions between 2000 and 2008 increased in most Parties** (25 Parties), while emission reductions occurred only in 16 Parties (13 of them being non-EIT Parties). The largest decrease in emissions was by 20.1 per cent (Monaco) and the greatest increase was by 47.6 per cent (Kazakhstan).

57. Latvia also had the largest decrease in emissions from the base year to 2000 (by 60.5 per cent), closely followed by Lithuania (by 60.1 per cent). Turkey had the greatest increase in emissions over the same period (by 58.8 per cent), followed by Portugal and Spain, whose emissions increased by more than 30 per cent. Emissions decreased in 26 Parties, including in all EIT Parties and in 12 non-EIT Parties. An increase in emissions occurred in 15 non-EIT Parties.

58. The total aggregate emissions of each Annex I Party in the base year, 2000, 2007 and 2008, as well as the percentage change in their emissions from the base year to 2008, are presented in table 2. The table also includes the emission reduction targets of each Annex B Party under the Kyoto Protocol.

Table 2

Total aggregate anthropogenic greenhouse gas emissions excluding emissions/removals from land use, land-use change and forestry for each Annex I Party

	Gg CO_2 eq				*Change from base*	*Kyoto Protocol*
Party	*Base year*	*2000*	*2007*	*2008*	*year to 2008 (%)*	*target (%)*
Australia	547 700	496 185	541 323	549 540	0.3	8.0
Austria	79 050	80 296	86 957	86 641	9.6	*–13.0*
Belarus[a]*	140 399	78 831	87 636	91 113	–35.1	–8.0[a]
Belgium	145 729	144 645	130 211	133 254	–8.6	*–7.5*
Bulgaria*	132 619	71 072	78 624	75 196	–43.3	–8.0
Canada	593 998	717 156	750 415	734 566	23.7	–6.0
Croatia*	31 441	25 886	32 294	31 143	–0.9	–5.0
Czech Republic*	194 248	147 522	147 485	141 434	–27.2	–8.0
Denmark	69 978	69 269	67 873	64 898	–7.3	*–21.*0
Estonia*	42 622	18 127	21 924	20 271	–52.4	–8.0
European Union (15)[b]	4 265 518	4 142 479	4 078 158	4 000 086	–6.2	–8.0
Finland	71 004	69 183	78 144	70 282	–1.0	*0*
France	563 925	557 295	531 242	528 090	–6.4	*0*
Germany	1 232 430	1 050 438	985 773	983 715	–20.2	*–21.0*
Greece	106 987	126 247	133 360	128 520	20.1	*25.0*
Hungary*	115 397	77 252	75 865	73 426	–36.4	–6.0
Iceland	3 368	3 766	4 508	4 880	44.9	10.0
Ireland	55 608	67 761	67 673	67 469	21.3	*13.0*
Italy	516 851	549 812	552 629	541 485	4.8	*–6.5*
Japan	1 261 331	1 344 290	1 369 037	1 281 884	1.6	–6.0
Kazakhstan	338 245	166 519	239 201	245 855	–27.3	–
Latvia*	25 909	10 232	12 311	11 941	–53.9	–8.0
Liechtenstein	229	255	243	263	14.8	–8.0
Lithuania*	49 414	19 737	25 799	24 688	–50.0	–8.0
Luxembourg	13 167	9 902	12 790	12 494	–5.1	*–28.0*
Monaco	108	120	98	95	–11.3	–8.0
Netherlands	213 034	214 573	206 918	206 917	–2.9	*–6.0*
New Zealand	61 913	70 064	75 202	75 120	21.3	0
Norway	49 619	53 352	55 842	54 408	9.7	1.0
Poland*	563 443	390 207	401 346	397 046	–29.5	–6.0
Portugal	60 148	81 301	79 872	78 381	30.3	*27.0*
Romania*	278 225	140 387	156 106	152 934	–45.0	–8.0
Russian Federation*	3 323 419	2 031 935	2 197 458	2 239 953	–32.6	0
Slovakia*	72 051	49 262	47 882	48 999	–32.0	–8.0
Slovenia*	20 354	18 821	20 571	21 285	4.6	–8.0
Spain	289 773	381 051	439 228	406 407	40.3	*15.0*
Sweden	72 152	68 861	66 163	64 271	–10.9	*4.0*
Switzerland	52 791	52 077	51 810	53 416	1.2	–8.0
Turkey**	187 029	297 006	379 976	366 502	96.0	–

Party	Gg CO_2 eq				Change from base year to 2008 (%)	Kyoto Protocol target (%)
	Base year	*2000*	*2007*	*2008*		
Ukraine*	920 837	393 130	440 477	427 843	–53.5	0
United Kingdom	779 904	675 981	643 723	631 733	–19.0	–12.5
Number of Parties showing a decrease in emissions by more than 1 per cent					24	
Number of Parties showing a change in emissions within 1 per cent					2	
Number of Parties showing an increase in emissions by more than 1 per cent					15	

Note: Targets under the "burden-sharing" agreement of the European Union are shown in italics.

* Parties undergoing the process of transition to a market economy.

** Decision 26/CP.7 invited Parties to recognize the special circumstances of Turkey, which place Turkey in a situation different from that of other Annex I Parties.

[a] The amendment to the Kyoto Protocol to include an emission reduction target for Belarus in Annex B (decision 10/CMP.2) has not yet entered into force.

[b] Data for the European Union included the group of its fifteen member States that agreed to fulfil their commitments under Article 3 of the Kyoto Protocol jointly in accordance with Article 4, paragraph 1, of the Kyoto Protocol. Individual targets for these member States are shown in italics.

F. Emissions data for individual Annex B Parties

59. Similar to the changes in the total aggregate GHG emissions of Annex I Parties, there is also considerable variation in the total emissions of individual Annex B Parties. In the period from the base year to 2008, Latvia had the largest decrease in emissions, while Iceland had the greatest increase in emissions. Also, between the base year and 2000 Latvia had the largest decrease in emissions, while Portugal had the greatest increase. From 2000 to 2008 the largest decrease in emissions occurred in Monaco, whereas the greatest increase in emissions occurred in Iceland.

60. The comparison of the emission levels in 2008 and the Kyoto targets of Annex B Parties is important for tracking the progress made towards achieving those targets, given that 2008 is the first year of the first commitment period of the Kyoto Protocol and that domestic action, as reflected in the emission trends, should constitute a significant element of the overall effort made to meet the targets. However, the overall determination of the progress made by Annex B Parties towards meeting their targets should be made taking into account also the use of LULUCF activities and the Kyoto mechanisms, as discussed in chapter 5 below. Figure 8 shows the difference between the projected average annual emission levels for the first commitment period of the Kyoto Protocol for individual Annex B Parties and their Kyoto targets. The average annual emission levels for the first commitment period of the Kyoto Protocol take into account only the effect of domestic action and do not include the planned use of LULUCF activities and the Kyoto mechanisms.

V. Projections and evaluation of the aggregated effect of policies and measures

A. Objective, scope and reporting

1. Objective and scope

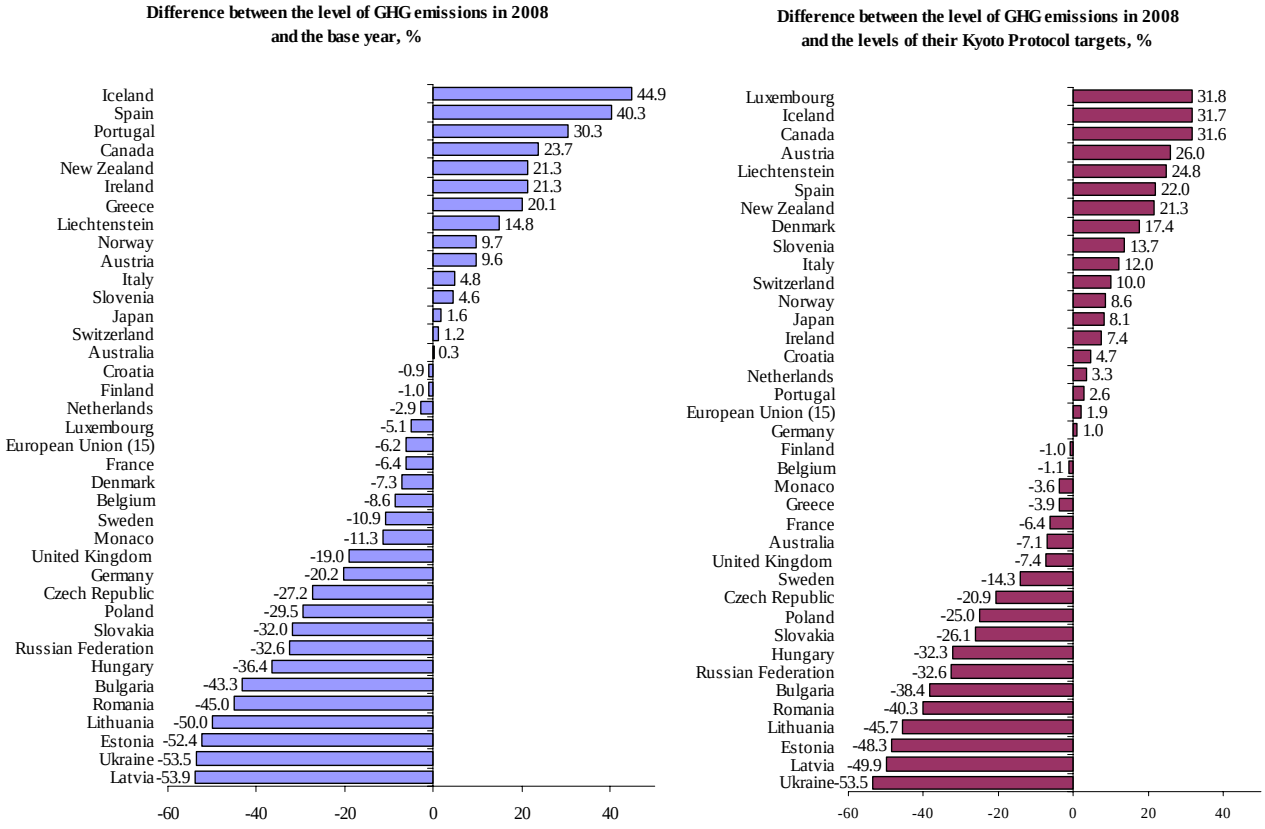
61. This chapter presents GHG emission projections for Annex B Parties for the first commitment period of the Kyoto Protocol on the basis of information reported in their NC5s, which were due by 1 January 2010.[12] While more recent and updated information on

[12] The information on GHG projections for all Annex I Parties, including those that are not Parties to the

projections is available for some Parties that provided such information in the course of the in-depth reviews of their national communications in 2010, that updated information has not been considered for the purpose of this report for consistency reasons.

Figure 8

Change in the total aggregate emissions of individual Annex B Parties in 2008 compared to the base year and to emission levels according to their targets under the Kyoto Protocol



Notes: (1) A negative value indicates overachievement of the Kyoto Protocol target and a positive value indicates a gap between the emission level in 2008 and the Kyoto Protocol target.

Abbreviation: GHG = greenhouse gas.

62. The primary objective of Annex I Parties reporting information on projections of GHG emissions in their national communications is to **give an indication of future trends in GHG emissions and removals**, given their national circumstances, implemented and adopted PaMs and a certain set of assumptions, as well as to give an indication of the pathways of emissions and removals under a scenario without such PaMs.

63. The emission estimates for the European Union are reported for the group of its fifteen member States (EU-15) and are reported separately from those of its individual member States. According to 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

Kyoto Protocol, is summarized in document FCCC/SBI/2011/INF.1/Add.1.

reporting guidelines),[13] at a minimum, **Parties are required to report projections under a 'with measures' scenario**. Parties may also report projections under 'without measures' and 'with additional measures' scenarios. Accordingly, the 'with measures' scenario takes into account the effects of PaMs that have been either implemented or adopted, whereas the 'with additional measures' scenario also includes the effects of planned PaMs at the time when the projections were being prepared. The 'without measures' scenario refers to a situation in which all PaMs either implemented, adopted or planned after a year chosen as the starting point for the projections are not taken into account.

2. Submission of information on projections

64. As at 25 March 2011, 38 Annex B Parties[14] had submitted their national communications to the secretariat. All 38 national communications contain a chapter on projections of GHG emissions under at least one of the following scenarios: 'with measures', 'with additional measures' and 'without measures'. Most Parties reported information for 2010, 2015 and 2020; some Parties also provided information on the annual average for the period 2008–2012.

65. Overall, out of 38 Parties that included a chapter on projections of GHG emissions in their NC5s, 36[15] provided quantitative information under the mandatory 'with measures' scenario for 2010 or the annual average for the period 2008–2012. In addition, 25 Parties reported projections under the 'with additional measures' scenario and 17 Parties reported projections under the 'without measures' scenario.

66. Further, 15 Parties (including the European Union and seven of its member States) reported quantitative estimates of their expected use of RMUs from LULUCF activities and 17 Parties (including the European Union and 10 of its member States) reported quantitative estimates of their expected use of the Kyoto mechanisms in meeting their Annex B targets.

67. For all Annex I Parties, including those that are not Parties to the Kyoto Protocol, information on GHG projections is presented in document FCCC/SBI/2011/INF.1/Add.1, chapters V–IX. To avoid repetition, this report contains those GHG data that relate to Annex B Parties, such as projections of total aggregate GHG emissions, the effect of the expected use of LULUCF activities and the Kyoto mechanisms, sectoral projections and emission trends for individual Annex B Parties.

68. In reporting their GHG emission projections, most Parties also reported the methods and approaches used and assumptions made in preparing the projections. The methods and approaches used, as well as the assumptions made with regard to key parameters that are the main drivers of GHG emissions for most of the Parties (average growth in gross domestic product, average population growth and the assumed price of crude oil on the international market), are summarized in chapter V.C of document FCCC/SBI/2011/INF.1/Add.1.

[13] 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, part II.

[14] Data for the European Union covered the group of its fifteen member States that agreed to fulfil their commitments under Article 3 of the Kyoto Protocol jointly in accordance with Article 4, paragraph 1, of the Kyoto Protocol. The amendment to the Kyoto Protocol to include an emission reduction target for Belarus in Annex B (decision 10/CMP.2) has not yet entered into force; information for Belarus is therefore not included in this report.

[15] Monaco and Poland did not provide projections data for 2010.

B. Greenhouse gas projections

1. Projections under the 'with measures' and 'with additional measures' scenarios compared with the base year emissions[16]

69. The information on GHG projections under the 'with measures' scenario covers 36 Annex B Parties that reported values for their annual average for the period 2008–2012[17] and two Parties (Monaco and Poland) that reported 'with measures' projections data for 2020 but not for 2010. For those two Parties, the average values for the period 2008–2012 were interpolated, assuming a linear emissions pathway, using sectoral data for 2007 and 2020 for Monaco and sectoral data for 2007 and 2015 for Poland.

70. Further, only 25 Parties reported projections data under the 'with additional measures' scenario for their annual average for the period 2008–2012. For comparability reasons, with regard to the Parties that did not report projections under the 'with additional measures' scenario, it has been assumed that their emissions under this scenario would be the same as under the 'with measures' scenario.

71. Projected total aggregate GHG emissions, excluding LULUCF, under the 'with measures' and 'with additional measures' scenarios for the period 2008–2012[18] based on the annual averages are shown in Figure 9. The figure also shows the total aggregate GHG emissions in the base year (1990)[19] used for calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol and the total aggregate GHG emissions in 2008.

72. Total aggregate GHG emissions, excluding LULUCF, under **the 'with measures' scenario for Annex B Parties taken together decreased** from 12.6 thousand Tg CO_2 eq in the base year to 10.4 thousand Tg CO_2 eq in 2008, or by 17.3 per cent. The decrease is projected to continue down to 10.1 thousand Tg CO_2 eq according to the annual average for the period 2008–2012, which leads to a 20.0 per cent **overall decrease in the emissions of Annex B Parties between the base year and the annual average for 2008–2012** or 18.2 per cent decrease between the 1990 level and the annual average for 2008–2012.

73. Under the **'with additional measures' scenario a slightly stronger decrease, of 21.0 per cent, is projected** between the base year emissions and the annual average for the period 2008–2012. The small difference between the two scenarios could be explained by the approach used to fill in the missing data for the 'with additional measures' scenario (see para. 70 above) and also by a small difference between the total emissions reported under the 'with measures' and 'with additional measures' scenarios for the 25 Parties that submitted projections under the 'with additional measures' scenario. In addition to the 'with additional measures' scenario, if the expected use of LULUCF activities and the Kyoto mechanisms is taken into account, the level of GHG emissions is projected to be 22.4 per cent below the base year level.

[16] The value for base year emissions refers to the value for total GHG emissions that was used for calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol.

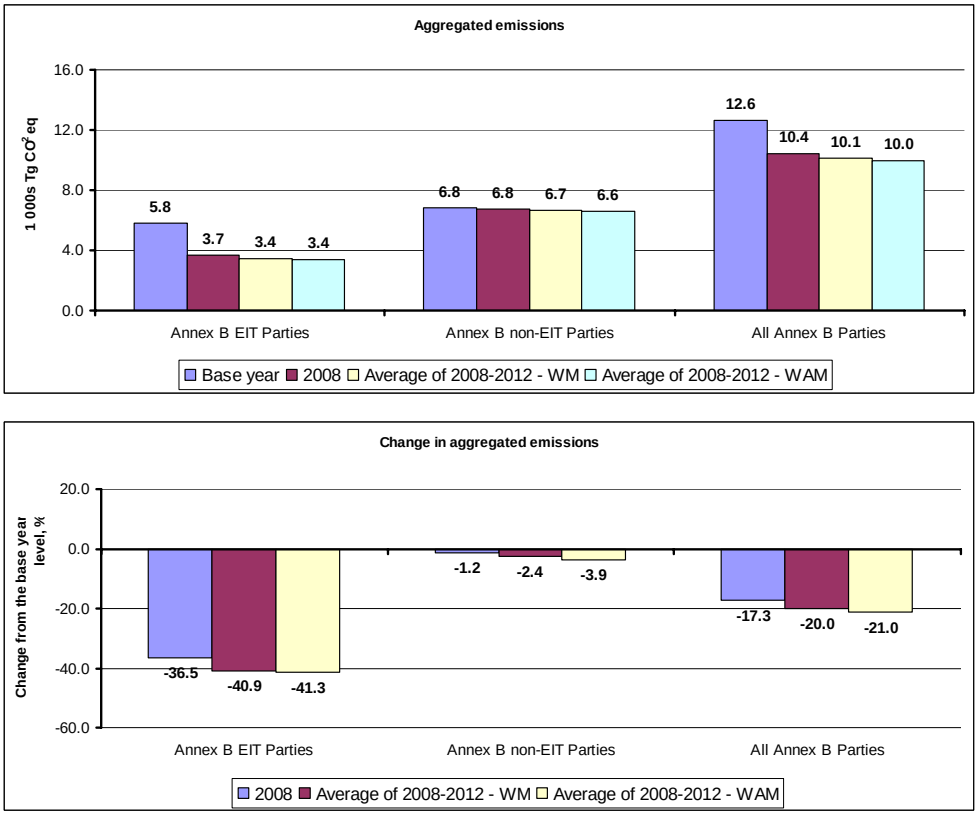
[17] Where values for the annual average for the period 2008–2012 were not available, the values for 2010 were used.

[18] Where values for the annual average for the period 2008–2012 were not available, the values for 2010 were used.

[19] Unless otherwise specified, here and elsewhere in this chapter base year data are used in sums and totals instead of the data for 1990 (in accordance with decisions 9/CP.2 and 11/CP.4, for Bulgaria (1988), Hungary (average of 1985–1987), Romania (1989) and Slovenia (1986)); some Parties chose to use 1995 as the base year for total emissions of fluorinated gases in accordance with Article 3, paragraph 8, of the Kyoto Protocol.

Figure 9

Projected greenhouse gas emissions for Annex B Parties excluding land use, land-use change and forestry under the 'with measures' and 'with additional measures' scenarios, and the change in emissions relative to the base year level



Notes: (1) Total greenhouse gas (GHG) emissions for the base year refers to the total emissions used for the calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol; (2) Total GHG emissions in 2008 are as reported in the 2010 inventory submissions of Annex B Parties; (3) Total GHG emissions for the base year includes net emissions of 132.9 Tg CO_2 eq from land use, land-use change and forestry (deforestation) in accordance with decision 13/CMP.1, annex, paragraph 5(b): Australia: 131.5 Tg CO_2 eq; Ireland: 0.005 Tg CO_2 eq; Netherlands: 0.04 Tg CO_2 eq; Portugal: 0.98 Tg CO_2 eq; and United Kingdom: 0.37 Tg CO_2 eq.

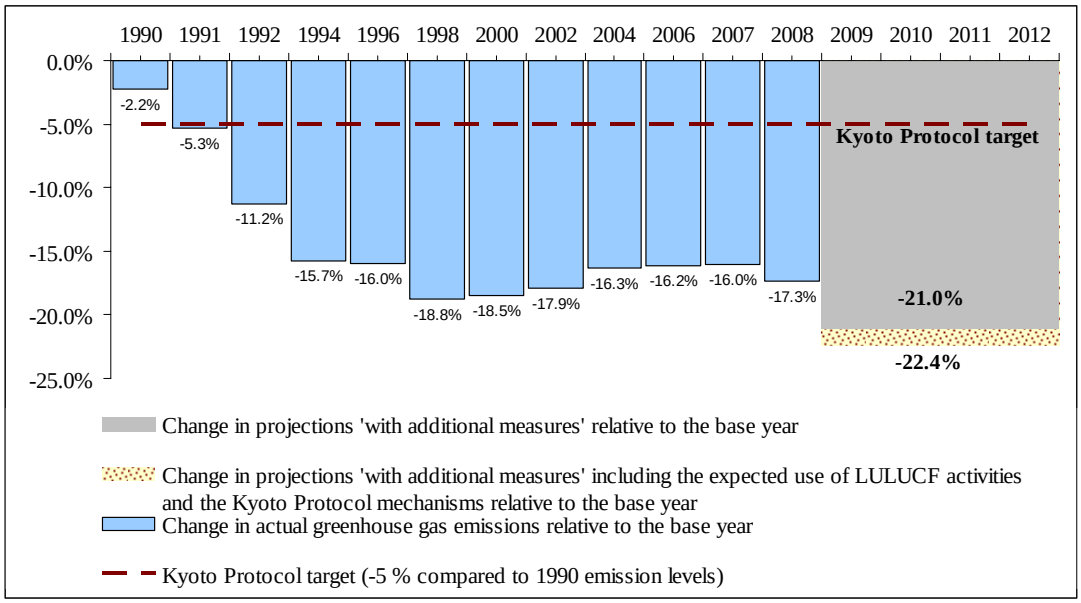
Abbreviations: EIT = economies in transition, WM = with measures, WAM = with additional measures.

74. According to the projections data for both the 'with measures' and 'with additional measures' scenarios, **Annex B Parties as a group are expected to exceed the target which is inscribed in Article 3, paragraph 1, of the Kyoto Protocol to reduce GHG emissions in the first commitment period of the Kyoto Protocol by at least 5 per cent below the 1990 level** (see Figure 10). Moreover, the expected emission reduction of 20 per cent under the 'with measures' scenario according to the NC5s is almost double the expected emission reduction of 10.8 per cent under the same scenario according to the data in the NC4s[20]. **The greater emission reduction for the period 2008–2012 reported in the NC5s compared with that reported in the NC4s reflects both a substantial**

[20] The compilation and synthesis report on supplementary information incorporated in fourth national communications submitted in accordance with Article 7, paragraph 2, of the Kyoto Protocol is contained in document FCCC/SBI/2007/INF.7.

strengthening of the PaMs in some key areas (see chapter VII below) **and some slowdown in economic growth in many Annex B Parties in the late 2010s.**

Figure 10
Progress towards the targets under the Kyoto Protocol of Annex B Parties as a group



Abbreviation: LULUCF = land use, land-use change and forestry.

75. Projected trends in emissions for Annex B EIT and non-EIT Parties show very different patterns. For Annex B EIT Parties under the 'with measures' scenario, total aggregate GHG emissions, excluding LULUCF, decreased from 5.8 thousand Tg CO_2 eq in the base year to 3.7 thousand Tg CO_2 eq in 2008, or by 36.6 per cent, and are projected to decrease further to 3.4 thousand Tg CO_2 eq according to the annual average for the period 2008–2012, or by 41.0 per cent. Emissions under the 'with additional measures' scenario are projected to decrease by an additional 0.8 per cent compared with emissions under the 'with measures' scenario over the same period.

76. For Annex B non-EIT Parties, under the 'with measures' scenario total aggregate GHG emissions, excluding LULUCF, decreased from 6.8 thousand Tg CO_2 eq in the base year to 6.72 thousand Tg CO_2 eq in 2008, and are projected to decrease further to 6.67 thousand Tg CO_2 eq according to the annual average for the period 2008–2012, or by just 2.4 per cent. Emissions under the 'with additional measures' scenario are projected to decrease further, by about 4.0 per cent. The higher level of decrease under the latter scenario reflects the endeavour of several Parties to achieve their targets or at least to minimize the distance[21] to their targets after taking into account possible use of the Kyoto mechanisms and LULUCF activities (see chapter V.B.5 below).

77. Because of the differences between the past and projected emission trends of Annex I EIT and non-EIT Parties, total aggregate GHG emissions in the period 2008–2012 are expected to be dominated by emissions from non-EIT Parties (69 per cent under the 'with

[21] The term "distance" to the target is used in this report to indicate the difference between the projected average annual emission levels for the first commitment period of the Kyoto Protocol and relevant emission levels that correspond to the Annex B targets. The planned use of LULUCF activities and the Kyoto mechanisms by the Parties is taken into account when assessing the distance to the Kyoto targets.

measures' scenario). This is in contrast to the base year, when the emissions from the two groups of Parties were almost comparable, namely Annex I non-EIT Parties' contribution to the total emissions was 54 per cent and the EIT Parties made up the rest.

2. Projected changes in sectoral greenhouse gas emissions under the 'with measures' scenario

78. Projected trends in average aggregate GHG emissions from Annex B Parties in the period 2008–2012 by sector are shown in Figure 11. It is important to note that projections data under the 'with measures' scenario were not available for some sectors and for some Parties. Hence, the comparison of the rate of change from the base year level to the average projected emission level for the period 2008–2012 across the sectors should be interpreted with caution.

79. For all Annex B Parties taken together,[22] average GHG emissions are projected to decrease in the period 2008–2012 in comparison with the base year level in all sectors, except transport: in the energy sector by 19.1 per cent, in the industrial processes[23] sector by 22.7 per cent, in the agriculture sector by 31.3 per cent and in the waste sector by 35.2 per cent. On the other hand, emissions from the transport sector are projected to increase by 19.9 per cent.

80. Projections by sector suggest that, as for historical emissions, **projected emissions from Annex B Parties are expected to be dominated by emissions from the energy sector**. Hence, the overall reduction in the total emissions will continue to be defined by the emission reductions in the energy sector. This sector is projected to achieve the most significant emission reductions, from 9.3 thousand Tg CO_2 eq in the base year to 7.5 thousand Tg CO_2 eq on average in the period 2008–2012, or by 19.4 per cent. The other sectors (such as agriculture, industrial processes and waste) are projected to contribute to the overall emission reductions to a lesser degree.

3. Total effects of the expected use of implemented and adopted policies and measures

81. This section discusses the estimated and expected total effect of implemented and adopted PaMs and of planned PaMs.

82. According to the UNFCCC reporting guidelines, Parties are required to present the estimated and expected total effect of implemented and adopted PaMs in the form of GHG emissions sequestered or avoided for 2010 and 2020. Parties may calculate the total effect of their measures by:

(a) Either taking the difference between their estimated GHG emissions under the 'with measures' and 'without measures' scenarios, if projections under the 'without measures' scenario were provided;

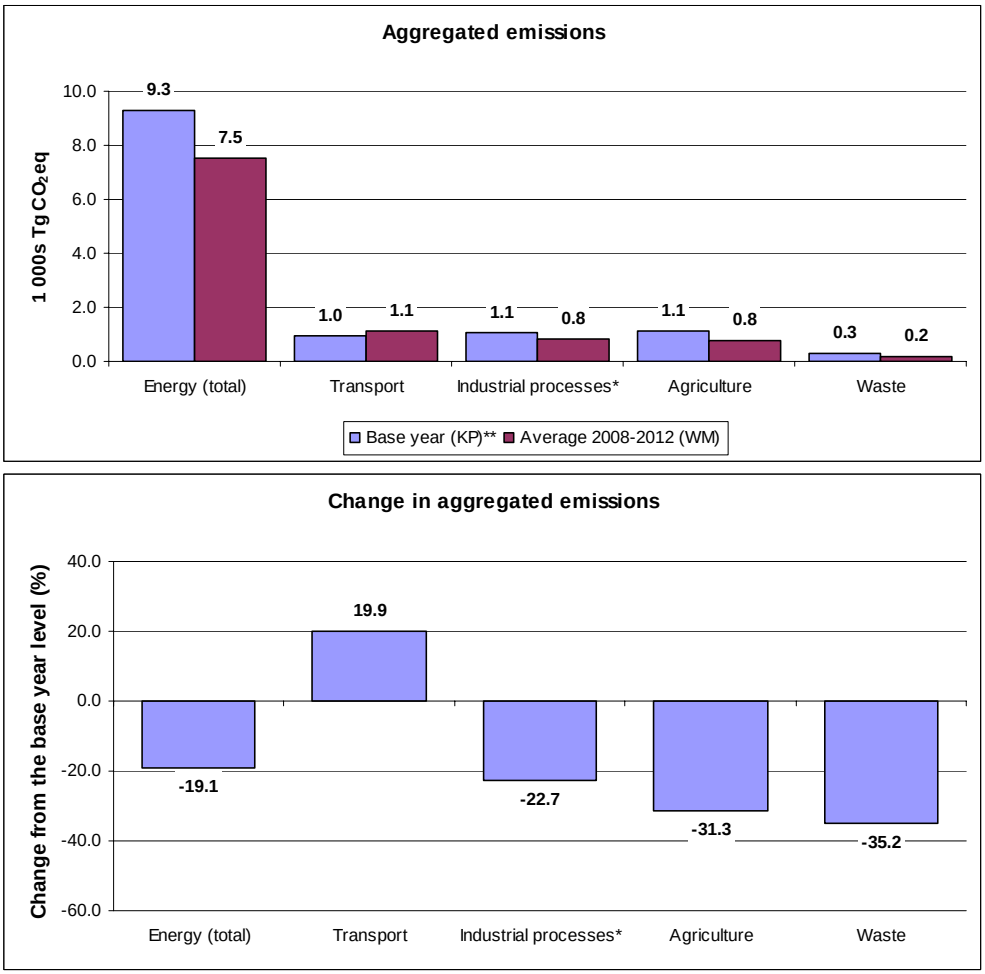
(b) Or aggregating the effects of individual PaMs that have been implemented or adopted.

[22] Note that detailed projections data by sector are not available for Canada and Iceland. Therefore, the sectoral values provided here do not include the data for these Parties. For some Parties, projections are available only for some sectors. The Russian Federation reported only aggregate emissions for the national total and the energy sector for both 2010 and 2020; the breakdown for the non-energy sectors was derived on the basis of the sectoral distribution of the historical GHG emissions. For Monaco and Poland, the sectoral data on the average for the period 2008–2012 were interpolated, assuming a linear emissions pathway, using sectoral data for 2007 and 2020 for Monaco and sectoral data for 2007 and 2015 for Poland.

[23] Emissions from solvent and other product use are included here.

83. Similarly, the estimated and expected total effect of planned PaMs is calculated by either taking the difference between the estimated GHG emissions under the 'with additional' measures and 'with measures' scenarios, if available, or by aggregating the effects of individual planned PaMs.

Figure 11
Projected greenhouse gas emissions from Annex B Parties, by sector



Notes: * Industrial processes includes emissions from the solvent and other product use sector; ** Net emissions of 132.9 Tg CO_2 eq from land use, land-use change and forestry (deforestation) included in the base year emissions of the following Parties in accordance with decision 13/CMP.1, annex, paragraph 5(b), are not included in the figure above: Australia: 131.5 Tg CO_2 eq; Ireland: 0.005 Tg CO_2 eq; Netherlands: 0.04 Tg CO_2 eq; Portugal: 0.98 Tg CO_2 eq; and United Kingdom: 0.37 Tg CO_2 eq.

(1) In order to avoid double counting, instead of using data for the 15 individual member States of the European Union, data reported by the European Union covering its fifteen member States (EU-15) are used here; (2) Owing to the unavailability of projections data by sector, data for Canada and Iceland are not included; (3) Number of Parties included in the analysis: energy (EU-15 plus 20 other Parties); transport (EU-15 plus 17 other Parties); industrial processes (EU-15 plus 19 other Parties); agriculture (EU-15 plus 18 other Parties); and waste (EU-15 plus 19 other Parties); (4) Because of the difference in the number of Parties covered, total emissions from individual sectors do not necessarily sum up to the overall totals given elsewhere in this document.

Abbreviations: KP = Kyoto Protocol, WM = with measures.

84. While 15 Parties provided projections data for total GHG emissions, excluding LULUCF, under the 'without measures' scenario for 2010 and 2020, only 11 Parties provided detailed projections data by sector for which the total effect of PaMs was calculated using the approach outlined in paragraph 82(a) above.[24] For 21 other Annex I Parties, the expected total effect of implemented and adopted PaMs by sector was calculated by summing up the effects of individual PaMs. There is no sufficient quantitative information in the national communications of the remaining Parties to calculate the total effect of their individual PaMs; hence, these Parties are not included in the sectoral analysis of PaMs.[25]

85. The estimated and expected total effect of implemented and/or adopted and planned PaMs of 32 Annex I Parties for the period 2008–2012 as an annual average by sector is shown in Figure 12. These estimates suggest that implemented domestic PaMs are expected to deliver emission savings of about 0.86 thousand Tg CO_2 eq, which are expected to increase further to 1.19 thousand Tg CO_2 eq if additional or planned PaMs are taken into account. This translates to **emission savings of 6.8 per cent of the total emissions of Annex B Parties annually** on average for the period 2008–2012, compared with **the base year emission level, through the implementation of existing PaMs; when the additional measures are considered, the emission savings increase to 9.4 per cent for the same period**.

86. **Most of the emission savings are projected to occur in the energy sector**, which alone is expected to account for, on average, 67 per cent of the total savings in the period 2008–2012. In addition, the industrial processes and solvent and other product use sectors together are projected to account for another 21 per cent of the total savings. The remaining 12 per cent of the total savings are expected to occur in the agriculture and waste sectors.

87. Some Parties expect to implement additional measures, which are projected to lead to emission savings of an additional 0.33 thousand Tg CO_2 eq. Most of these savings are expected to occur in the energy sector (about 0.24 thousand Tg CO_2 eq). The estimates shown here may be on the conservative side as the PaMs of seven Parties were not included. Also, the effects of some of the individual PaMs were not quantified, and hence these were not taken into account in the estimates.

4. Total effects of the expected use of Kyoto Protocol mechanisms and land use, land-use change and forestry activities

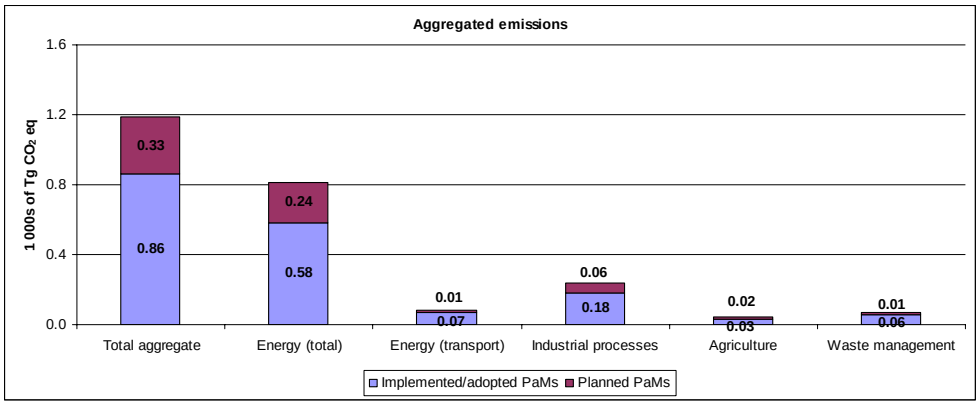
88. This section discusses the estimated and expected effects of the use of LULUCF activities and the use of the Kyoto mechanisms, which Annex B Parties can use in addition to domestic action for the purpose of meeting their Annex B targets.

89. As noted in paragraph 74 above and shown in Figure 10, **Annex B Parties as a group are projected to exceed the overall emission reduction target of 5 per cent below the 1990 level** inscribed in Article 3, paragraph 1, of the Kyoto Protocol even in the absence of additional PaMs and without the use of LULUCF activities and the Kyoto mechanisms. Also, at an individual Party level, many of the Parties expect to meet their Kyoto targets by reducing emissions from sources listed in Annex A to the Kyoto Protocol only. However, a number of Parties are expecting to make use of the Kyoto mechanisms and LULUCF activities and to add units generated from them to their initial assigned amount in meeting their targets. Information on emission projections and the use of these units is compiled in Table 3.

[24] Croatia, Czech Republic, France, Hungary, Lithuania, Luxembourg, New Zealand, Slovakia, Spain and Ukraine.

[25] Belarus, Finland, Iceland, Italy, Monaco, Poland and Russian Federation.

Figure 12
Total effects of the expected use of implemented and/or adopted and planned policies and measures, by sector



Notes: (1) Owing to the lack of sufficient quantitative information by sector in the national communications to calculate the total effect of individual PaMs, the following Parties were not included in the sectoral analysis shown above: Finland, Iceland, Italy, Poland and Russian Federation; (2) For Monaco, the total effect of its expected use of implemented and adopted PaMs by sector for the period 2008–2012 was interpolated from its sectoral data for 2007 and 2015.
Abbreviation: PaMs = policies and measures.

Table 3
Overview of the total effects of the use of land use, land-use change and forestry activities and the Kyoto Protocol mechanisms for the first commitment period of the Kyoto Protocol

Projected GHG emissions and change from the base year level to the average for 2008–2012	
Total GHG emissions (base year), Tg CO_2 eq	12 606.3
'With measures' projected GHG emissions (average for 2008–2012), Tg CO_2 eq	10 085.2
'With additional measures' projected GHG emissions (average for 2008–2012), Tg CO_2 eq	9 954.7
'With measures' projections, change from base year level, %	–20.0
'With additional measures' projections, change from base year level, %	–21.0
Expected use of LULUCF activities (for Parties that reported such information), Tg CO_2 eq	47.0
Expected use of the Kyoto Protocol mechanisms (for Parties that reported such information), Tg CO_2 eq	123.6
Total expected use of LULUCF activities and the Kyoto Protocol mechanisms, Tg CO_2 eq	170.6
Total expected effect of use of LULUCF activities and the Kyoto Protocol mechanisms relative to base year emission level, %	1.4
'With additional measures' projected GHG emissions after taking into account the use of LULUCF activities and the Kyoto Protocol mechanisms (average for 2008–2012), Tg CO_2 eq	9 784.2
Change from base year emission level to 'with additional measures' projected GHG emissions after taking into account the use of LULUCF activities and the Kyoto Protocol mechanisms, %	–22.44

Abbreviations: GHG = greenhouse gas, LULUCF = land use, land-use change and forestry.
Note: GHG emissions referred to in the table are emissions excluding LULUCF.

90. A summary of emission projections and effects of the expected use of LULUCF activities and the Kyoto mechanisms is provided in Table 4. The net quantity of the effect of the expected use of LULUCF activities by 14 Parties that reported such quantitative information amounts to 47.0 Tg CO_2 eq as an annual average over the period 2008–2012. This net figure includes net removals from LULUCF activities of 75.5 Tg CO_2 eq and net

emissions of 28.5 Tg CO_2 eq.[26] The quantity of the effect of the expected use of Kyoto units by 17 Parties that reported such information amounts to 123.6 Tg CO_2 eq annually over the same period.

91. Overall, the total effect of the **expected use of LULUCF activities and the Kyoto Protocol mechanisms by Annex B Parties as a group for meeting their Kyoto Protocol targets during the first commitment period appears to be very small** (170.6 Tg CO_2 eq annually on average for 2008–2012, or a reduction of about 1.4 per cent compared with the base year emission level) and is comparable with the effect of additional measures (emission reduction of 1.0 per cent compared with the base year emission level). This might be a very conservative estimate since it reflects the status as at 2010 when Parties submitted their NC5s and does not necessarily take into account the total units that may be available for use by the end of the first commitment period. Also, for individual Parties the use of LULUCF activities and the Kyoto mechanisms could be sizeable (see para. 93 below).

5. Projections data for individual Annex I Parties

92. Similar to the historical trends in GHG emissions, **the change in projected total GHG emissions for individual Annex B Parties from the base year to the period 2008–2012 varies significantly from Party to Party** (see Figure 13), from a decrease in emissions of about 63 per cent (Estonia) to an increase of about 43 per cent (Portugal) under the 'with measures' scenario and from a decrease of about 63 per cent (Estonia) to an increase of about 26 per cent (Iceland) under the 'with additional measures' scenario and taking into account the expected use of LULUCF activities and the Kyoto mechanisms.

93. Table 4 presents the projected changes in GHG emissions for individual Annex B Parties from the base year to the period 2008–2012 under two scenarios, the 'with measures' and 'with additional measures' scenarios, and the expected use of LULUCF activities and the Kyoto mechanisms. Data reported by Annex B Parties suggest **that in meeting their Annex B targets a number of Parties expect a sizeable contribution** from:

(a) Additional measures, for example Austria (1.3 per cent of the base year level), Croatia (3.4 per cent), European Union (1.7 per cent), Ireland (6.3 per cent), Japan (2.7 per cent) and Spain (3.9 per cent);

(b) LULUCF activities, for example Croatia (3.1 per cent of the base year level), Denmark (3.1 per cent), European Union (1.0 per cent), Ireland (4.0 per cent), Italy (2.0 per cent), Japan (1.0 per cent), New Zealand (25.7 per cent), Norway (3.0 per cent), Sweden (3.0 per cent) and Switzerland (0.7per cent);[27]

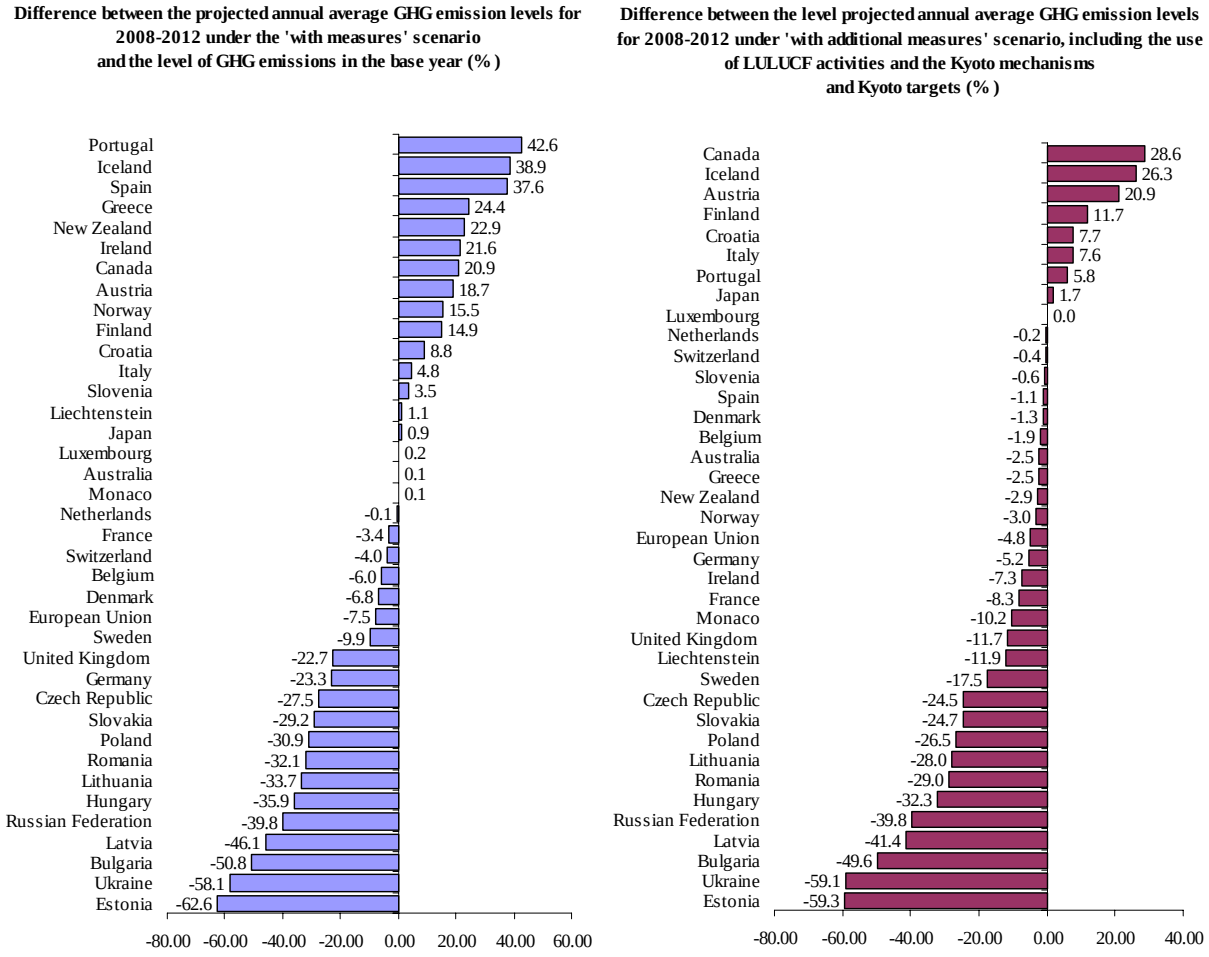
(c) The Kyoto mechanisms, for example Austria (11.4 per cent of the base year level), Belgium (3.1 per cent), Denmark (12.1 per cent), European Union (2.2 per cent), Finland (2.0 per cent), Ireland (6.5 per cent), Italy (2.2 per cent), Japan (1.6 per cent), Liechtenstein (20.0 per cent), Luxembourg (27.3 per cent), Netherlands (6.1 per cent), Norway (14.5 per cent), Portugal (7.4 per cent), Slovenia (5.4 per cent), Spain (20.0 per cent) and Switzerland (3.8 per cent).

[26] Australia projected net emissions of 28.5 Tg CO_2 eq as an annual average for the period 2008–2010 from its LULUCF activities under Article 3, paragraph 3, of the Kyoto Protocol. Under such a scenario, Australia may need to cancel an equivalent amount of units from its assigned amount at the end of the first commitment period.

[27] The contribution of LULUCF activities is also important for Australia, but, following the accounting rules under Article 3, paragraphs 7 and 8, of the Kyoto Protocol, this contribution is reflected in the base year emission level.

Figure 13

Change in the projected levels of greenhouse gas emissions from individual Annex B Parties compared to the base year and to emission levels according to their targets under the Kyoto Protocol



Notes: (1) For Monaco and Poland, average values for the period 2008–2012 were interpolated, assuming a linear emissions pathway, using sectoral data for 2007 and 2020 for Monaco and sectoral data for 2007 and 2015 for Poland; (2) Iceland provided GHG projections under two scenarios: Scenarios 1 and 2. The projections under Scenario 1, which assumes the peaking of the production capacity of energy-intensive industries in 2008, are used here; the estimates for Iceland do not take in consideration the provisions of decision 14/CP.7 that Iceland intends to implement in meeting its commitments under Article 3, paragraph 1 of the Kyoto Protocol, since the way the decision will be implemented can be defined only after greenhouse gas inventory data are reported for the last year of the first commitment period of the Kyoto Protocol; (3) For Croatia, the figure does not take into account 3.5 Mt CO_2 eq referred to in decision 7/CP.12. The final decision of the enforcement branch with respect to Croatia which, among things, concludes that decision 7/CP.12 cannot be applied by Croatia in its calculation of its assigned amount, is under appeal with the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. The final value for its base year emissions may be available once the appeal is resolved; (4) The annual average assigned amount for the period 2008–2012 is calculated by dividing the initial assigned amount established pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol by five; (5) The data for the use of LULUCF activities and the Kyoto mechanisms are preliminary as they are based on the expected use of LULUCF activities and the Kyoto mechanisms in 2009. Actual use of LULUCF activities and the Kyoto mechanisms for compliance with the Kyoto Protocol target will be determined after the end of the first commitment period; (6) A negative value indicates overachievement of the Kyoto Protocol target and a positive value indicates a gap.

Abbreviation: GHG = greenhouse gas.

94. The reported GHG projections allow the following preliminary[28] conclusions (see box 1) to be drawn on whether and how Annex I Parties are expected to adhere to their Kyoto targets.

Box 1
Preliminary estimates on whether and how Annex I Parties are expected to adhere to their targets under the Kyoto Protocol

About half of Annex B Parties (18 out of 38 Annex B Parties) are expected to meet their Kyoto targets under the 'with measures' scenario, which includes the effects of implemented and adopted PaMs. These are mostly Annex B EIT Parties (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovakia and Ukraine) that experienced a substantial decrease in emissions in the 1990s as a result of the transition from a centrally planned to a market economy, but also some Annex B non-EIT Parties (Australia, France, Germany, Greece, Monaco, Sweden and United Kingdom).

The European Union expects to meet its Kyoto target using additional measures.

A few Annex B Parties expect to meet their Kyoto target by using LULUCF activities, namely Australia, Croatia and New Zealand or by using the Kyoto mechanisms, namely Belgium, Lichtenstein, Netherlands and Spain, or by a combination of both, namely Denmark, European Union (15), Finland, Ireland, Norway, Slovenia and Switzerland.

A few Parties, including Austria, Croatia, Finland, Iceland, Italy, Japan, Luxembourg and Portugal, may need to implement further measures and/or use the Kyoto mechanisms beyond the plans reported in their NC5s to attain their Kyoto targets.

Canada projected its emissions to be 21 per cent above the base year level in 2008–2012, which is well above its Kyoto target (–6 per cent). It did not indicate whether and how it plans to attain its Kyoto target.

[28] These conclusions, drawn on the basis of data on the annual average emissions for the period 2008–2012 or for 2010, are preliminary since the true picture of a Party's GHG emissions and its holdings of Kyoto units and RMUs for the commitment period and their use for compliance with its Kyoto target will become clear only at the end of the first commitment period.

Table 4

Projected changes in total aggregate greenhouse gas emissions, excluding emissions/removals from land use land-use change and forestry, and the contribution of land use, land-use change and forestry activities and the Kyoto Protocol mechanisms for individual Annex B Parties in meeting their Annex B targets for the first commitment period of the Kyoto Protocol

	Emissions (Tg CO_2 eq)					*Contribution of LULUCF activities and Kyoto Protocol mechanisms (Tg CO_2 eq)*				
		With measures		*With additional measures*						
	Base year (Kyoto Protocol)[a]	*2008–2012 average*	*Change from base year (%)*	*2008–2012 average*	*Change from base year (%)*	*Expected use of LULUCF activities*	*Expected use of the Kyoto Protocol mechanisms*	*Emissions taking into account the use of LULUCF activities and the Kyoto Protocol mechanisms*[b]	*Change in emissions compared with base year level (%)*	*Target under the Kyoto Protocol (or under the burden-sharing agreement for the European Union (15) (%)*
Australia	547.70	548.50	0.2	–	–	(–28.50)	–	577.00	5.4	8
Bulgaria	132.62	65.29	–50.8	61.51	–53.6	–	–	–	–	–8
Canada	594.00	718.00	20.9	–	–	–	–	–	–	–6
Croatia	31.32[c]	34.09	8.8	33.02	5.4	–0.97	–	32.05	2.3	–5
Czech Republic	194.25	140.81	–27.5	134.91	–30.5	–	–	–	–	–8
Estonia	42.62	15.96	–62.6	15.98	–62.5	–	–	–	–	–8
European Union (15)	4 265.52	3 944.00	–7.5	3 871.00	–9.3	–42.40	93.10	3 735.50	–12.4	–8
Austria	79.05	93.87	18.7	92.87	17.5	–0.70	9.00	83.17	5.2	–13
Belgium	145.73	136.93	–6.0	136.71	–6.2	–	4.46	132.25	–9.3	–7.5
Denmark	69.98	65.25	–6.8	–	–	–2.19	8.50	54.56	–22.0	–21
Finland	71.00	81.60	14.9	81.30	14.5	–0.59	1.40	79.31	11.7	0
France	563.93	544.56	–3.4	516.99	–8.3	–	–	–	–	0
Germany	1 232.43	944.67	–23.4	923.28	–25.1	–	–	–	–	–21
Greece	106.99	133.04	24.4	131.33	22.8	–0.90	–	130.43	21.9	25
Ireland	55.61	67.59	21.6	64.11	15.3	–2.24	3.60	58.28	4.8	13
Italy[d]	516.85	541.80	4.8	–	–	–10.20	11.50	520.10	0.6	–6.5
Luxembourg	13.17	13.20	0.2	13.19	0.2	–	3.71	9.48	–28.0	–28
Netherlands	213.03	212.80	–0.1	–	–	–	13.00	199.80	–6.2	–6
Spain	289.77	398.70	37.6	387.41	33.7		57.88	329.53	13.7	15
Sweden	72.15	65.00	–9.9	64.00	–11.3	–2.13	–	61.87	–14.3	4
Portugal	60.15	85.80	42.6	85.27	41.8	–	4.44[e]	80.83	34.4	27
United Kingdom	779.90	602.50	–22.8	–	–	–	–	–	–	–12.5
Hungary	115.40	73.95	–35.9	73.49	–36.3	–	–	–	–	–6
Iceland[f]	3.37	4.68	38.9	–	–	–	–	–	–	10

	Emissions (Tg CO_2 eq)					Contribution of LULUCF activities and Kyoto Protocol mechanisms (Tg CO_2 eq)				Target under the Kyoto Protocol (or under the burden-sharing agreement for the European Union (15) (%)
		With measures		With additional measures						
	Base year (Kyoto Protocol)[a]	2008–2012 average	Change from base year (%)	2008–2012 average	Change from base year (%)	Expected use of LULUCF activities	Expected use of the Kyoto Protocol mechanisms	Emissions taking into account the use of LULUCF activities and the Kyoto Protocol mechanisms[b]	Change in emissions compared with base year level (%)	
Japan	1 261.33	1 273.00	0.9	1 239.00	–1.8	–13.00	20.18	1 205.82	–4.4	–6
Latvia	25.91	13.97	–46.1	–	–	–	–	–	–	–8
Liechtenstein	0.23	0.23	1.1	–	–	–	0.05	0.19	–18.9	–8
Lithuania	49.41	32.75	–33.7	32.75	–33.7	–	–	–	–	–8
Monaco[g]	0.11	0.0973	–9.6	0.0939	–12.8	–	0.005	0.0889	–17.4	–8
New Zealand	61.91	76.08	22.9	–	–	–15.94	–	60.15	–2.9	0
Norway	49.62	57.30	15.5	–		–1.50	7.20	48.60	–2.1	1
Poland[h]	563.44	389.17	–30.9	–	–	–	–	–	–	–6
Romania	278.23	188.84	–32.1	181.81	–34.7	–	–	–	–	–8
Russian Federation	3 323.42	2 000.00	–39.8	2 000.00	–39.8	–	–	–	–	0
Slovakia	72.05	51.01	–29.2	49.93	–30.7	–	–	–	–	–8
Slovenia	20.35	21.06	3.5	21.04	3.4	–1.32	1.10	18.62	–8.5	–8
Switzerland	52.79	50.70	–4.0	50.70	–4.0	–0.35	2.00	48.35	–8.4	–8
Ukraine	920.84	385.76	–58.1	376.66	–59.1	–	–	–	–	0

Abbreviation: LULUCF = land use, land-use change and forestry.

[a] Total greenhouse gas (GHG) emissions for the base year refers to the total GHG emissions used for the calculation of the assigned amount pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol.

[b] This is calculated only for those Parties that provided quantitative information on the expected use of LULUCF activities and the Kyoto Protocol mechanisms.

[c] This figure does not include 3.5 Mt CO_2 eq referred to in decision 7/CP.12. The final decision of the enforcement branch with respect to Croatia which, among things, concludes that decision 7/CP.12 cannot be applied by Croatia in its calculation of its assigned amount is under appeal with the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. The final value for its base year emissions may be available once the appeal is resolved.

[d] Up to now, no estimates of removals from LULUCF activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol have been provided; for a conservative assessment of yearly accountable credits from national sinks in the first commitment period, Italy refers to the assigned cap of 10.2 Mt CO_2 under Article 3, paragraph 4, of the Kyoto Protocol.

[e] Taking into account a conservative estimate of Portugal's emissions until 2012, its estimated use of the Kyoto mechanisms for the first commitment period is 19.1 Mt CO_2 eq (3.82 Mt CO_2 eq/year). However, in order to address the higher deficit estimate and the risks associated with this estimate, the target for its expected use has been set at 22.2 Mt CO_2 eq (4.44 Mt CO_2 eq/year).

[f] Iceland provided GHG projections under two scenarios: Scenarios 1 and 2. The projections under Scenario 1, which assumes the peaking of the production capacity of energy-intensive industries in 2008, are used here. The estimates for Iceland do not take in consideration the provisions of decision 14/CP.7 that Iceland intends to implement in meeting its commitments under Article 3, paragraph 1, of the Kyoto Protocol, since the way in which the decision will be implemented can be defined only after greenhouse gas inventory data are reported for the last year of the first commitment period of the Kyoto Protocol.

[g] Monaco's fifth national communication did not contain GHG projections for 2010; the projections data for 2010 were interpolated from data for 2008 and 2020 assuming linear emission growth between 2008 and 2020.

[h] Poland did not provide GHG projections data for 2010 in its fifth national communication; the projections data for 2010 were interpolated from data for 2008 and 2015 assuming linear emission growth between 2008 and 2015.

VI. National systems and registries under the Kyoto Protocol

A. National systems

95. The national system under Article 5, paragraph 1, of the Kyoto Protocol (decision 19.CMP.1) (hereinafter referred to as the national system) is an important element of the overall institutional framework needed for the successful implementation of the Kyoto Protocol, since it enables the Party to prepare a comprehensive GHG inventory by means of a thorough assessment of the sources and removals of GHG emissions. In accordance with decision 15/CMP.1, all Annex I Parties, in their NC5s, **provided some information** on how their national system is performing the general and specific functions defined in decision 19.CMP.1. Some Parties provided an explicit description of these functions in their NC5s (Australia, Canada, Denmark and New Zealand); however, the majority of the Parties referred to their initial report and the NIR of their 2009 annual submission for an elaborated description of the structure and functions of their national system.

96. Understanding that a robust national system provides a foundation for a high-quality GHG inventory, **most Parties have made notable efforts to improve and strengthen their national systems since 2006**. Such efforts include **further institutionalizing the national system** by strengthening arrangements for the single national entity, enhancing the administrative arrangements for inventory preparation and management, and improving QA/QC procedures, methodologies, AD, EFs and uncertainty analysis.

97. Although **national circumstances, such as the size of the country, dominant economic sectors, and tradition in inter-institutional cooperation, have predetermined the diversity in the arrangements for national systems**, as a rule, the respective central governmental institution has overall responsibility for the national inventory and other governmental institutions, implementing agencies, organizations and consultants also contribute to the preparation of the inventory. For the multi-state Party of the European Union, the Directorate-General for the Environment of the European Commission is responsible for preparing the inventory on the basis of the inventories submitted by the member States. Arrangements established in Belgium are somewhat similar, as the three regions compile their own inventories and submit them to the federal governmental agency. Canada's single national authority, Environment Canada, has procedural arrangements (memorandums of understanding and data-sharing agreements) between federal departments. A few Parties (Liechtenstein, Luxembourg and Monaco), given the small size of their economies, have extensively involved experts from neighbouring Parties to assist them in the preparation of their annual submissions.

98. Examples of enhanced institutionalization of the national systems include:

(a) **Establishing interdepartmental/inter-ministerial institutions** overseeing the functionality of the national system, such as a cross-governmental reporting governance group in New Zealand and the National Inventory Systems Executive Committee in Australia;

(b) **Further enhancing the sustainability** of the national system through the formalization of the data provision process (e.g. United Kingdom);

(c) Further developing **centralized databases** for emission calculations and reporting and archives (e.g. Germany and Ukraine);

(d) **Further strengthening cooperation with relevant national scientists**, such as through the establishment of the independent agricultural inventory advisory panel (New Zealand).

99. **Parties paid particular attention to enhancing their QA/QC procedures**. Most Parties have applied a systematic and strategic approach to QA/QC, such as following International Organization for Standardization (ISO) 9000 standards (Switzerland) or ISO standard 17020 (Austria), establishing a QA/QC programme and plan (United Kingdom), developing a multi-year schedule for the implementation of QA/QC activities (Canada), establishing the GHG Inventory Quality Assurance Working Group (Japan) and developing a QA/QC manual (Portugal).

100. **In ensuring the functionality of their national systems in the area of LULUCF activities, the majority of the Parties have made significant efforts to identify land areas subject to afforestation, reforestation and deforestation and to estimate and report corresponding emissions and removals**. Some Parties developed new specific legislation (Hungary), whereas others built upon existing legal acts regulating forest management. Some Parties set up a specialized database (Japan) and launched a dedicated project to estimate and monitor major carbon stocks and carbon stock changes (Denmark). Most Parties provided a clear description of their 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 contributes to the conservation of biodiversity and the sustainable use of natural resources.

101. The most important evidence of the strengthening of national systems in most Parties is the demonstration of major improvements in the quality of the GHG inventories (improved time-series consistency; use of higher-tier estimation methods, country-specific EFs and more accurate AD; and reduction of uncertainty) in the NC5s compared with the NC4s. For example, for the European Union, the improvements in the GHG inventories of the EU-15 resulted in the decrease in the GHG emission trend between 1990 and 2003 from –1.7 per cent (as reported in the NC4) to –1.2 per cent (as reported in the NC5). Remaining key planned improvements include efforts to reduce uncertainty (Ireland), enhancing the archiving system (Belgium and Czech Republic), and the improvement of the completeness and transparency of reporting (Lithuania, Romania and Ukraine). **By continuously improving the completeness, transparency, accuracy, comparability and timeliness of their GHG inventories, the Parties provide a solid basis for climate change policymaking, the implementation of the Kyoto Protocol and assessing compliance with the Kyoto Protocol**.

102. Notwithstanding notable progress in improving their national systems, **several challenges remained for some Parties, such as gathering confidential data or assessing emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol**. In order to improve the transparency of their GHG inventories by providing more accurate GHG estimates based on the data deemed confidential by the Parties, several of them (e.g. Portugal and United Kingdom) made further efforts to formalize agreements with data providers. Several Parties envisage further substantial work to be done for estimating and reporting emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (Hungary, Lithuania, Luxembourg, Portugal and Ukraine). Also, the inter-institutional reallocation of responsibilities for GHG inventory preparation and management caused by the restructuring of governmental institutions has temporarily hindered the sustainability of the national systems of a few Parties (e.g. Bulgaria and Greece).

103. **Capacity-building** among Annex I Parties for GHG inventory preparation played an important role in strengthening their national systems. Some Parties implemented separate

projects dedicated to the improvement of the national system and the quality of the GHG inventory (e.g. Belarus and Ukraine), whereas other Parties benefited from sector-specific projects (e.g. Estonia) or acquired know-how through the training of experts (e.g. Bulgaria and Hungary). The Netherlands reported on a government-to-government programme under which it has provided support to Croatia. The European Union reported a list of workshops and expert meetings organized with a focus on sector-specific inventory-quality improvements and noted an established collaborative internal EU review mechanism aimed at providing suggestions for progressive improvements to inventories. Some Parties participate in special programmes where know-how is transferred from government to government.

B. National registries

104. While for the national systems some institutional and administrative arrangements were already in place before the Kyoto Protocol came into force, the national registries had to be newly established. National registries are crucial for assessing the compliance of the Parties with their Kyoto targets as they record the holdings and transactions of Kyoto units and maintain information on these units in accounts with a pre-defined structure. All Parties, except for the United Kingdom, reported on the arrangements for their national registry in their NC5s, and the majority of the Parties referred, for further information on their national registries, to their initial reports and 2009 or previous annual submissions.

105. Since the publication of the NC4s, **significant progress has been made in improving operations and in further institutionalizing** the national registries. Most Parties passed the initial test to allow them to connect to the ITL in 2007 and the national registries of Japan, New Zealand and Switzerland were connected to the ITL at the end of 2007. In 2008, the national registries of most Parties were successfully connected to the ITL and could perform transactions of Kyoto units. Compliance with the technical standards for data exchange between registry systems has been improved considerably since 2006, resulting in the more reliable processing of transactions of Kyoto units. Also, the reporting and review of national registries has been significantly improved, including through the use of tools such as the SEF submission tool and procedures such as the SIAR, whereby registry system administrators assess the national registries of other Parties.

106. **To share knowledge and exchange experience with regard to the further development of national registry systems, the registry system administrators have participated in the Registry System Administrators Forum, coordinated by** the secretariat. Also, many registry system administrators have gained experience in registry operation and management through the operation of the registries under the European Union emissions trading scheme (EU ETS) since 2005.

VII. Policies and measures in accordance with Article 2 of the Kyoto Protocol

107. This chapter outlines the climate change PaMs reported by 39 Parties in their NC5s. The PaMs cover a wide range of planned, adopted and implemented activities, across all levels of government – regional, national, state/provincial and municipal. Since the Annex I Parties implement broadly the same set of PaMs under both the Convention and the Kyoto Protocol, this chapter essentially provides a summary of the relevant chapter of the

compilation and synthesis of NC5s,[29] with a particular focus on Parties to the Kyoto Protocol.

A. Overview

1. Introduction

108. The Parties reported on over 1,000 implemented, adopted and planned mitigation PaMs in their NC5s. The reported PaMs are applied at all levels of governmental jurisdiction – regional, national, state/provincial and municipal – and involve a wide range of actors and institutions in many activities related to energy supply, energy end-use and non-energy emissions.

109. This chapter provides a qualitative overview of the PaMs, because although quantitative estimates of the mitigation effects of many individual PaMs are reported in the NC5s, the estimates are not necessarily consistent among Parties in terms of categorization, baseline assumptions, modelling procedures and methodological approaches to account for policy synergies and interactions.

2. General trends

110. On the whole, **the types of PaMs reported in the NC5s are similar to those reported in the NC4s**. However, since the submission of the NC4s, due on 1 January 2006, some Parties have made major overhauls to their climate change policy portfolios. This has resulted in **PaMs in some key areas being substantially strengthened**, through more stringent requirements, wider coverage and increased expenditure of resources. **Between 2004 and 2010, most Parties to the Kyoto Protocol made the most substantial changes to their PaMs, in order to deliver the emission savings needed to achieve their Kyoto targets. Their mixes of PaMs show a pronounced move towards greater use of broad carbon-pricing frameworks, based on ETS, and stronger mandatory regulations**.

111. Despite the diversity and complexity of Parties' climate change strategies and PaMs, eight general trends are apparent:

(a) Most Parties now treat **climate change mitigation as a core top-level issue in the national policy agenda** and have developed greater policy capacity as well as legal and institutional frameworks – including top-level inter-ministerial coordinating groups – to reduce emissions;

(b) Parties are making **greater use of multilevel governance –** across multiple levels of government (e.g. local to regional) and non-governmental actors – when it comes to climate change issues;

(c) Parties, in the context of the global economic crisis and shifts in global economic and energy flows, are **looking for climate change PaMs that can combine the goals of emission reductions, energy security**, job creation and economic competitiveness, as well as air and water quality. To that end, integrated energy and climate packages have been developed by several Parties, and emphasis is being put on research and development (R&D) in relation to new technologies and innovative solutions, such as carbon capture and storage;

(d) Some Parties have progressed through one or more policy cycles and are now implementing **second- and third-generation policy strategies and PaMs**, which reflect lessons learned and are likely to be more effective in reducing emissions than previous efforts;

[29] FCCC/SBI/2011/INF.1 and Add.1, chapter IV.

(e) Many Parties have established or are planning multisectoral (cross-cutting) **ETS as a foundation element** upon which climate change mitigation strategies are based;

(f) Many Parties are **supplanting voluntary programmes with mandatory regulations,** including mandatory ETS, in the key sectors of electricity generation, emission-intensive industry, transport energy supply and road vehicle transportation;

(g) Parties are **continuing to make wide use of the relatively low-cost options for mitigating non-CO_2** (i.e. CH_4, N_2O, PFCs, HFCs and SF_6) emissions in the industrial processes and waste sectors, but there is little remaining room for further emission reductions in these areas;

(h) Several Parties are **developing long-term strategies (e.g. to 2050)**, with corresponding R&D programmes, for decoupling GHG emissions and economic growth and establishing low-carbon societies.

3. Sectoral emissions

112. From the base year to 2008, total emissions excluding LULUCF decreased by 16.2 per cent (2,148.34 Tg CO_2 eq) for all Annex I Parties (see also para. 45 above). **The greatest absolute decreases in emissions were seen in the following sectors: energy**, by 13.4 per cent (1,373 Tg CO_2 eq); **agriculture**, by 27.3 per cent (356.80 Tg CO_2 eq); and **industrial processes**, by 20.3 per cent (234.11 Tg CO_2 eq). Between 1990 and 2008, total removals from the LULUCF sector increased by 51.5 per cent (737.80 Tg CO_2 eq). Insufficient information was reported in the NC5s to distinguish the extent to which these changes in sectoral emissions were due to structural change, autonomous (i.e. not related to PaMs) efficiency improvements or PaMs.

113. The **largest absolute emission reductions were reported by EIT Parties**. Their total emissions excluding LULUCF declined by 37.0 per cent between the base year and 2008. The EIT Parties reported fewer PaMs than the rest of the Annex I Parties did. Most of their emission reductions appear to have come not from explicit climate change PaMs but from the economic policies and market forces that shaped the economic restructuring in the early to mid-1990s.

114. **Non-EIT Annex I Parties implemented many more PaMs,** but they were not sufficient to offset the emission growth in most sectors. Their total emissions excluding LULUCF increased by 6.4 per cent between the base year and 2008. Emission increases were greatest in the energy supply and transport sectors and decreases were greatest in the energy use, industrial processes, manufacturing industries and construction, waste and agriculture sectors.

4. Cross-cutting issues relating to policies and measures and choice of policy instruments

115. Parties reported in their NC5s a wide variety of PaMs to mitigate GHG emissions. The variety reflects the great diversity of human activities – the numerous investments, purchases and behaviours of many individuals and organizations in varying circumstances – that must be effectively influenced to mitigate climate change. To help understand the underlying structures and trends, the numerous PaMs are characterized into the following categories:

(a) Economic and fiscal:

(i) Carbon and energy taxes;

(ii) ETS;

(iii) Other market instruments (other quotas and certificates) and reforms;

(iv) Other fiscal and economic incentives (fees, subsidies and project funding);

(b) Regulations (rules, standards and permitting requirements);

(c) Voluntary/negotiated agreements:

(i) Voluntary sectoral commitments;

(ii) Voluntary enterprise partnerships;

(d) Information, education and public awareness (labels, auditing, advice and demonstration);

(e) R&D;

(f) Other:

(i) Public facilities, vehicles, infrastructure and waste management;

(ii) Urban and regional development and land use.

B. Implementation of policies and measures by sector

1. Climate policy strategies and ambitions

116. Some Parties reported **large policy packages**, **with demanding medium- and long-term emission goals**, used to build political momentum for action on climate change mitigation. These packages and goals help to frame, communicate and align the stringency of the many PaMs involved. Among the larger packages and visions reported in the NC5s are the EU "20-20-20" energy and climate package and the medium- and long-term targets of Australia and Japan. The United Kingdom's carbon budgets introduce the concept of targets with binding milestones.

117. **The EU "20-20-20" energy and climate package**, which "provides an integrated and ambitious package of PaMs to tackle climate change", was adopted in January 2008 and contains proposals for specific targets for 2020:

(a) A target to **reduce GHG emissions by at least 20 per cent compared with the 1990 level by 2020**, with a commitment to increase this target to 30 per cent in the event of a satisfactory international agreement being reached;

(b) A target to generate **20 per cent of energy consumed from** renewable **sources by 2020** (as a share of total EU gross final energy consumption), supplemented by a target to generate a minimum of 10 per cent of transport fuel from renewable sources;

(c) A reiteration of the commitment **to save 20 per cent of total primary energy consumption by 2020,** compared with a 'business as usual' baseline.

118. The package contains proposals for three new directives and a decision, covering: renewable energy, the EU ETS, combined efforts of member States to reduce emissions, and geological storage of CO_2. A directive on the monitoring and reduction of GHG emissions from fuels, and proposals relating to the emission performance of new passenger cars, although not part of the package, were also negotiated in parallel.

119. **Australia developed an integrated policy programme** to reduce its GHG emissions and to enable it to achieve more ambitious reductions over the long term, including a target for 2020 of a 25 per cent reduction in emissions compared with the 2000 level (in the context of a comprehensive global agreement capable of stabilizing atmospheric concentrations of GHGs at 450 ppm CO_2 eq or lower), and a target for 2050 of a 60 per cent reduction in emissions compared with the 2000 level. The programme

includes measures such as the establishment of a comprehensive ETS, the Carbon Pollution Reduction Scheme (CPRS) and the implementation of an expanded national renewable energy target of generating 20 per cent of Australia's electricity supply from renewable energy sources (RES) by 2020.

120. **Japan announced in 2009 a medium-term national GHG emission reduction target of 25 per cent by 2020** compared with the 1990 level, premised on the establishment of a fair and effective international framework. As part of plans to strengthen its climate policy framework, the Japanese Cabinet has approved an ambitious GHG-related goal for the medium term for reducing energy-related CO_2 by 30 per cent by 2020. Japan has also developed a national long-term goal for the reduction of energy-related CO_2 emissions by 80 per cent by 2050 compared with the 1990 level.

121. **The United Kingdom's** Climate Change Act (2008) sets out a legally binding national framework to reduce GHG emissions, establishing a legally binding target to reduce net GHG emissions by at least 80 per cent below the 1990 level by 2050 and **defining the emission reduction pathway to that target** by limiting the total amount of GHG emissions permitted in each consecutive five-year period, beginning in 2008. The five-year carbon budgets are specified in the national strategy for climate and energy, the UK Low Carbon Transition Plan (LCTP), which has become the United Kingdom's key strategy for climate policy. LCTP set out a route map accompanied by a number of PaMs for the transition to a low-carbon economy. LCTP aims to deliver emission cuts of 18 per cent below the 2008 level by 2020 (equivalent to 34 per cent below the 1990 level). It sets out the policies and proposals for meeting the three five-year carbon budgets for the periods 2008–2012, 2013–2017 and 2018–2022. The carbon budget for the period 2008–2012 corresponds to a 22 per cent reduction of net emissions in relation to the 1990 level, while the carbon budget for the period 2018–2022 corresponds to an emission reduction of at least 34 per cent below the 1990 level by 2020.

122. **Denmark has established targets for energy**, including increasing the share of renewable energy in the total energy consumed to 30 per cent by 2020, reducing total energy consumption by 4 per cent by 2020 compared with the 2006 level, and doubling the public spending on R&D in relation to energy technologies to reach 1 billion Danish kroner annually by 2010. The Climate Commission has published a report containing specific recommendations for freeing Denmark completely from dependence on fossil fuels in line with the objective set in the Government's policy document entitled "A Visionary Danish Energy Policy up to 2025".

123. **Finland's** long-term national policy document, the Foresight Report, sets a target to reduce GHG emissions by **at least 80 per cent by 2050 compared** with the 1990 level. It includes a set of scenarios for progressing towards a low-carbon economy, all of which foresee reaching the level of almost zero emissions from the transport sector and energy production by 2050, while the major emitters are forecast to be the agriculture and industrial processes sectors.

124. **Norway's** medium- and long-term climate target is a reduction of GHG emissions by 30 per cent in relation to the 1990 level by 2020. Norway has made **a political pledge to achieve carbon neutrality,** undertaking to reduce global GHG emissions by the equivalent of 100 per cent of its own emissions by 2050 at the latest, or by 2030 if an ambitious global climate agreement is achieved in which other developed countries also take on extensive obligations.

2. Multilevel governance

125. Parties are making increasing use of multilevel governance (local, state/provincial, regional and national) to better target PaMs at diverse circumstances existing within their jurisdictions.

126. In some cases, higher-level governments frame the policies, but devolve – through regulation (e.g. framework targets), support (e.g. project funding) and political mandates and persuasion – **the responsibilities for designing and implementing the PaMs to lower-level governments**. EU member States share responsibilities for climate change policy with the European Commission. In federal systems (e.g. Canada), states and provinces have obligations devolved to them by their national governments.

127. In some cases, specific measures are prescribed in the implementation process (e.g. the EU directive on the energy performance of buildings). In others, only framework targets or project funding levels are prescribed and the government or private party assuming responsibility decides what measures to implement (e.g. the EU directive on end-use efficiency and energy services, and the Canadian Clean Air and Climate Change Trust Fund for provincial mitigation initiatives). The targets and budgeting processes provide a long-term vision to guide general activity, while implicitly recognizing that the diversity of regional, national and local circumstances demands a tailored implementation of measures.

128. Framework targets that establish **goals for technology shares, fuel shares and efficiency levels** are used mostly in the areas of electricity and heat generation, transport energy supply and landfill emissions. They are used most heavily by the European Union, but other Parties use them as well. They involve setting goals (e.g. to achieve by 2020 a 20 per cent share of final energy consumption from RES and a 10 per cent share of transport energy consumption from RES), but leaving the development and implementation of specific measures to the EU member States. The most prominent EU directives of this type are: the EU directive on the promotion of the use of energy from renewable sources; the EU landfill (of waste) directive; the EU packaging and packaging waste directive; the EU waste electrical and electronic equipment (WEEE) directive; and the EU end-use efficiency and energy services directive. Ireland and United Kingdom introduced so-called carbon budgets, which set legally binding limits on the total GHG emissions allowed in successive time periods and which are further broken down into carbon budgets for each government department. Other Parties devolve responsibility through funding mechanisms. Canada, in particular, funds many climate change mitigation measures developed and administered by the provinces.

129. In some cases, **the PaMs are initiated by the lower levels of governments** in the absence of consensus at the higher levels. For example, British Columbia (Canada) has implemented a carbon tax; Alberta (Canada) has established an ETS; and New South Wales (Australia) has the world's longest-running ETS.

3. Cross-cutting instruments and policies

130. Parties reported some mitigation PaMs that cover multiple sectors. The most inherently cross-sectoral PaMs are **ETS, carbon taxes, energy market reform, and urban and regional development and land use, but R&D** sometimes spans several sectors as well. Rarely are any of these policies used on an economy-wide scale.

131. **ETS are the newest policy instrument, with the fastest-growing role** in the overall climate change portfolio. They are the most wide-ranging instrument for reducing CO_2 emissions from energy production and industrial energy use, and have begun also to cover emissions of other GHGs and from other sectors. Since the NC4s, there have been major policy-related efforts in nearly all Annex I Parties to establish new or strengthen existing ETS. As at March 2011, there were eight active GHG ETS in Annex I Parties. Two

of them were reported in the NC4s: the New South Wales Greenhouse Gas Reduction Scheme and the EU ETS. Six other active systems have been developed since the NC4s: Norway's ETS (begun in 2005), the Alberta GHG emissions regulation for large industry (2007), the New Zealand Emissions Trading Scheme (2008) (see box 2), the Swiss Emissions Trading Scheme and CO_2 tax (2008), the United Kingdom's Carbon Reduction Commitment (CRC) Energy Efficiency Scheme (2010) and the Tokyo Cap-and-Trade Program in Japan (2010). Two additional systems are still under development in Annex I Parties: the Australian CPRS and the mandatory Japanese national system.

Box 2
New Zealand's emissions trading scheme

New Zealand's emissions trading scheme (ETS), while not the world's largest, is the most comprehensive, as it encompasses all greenhouse gases and sectors covered by the Kyoto Protocol. The ETS was launched in 2008, starting with the forestry sector, followed by fossil fuel use in stationary energy sources, transport and the manufacturing industry sector (included in the ETS in 2010). It is foreseen that the waste sector and synthetic gases will be included in the ETS in 2013 and the agriculture sector in 2015. Thus, it is expected that by 2015 all sectors and gases will be covered by the ETS.

New Zealand estimates in its fifth national communication that the ETS will reduce emissions by 10 Tg CO_2 equivalent by 2020, representing about 81 per cent of the expected difference in net emissions (including removals from the forestry sector) between the 'with measures' and 'without measures' scenarios in that year.

132. **The EU ETS, currently the world's largest emissions trading scheme**, will be broadened to include the aviation sector (from 2012) and also other CO_2 emissions from the petrochemicals, ammonia and aluminium sectors; N_2O emissions from the production of nitric, adipic and glyoxylic acid; and PFC emissions from aluminium production (from 2012–2013). In addition, Phase III (2013–2020) of the EU ETS will bring:

(a) The establishment of a single EU-wide declining cap on allowances, in place of the current system of national caps on emission allowances;

(b) The progressive move towards the full auctioning of allowances, in place of the current system of cost-free allocation;

(c) The use of ex-ante benchmarks to allocate free allowances to energy-intensive industries if their competitiveness is judged to be at risk owing to less stringent emission constraints in other parts of the world.

133. **Carbon taxes** were reported by Denmark (CO_2 tax), Finland (CO_2 tax), Germany (ecological tax), Liechtenstein (CO_2 levy), Netherlands (energy tax), Norway (CO_2 tax), Slovenia (CO_2 environmental tax), Sweden (CO_2 tax), Switzerland (CO_2 levy and "climate cent"), United Kingdom (Climate Change Levy) and British Columbia, Canada (carbon tax). They have also been proposed recently in France (carbon tax). Where they are used, carbon taxes are typically applied to a wider array of sectors (e.g. electricity generation, transport, residential, commercial, public, less energy-intensive industrial sectors, and sometimes more energy-intensive industries as well) than emission allowance systems. Carbon taxes are not yet applied to non-energy sources of GHG emissions.

134. Carbon taxes have been eclipsed by ETS as the main policy instrument of Parties seeking to establish a price for carbon. Since the NC4s, there has been **much less policy-related effort directed at introducing new carbon taxes** than at developing ETS.

However, carbon taxes have still been put forward as an alternative carbon-pricing mechanism during policy deliberations in some countries, especially when the complexities and shortcomings of emission allowance systems are discussed. Furthermore, some Parties (e.g. France, Norway and United Kingdom) are increasingly treating **carbon taxes and ETS as complementary measures**, with the latter targeting energy-intensive sectors, such as power generation and industry, and the former focused on the residential and commercial sectors.

135. **Energy taxes** (e.g. ad valorem and excise taxes), which greatly influence energy use and GHG emissions, are used in all Annex I Parties. The primary purposes of energy taxes have historically been generating revenue and ensuring oil security. However, Parties are increasingly using their energy taxes to achieve their emission reduction goals, **by differentiating rates to favour RES** (e.g. tax exemption for biofuels).

136. **Urban and regional development and land-use measures** seek to gain efficiency and emission reductions through tighter integration among the components of large systems and networks. **Japan has measures in place to make urban design, transport networks, power networks and industrial parks more climate-friendl**y. Japan reported its intention to improve the energy environment of urban areas by means of area-wide energy-use or heat-island countermeasures, while extending the useful life of housing, buildings and infrastructure. It will also encourage low-carbon urban/regional development by realizing cities with minimal environmental loads, or "compact cities", where urban services are located within walking distance. In order to increase the efficiency of transport systems, the Japanese Government will implement comprehensive measures, including: traffic jam alleviation; traffic demand management; development of traffic safety facilities such as traffic signals; and promotion of the use of public transport systems. To promote the greening of the overall logistics system, the Government will strengthen and expand the efforts as part of the cooperation among shippers and logistics operators, while promoting modal shifts, improvement of the efficiency of truck transport and other measures.

137. **R&D** activities were reported by Australia, Canada, European Union, Germany and Japan. Many other Parties reported **contributions to joint international research efforts**. The efforts are intended to provide a long-term incentive to industry to enhance its ability to deliver necessary emission reductions in the energy supply, energy end-use and non-energy fields, while improving Parties' competitive position in the potential markets for the new technologies. Government support for long-term R&D in relation to energy and emissions is necessary because today's markets do not provide sufficient incentives for solely private R&D in relation to reducing emissions. Private efforts are limited by the uncertain outlook for the emission pricing mechanisms and the inability of individual firms to capture a sufficiently large portion of the benefits of their investments in R&D. All emission reduction technologies can benefit from additional R&D, but the ones offering the largest potential emission reductions and facing the biggest technological challenges are: carbon capture and storage (CCS), hydrogen networks, fuel cells, cellulosic biofuels and solar power options. Owing to the long-term nature of R&D efforts, Parties are rarely able to estimate the specific effects of such efforts on emissions.

138. Various long-term **R&D efforts are directed at electricity and heat generation.** Japan funds the development of CCS and advanced nuclear fission power technologies, while Canada funds research on solar and wind technologies. The European Union's Seventh Framework Programme (FP7), which runs from 2007 to 2013, includes European Technology Platforms – industry-led initiatives operating under the coordination of the European Commission's Directorate-General for Research and Innovation and of a dedicated European Commission Inter-Service Group – for Zero Emission Fossil Fuel Power Plants and for photovoltaics, wind energy and biofuels. Australia has released technology road maps to advance the use of solar thermal energy and geothermal energy.

Germany's Innovation and New Energy Technologies programme supports a wide range of climate-related R&D efforts, including on: power-station technologies, combined heat and power (CHP), district heat, fuel cells, hydrogen, wind, bioenergy and biomaterials, efficient electricity use, storage systems, energy and resource efficiency in the construction sector, and energy efficiency in industry, commerce, trade and services. The programme also includes measures for supporting research into safety and final storage for the nuclear sector.

4. Energy supply

139. The predominant focus of mitigation PaMs in the energy supply sector is **on electricity and heat generation, and increasingly on transport fuels, primarily biofuels**, which are discussed in the transport sections of the NC5. Those aimed at reducing fugitive emissions at oil, gas and coal facilities were reported by only a few Parties.

Electricity and heat

140. Parties reported using substantially **strengthened ETS, framework targets** (administered through economic incentives and other market instruments) **and regulations**, in addition to the continued use of voluntary enterprise partnerships and long-term R&D, directed at electricity and heat generation, in order to:

(a) Increase the share of energy generated from energy sources that are less carbon-intensive than coal (i.e. RES, natural gas and nuclear energy);

(b) Increase generation, transmission and distribution efficiency through the use of CHP, grid upgrades, distributed (i.e. small-scale) generation and other means;

(c) Stimulate the development, deployment and dissemination of CCS over the longer term.

141. **ETS are used to promote the reduction of emissions from electricity and heat generation** by all the technical means mentioned in paragraph 140 above. All of the active ETS, except the United Kingdom's CRC Energy Efficiency Scheme and the Tokyo Cap-and-Trade Program, cover the power sector.

142. Many Parties also use **framework targets** (administered through economic incentives and other market instruments), **economic incentives and other market instruments** to directly encourage the use of renewable energy sources in electricity generation (RES-E). For example, all EU member States have ambitious RES-E targets under the 2001 and 2008 EU renewable energy directive,[30] which they meet using varying combinations of feed-in tariffs, tariff premiums, quota obligations (green certificates), investment grants, tax exemptions and fiscal incentives.

143. Other programmes to promote RES-E that have been strengthened since the NC4s include: the Australian Renewable Energy Certificates (green certificate) programme, which requires wholesale electricity companies to purchase increasing amounts of RES-E; the Canadian ecoENERGY for Renewable Power programme; the EU renewable energy directive, with its binding target for RES as a share of gross national energy consumption; the Russian Federation targets for electricity produced from renewable energy other than large hydro; the Swiss feed-in tariffs for renewable electricity; and the Ukrainian law on "green tariffs", setting subsidies for power production from RES.

144. Other new PaMs that have been implemented since the NC4 play smaller roles in mitigating emissions from the electricity and heat generation sector. Australia (Renewable

[30] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.

Energy Demonstration Program), Japan and New Zealand are offering new financial and technical assistance for various aspects (i.e. feasibility studies, R&D, deployment of pre-commercial devices and construction of commercial installation) of new renewable-based electricity generation projects.

145. Several Parties (Australia (Queensland), Greece, Japan and Portugal) use regulations and economic incentives to increase the use of natural gas in electricity generation. Parties also use measures to advance specific technologies (e.g. CHP, nuclear power and grid improvements).

Fugitive emissions at oil, gas and coal facilities

146. In the NC5s, two Annex I Parties reported the continued use of their previous PaMs (regulations in Norway and voluntary sectoral commitments in the Netherlands) to enhance the capture and use or flaring of fugitive CH_4 emissions at oil, gas and coal production and distribution facilities. A new programme to include fugitive CH_4 emissions in a tradable emission allowance system was reported by Australia. The Russian Federation and Ukraine reported activities to stem losses occurring during natural gas transportation.

5. Energy consumption

147. Mitigation PaMs are being implemented in all of the major energy end-use sectors (residential, commercial and public, and industry). Most of the PaMs **focus on improving energy efficiency** (as opposed to fuel switching) and are generally sector-specific PaMs or even more narrowly targeted. There are, as reported in the NC4s, some broader policies being pursued, such as systems-oriented policies (e.g. urban design) in Japan. In addition, the EU "20-20-20" energy and climate package sets a framework target of a 20 per cent reduction in primary energy use in 2020 compared with projected levels, to be achieved by improving energy efficiency.

Residential, commercial and public

148. Parties reported the **continued use of regulations, fiscal incentives, framework targets, information, voluntary enterprise partnerships, public facilities management and carbon taxes** to:

(a) Increase the energy efficiency of new and existing residential, commercial and public buildings, including their space heating, cooling and ventilation, water heating, and lighting services (via designing, building, renovating and purchasing);

(b) Increase the energy efficiency of household appliances, home entertainment devices, office equipment (via manufacturing, retailing and purchasing) and lamps;

(c) Increase the use of alternative energy supplies.

149. **Regulations (mandatory standards) are widely used for buildings.** Mandatory energy-efficiency requirements for residential and commercial buildings are used in Australia (National Strategy on Energy Efficiency), British Columbia and Ontario, Canada, and the European Union (energy performance of buildings directive). All Parties use regulations (mandatory standards) to a lesser or greater extent for equipment (household appliances, home entertainment devices, office equipment and, increasingly, lamps). Many Parties are undertaking to phase out the use of incandescent light bulbs. Japan's Top Runner standards programme is unique in that it incorporates automatic recalibration: setting future standards based on the most energy-efficient model on the current market, and when the future date is reached the process repeats itself. Australia's standards programme set its energy efficiency target at the equivalent of a world-best regulatory target or a more stringent level developed specifically for Australia. **Information**

(primarily labels, rating and certification programmes) is likewise **used widely for appliances, devices and equipment, and increasingly for buildings** as well.

150. Since the NC4s, **regulations for buildings and equipment have been strengthened** o**r newly established** in many Parties. The EU energy performance of buildings directive, for new and large existing buildings, has been clarified and extended to require mandatory energy performance certificates and to incorporate a benchmarking system. The EU framework directive for the eco-design of energy-using products has been implemented to harmonize eco-design criteria for energy-using and energy-related products to be eligible for incentive programmes. New Zealand introduced minimum energy performance standards for air conditioners/heat pumps, domestic refrigerators and freezers, electric hot water heater cylinders, fluorescent lamps and ballasts, and electric motors. Australia introduced minimum energy performance standards for water heaters; established standards for the design, installation, operation and maintenance of heating, ventilation and air-conditioning equipment; and strengthened residential and commercial building codes, rating systems and disclosure requirements. Japan strengthened mandatory energy management practices to cover offices and franchised stores. The Russian Federation implemented stricter appliance and building standards, as well as labelling requirements. Australia and Switzerland introduced minimum energy performance standards for lighting.

151. **Fiscal incentives (subsidies and tax incentives)** reported in the NC4s **continue to be used for making energy-efficiency improvements** in low-income households in the United Kingdom and for solar water heating in Portugal. Since the NC4s, new financial incentives have been established in Australia for investment in solar, water and energy-efficient technologies, and in Switzerland for the refurbishment of existing buildings and the implementation of renewable heating systems, waste heat use and services engineering. Ireland introduced the Accelerated Capital Allowance scheme, which enables businesses to write off the entire cost of a specified set of energy-efficient motors, lighting and building energy management systems in the first year of purchase.

152. Other PaMs reported in the NC4s continue to be used but have not changed significantly since then. The EU energy end-use efficiency and energy services directive sets a **framework target** calling for member States to adopt general national targets of 1 per cent cumulative savings annually, to ensure that the public sector in each member State sets a good example with indicative national targets of 1.5 per cent cumulative savings annually, and to support companies offering energy services and energy-efficiency programmes. In Australia, regulations oblige electricity and natural gas suppliers to offer energy-efficiency improvements. **Information (auditing and advice)** programmes are widely used. **Public facilities management programmes,** which offer direct opportunities to improve energy efficiency and reduce carbon emissions, are used in Australia and Canada.

153. **Green Investment Schemes** (GIS), which aim to ensure that revenue from sales of AAUs is spent on emission-reducing activities, are often linked to energy efficiency and the use of RES in the building sectors of EIT Parties. GIS activities were reported by Bulgaria, Czech Republic, Estonia, Hungary, Lithuania (plans), Poland, Romania (under investigation) and Slovakia.

Industry

154. In the NC5s, Parties reported on the **continued use of ETS, regulations, voluntary sectoral commitments, voluntary enterprise partnerships, information and long-term R&D** to:

(a) Increase energy efficiency and general emission reductions (i.e. not targeting specific equipment and processes) in energy-intensive industries;

(b) Increase the implementation of energy-efficient methods (e.g. energy management systems);

(c) Increase the use of energy-efficient equipment (e.g. motors, boilers and lighting), particularly, but not exclusively, in small- and medium-sized enterprises;

(d) Promote long-term R&D in relation to CCS by energy-intensive industries.

155. Most of the reported PaMs **focus on energy efficiency** and general emission reductions in the energy-intensive industries. A few are aimed at less energy-intensive industries and research on CCS is directed only at energy-intensive industries.

156. **Voluntary sectoral commitments** were once the most important measure aimed at achieving emission reductions and energy efficiency in the industrial sector, but they have been overshadowed in recent times by ETS in many regions. **ETS have become the highest profile way** to promote general emission reductions and to encourage long-term interest in CCS in energy-intensive industries. All of the active ETS in Annex I Parties, except the Tokyo Cap-and-Trade Program, cover the industrial sector. Voluntary sectoral commitments remain important mitigation PaMs for the industrial sector in Japan, where the new Commitment to a Low Carbon Society voluntary sector commitments programme will succeed the soon to be completed Keidanren Voluntary Action Plan on the Environment. Also in Japan, **regulations** have been established that require industrial companies to benchmark their energy efficiency level against others within the same subsector and to meet medium- and long-term targets.

157. There were other PaMs reported in the NC4s that continue to be used but that have not changed significantly since then. Regulations (not related to ETS) aimed at achieving emission reductions and energy efficiency are used in only a few special circumstances in the industry sector, because of the diversity of industrial processes and equipment. Regulations in Japan require industrial plants over a certain size to have an appointed energy manager. In Australia, companies over a certain size must participate in the Energy Efficiency Opportunities programme, requiring a rigorous and comprehensive assessment of their energy use to identify cost-effective opportunities for energy efficiency, and report to the Australian Government and public on their business response. Australia, Canada and New Zealand have implemented energy efficiency standards for electric motors. The EU directive on integrated pollution prevention and control (IPPC) contains requirements that oblige industry to use best available technologies to ensure that energy is used efficiently.

158. Other measures include: **voluntary enterprise partnerships**, such as the European Motor Challenge Programme; **long-term R&D** being pursued in relation to CCS and industrial technologies in the European Union; and systems approaches for energy interchange among multiple entities, including the interchange among businesses of factory exhaust heat in industrial complexes and others of high industry concentration, being explicitly investigated by Japan.

6. Transport

159. Parties reported PaMs aimed at achieving two major objectives in the transport sector:[31]

[31] From a conceptual viewpoint, the transport fuel sector is engaged in energy supply activities and the transport energy-use sector is engaged in energy consumption activities. However, they are presented here together under a separate transport category to be consistent with the way in which Parties reported their PaMs in their NC5s.

(a) Transport fuels (transport energy supply) – reducing the carbon intensity of the transport fuel mix, most immediately through the increased use of biofuels, but in the long term also through the use of electricity, fuel cells and hydrogen;

(b) Transport energy use (transport energy demand) – increasing the transport services (e.g. personal travel and freight moved) per unit of fuel use.

Transport energy supply

160. Parties reported the **strengthened use, since the NC4s, of framework targets** (administered through economic incentives and other market instruments), regulations, other market instruments and long-term R&D **to increase the production, use and environmental sustainability of liquid fuels from RES (biofuels)**. The EU renewable energy directive (framework target) sets a binding goal of energy from RES comprising a 10 per cent share of each member State's transport energy consumption by 2020, and also establishes sustainability criteria for biofuels and bioliquids, which ensure that they are counted as RES only if they meet standards regarding biodiversity, the protection of rare, threatened or endangered species and ecosystems, and GHG emission savings. The principal national measures that EU member States are using to comply with the transport fuel targets are quota obligations and tax exemptions. In Canada, the new national renewable fuels standard requires fuel producers and importers to have an average annual renewable fuel content of at least 5 per cent of the volume of gasoline that they produce or import, effective in 2010, and an average 2 per cent renewable fuel content in diesel fuel and heating oil by 2011 or earlier, subject to technical feasibility. In Switzerland, new tax incentives, compensated by increased rates of tax on petrol, are being provided for the use of low-carbon fuels, including tax reductions for natural and liquefied petroleum gas and complete tax exemptions for biogas and other biofuels fulfilling social and ecological criteria. The New Zealand ETS encompasses liquid fossil fuels.

161. Elsewhere, **fiscal incentives are being used to expand** the capacity and production of biofuels in Australia (grants), to increase the purchase and use of biofuels in Canada (consumer tax exemptions), to increase the production of biofuels in Canada (capacity construction loan guarantees) and to support cost-effective abatement opportunities in Australia (grants). Other measures include agricultural market reform, with its long-term fiscal incentives for biocrop production (European Union).

162. With regard to the **long-term R&D programmes** focused on the onboard technology and the supporting fuelling infrastructure that would enable widespread use of alternative fuel vehicles such as those working on biofuels, electricity and hydrogen, Canada continues to fund programmes on fuel cells, biofuels and hydrogen. Japan funds programmes on fuel cells and hydrogen. The European Union's FP7 includes a European Technology Platform for hydrogen and fuel cells. Japan is promoting **systems approaches** to emission reductions in transportation and shipping/distribution. Australia announced the Second Generation Biofuels Research and Development Program in 2008 and has released a technology road map to advance the use of hydrogen and fuel cells.

Transport energy demand

163. In the NC5s, Parties reported **new regulations, ETS, fiscal incentives and information programmes, as well as the continued use of regulations, voluntary sectoral commitments, fiscal incentives, information and long-term R&D**, to:

(a) Improve the energy efficiency and CO_2 emissions intensity of the road vehicle fleet;

(b) Address transport activity and structure through transport demand management and incentives for modal shifts towards less-polluting transport modes, such as public transport, cycling and walking, traffic-flow improvements and spatial planning;

(c) Improve the CO_2 emissions intensity of domestic and international aviation.

164. **Road vehicle fuel economy and CO_2 emission standards**, implemented increasingly via **mandatory regulations** (gradually replacing voluntary approaches), have the highest mitigation impact of any transport-related measures. Many of the standards have been newly established or substantially strengthened since the NC4s. Canada has established mandatory standards mirroring the United States' fuel economy and emission regulations. In Europe, the European Union's new strategy for reducing CO_2 emissions from cars sets emission performance requirements (replacing voluntary sectoral commitments with the European, Japanese and Korean car manufacturers' associations) for new passenger cars as part of an integrated approach to reduce CO_2 emissions from light-duty vehicles. In Japan, the revised Top Runner standards programme, which emphasizes periodic recalibration for continued improvement, has been revised for automobiles. In Australia, the Government is undertaking a regulatory impact analysis for the introduction of CO_2 emission standards for light-duty vehicles.

165. Since the NC4s, **ETS** have been expanded to cover the transport sector in the European Union (i.e. planned coverage of aviation under the EU ETS) and New Zealand (i.e. inclusion of transport fuel use in the ETS). **New fiscal incentives have been introduced** to promote efficient vehicles in Canada (i.e. feebates) and France (i.e. bonus-malus) and to support the use of electric cars in New Zealand and Portugal. Fiscal incentives have also been implemented in Canada to support freight transport technology, advanced vehicle technology, municipal mode shifting, and vehicle buying, driving and maintenance initiatives. New **regulations** and **information (labels) on the performance of tyres have been established** in the European Union. **Information (labelling) on vehicles** has commenced in New Zealand.

166. There were other PaMs reported in the NC4s that continue to be used but that have not changed remarkably since then. There are fiscal incentives, such as differentiated vehicle taxes and fees used in Austria, Belgium, Denmark, France, Germany, Italy, Japan, Luxembourg, Netherlands, Portugal, Sweden and United Kingdom, infrastructure charges on heavy goods vehicles used in Austria, and the "climate cent" fuel tax in Switzerland that funds mitigation projects. There is information (mandatory labels) used in Australia and the European Union to show consumers the fuel economy and CO_2 emissions of new cars in order to encourage them to buy fuel-efficient models. In many countries, government-owned and -managed vehicle fleets are a significant source of emissions. **Government operations programmes** to increase the energy efficiency of and reduce CO_2 emissions from government fleets are used in Australia and Canada. For the longer term, Japan is promoting **systems approaches** to emission reductions in transportation and shipping/distribution.

7. Non-energy sectors

167. The predominant focus of reported mitigation PaMs targeting non-energy sectors is on the waste and industrial processes sectors. Policies aimed at mitigation in the agriculture and LULUCF sectors were reported to a somewhat lesser extent.

Industrial processes

168. In the NC5s, Parties reported continued use of their previous **regulations, reporting, voluntary enterprise partnerships, voluntary sectoral commitments and fiscal incentives (taxes)** to:

(a) Limit (ban) the use of certain HFCs and PFCs used as substitutes for ozone-depleting substances (ODS);

(b) Improve the manufacturing, handling, use and end-of-life recovery of fluorine-containing gases used as substitutes for ODS;

(c) Reduce PFC, HFC and SF_6 emissions in semiconductor manufacture, PFC emissions in aluminium production, SF_6 emissions in electric power transmission and distribution and magnesium production, and HFC and SF_6 emissions from miscellaneous sources;

(d) Reduce CO_2 emissions through improved operations in cement, lime and ammonia production;

(e) Reduce N_2O emissions through improved operations in adipic acid and nitric acid production.

169. The most effective and most frequently reported measures are those **directed at reducing fluorinated gases (F-gases)**. Those aimed at reducing CO_2 and N_2O emissions received less attention.

170. **Regulations** are used in Australia (Ozone Protection and Synthetic Greenhouse Gas Management Regulations) and the European Union (directives on F-gases, mobile air-conditioning and IPPC) to limit the manufacture, or to improve the manufacturing, handling, use and end-of-life recovery of fluorine-containing gases used as substitutes for ODS. In Iceland, the management of PFCs from aluminium production is subject to permitting regulations. **Voluntary enterprise partnerships** are used in Australia (best practices for handling SF_6) to limit emissions of HFCs, PFCs and SF_6 in semiconductor production, electric power distribution and magnesium production; reduce PFC emissions in aluminium production; reduce trifluoromethane (HFC-23) emissions in chlorodifluoromethane production; and improve the environmental performance of mobile air conditioners. **Voluntary sectoral commitments** are used in a few instances to reduce emissions from industrial processes. An industry-led initiative is seeking to reduce PFC emissions in aluminium production worldwide, and there are also national-level commitments in the Netherlands (Low-PFC Aluminium Production) and Norway (Climate Change Agreement with the Aluminium Industry). In France, N_2O agreements and regulations of the Association of Companies for the Reduction of the Greenhouse Effect (AERES), and other agreements relating to emissions from industrial processes, are used to reduce industrial N_2O emissions. **Fiscal incentives (taxes)** are used to reduce F-gas emissions in Denmark (imports of HFCs, PFCs and SF_6) and Norway (imports and production of HFCs and PFCs).

171. The PaMs directed at industrial processes reported in the NC5s were generally the same as those reported in the NC4s. The most significant addition was Switzerland's planned deposits or advanced disposal fees (fiscal incentives) targeting synthetic GHGs (HFCs, PFCs, etc.).

Agriculture

172. Parties reported relatively few PaMs targeting the agriculture sector. In the NC5s, Parties reported continued use of their previous **fiscal incentives** (either directly or within the context of agricultural market reform) **and** to a lesser extent the use of **regulations** (e.g. the EU nitrates directive) to:

(a) Reduce N_2O emissions through better manure management;

(b) Reduce N_2O emissions through optimized nitrogen fertilizer use;

(c) Reduce CH_4 emissions through changes in livestock management.

173. In the European Union, **fiscal incentives (i.e. subsidy reorientation**, taken within the context of agricultural market reform) are the principal instrument used to pursue the objectives listed in paragraph 172 above. For the most part, however, the primary purposes of these fiscal incentives are economic efficiency and the environmental quality of water and soil. Two key changes to the EU Common Agricultural Policy reported in the NC5s, of particular relevance to the cultivation of crops for bioenergy and thereby to GHG emissions, are the abolishment of direct payments for energy crop production and the abolishment of set-aside land from 2007. The abolishment of the direct premium paid for the cultivation of energy crops may have a negative impact on bioenergy, while the removal of set-aside land brings some land back into cultivation, making a potentially larger area of land available for energy crop cultivation. However, the removal of the set-aside obligation may also lead to increased CO_2 emissions.

174. In addition, **the EU nitrates directive (regulation**) seeks to prevent water pollution caused by N_2O coming from the excessive use of agricultural fertilizers and from agricultural waste. Secondarily, the reduction of N_2O in soils also has climate change mitigation related benefits.

175. Other, more climate-focused policies include: **voluntary enterprise partnerships** which promote the reduction of GHG emissions at farms in Canada, **long-term R&D** in Australia, and farm-level GHG reporting models and **demonstrations of practices** in New Zealand.

176. The PaMs directed at the agriculture sector reported in the NC5s were **generally the same as those reported in the NC4s.** The most significant changes were in Canada, European Union, Japan and Switzerland. In the European Union, there is new comprehensive funding for rural development for, among other things, the modernization of agricultural holdings, agri-environmental measures and diversification into biogas and biomass products. Also, in the European Union, there is a new framework directive for protecting soil and enhancing its value as a carbon sink. In Japan, financial and technical assistance are provided for the optimization and reduction of fertilizer use**.** In Canada, financial and technical assistance are provided for biofuel development. In Switzerland, eligibility for agricultural support payments is linked to ecological standards and financial and technical assistance are provided for the efficient use of natural resources.

Land use, land-use change and forestry

177. As for the agriculture sector, Parties reported relatively few PaMs targeting the LULUCF sector. The measures tend to be **part of larger policy strategies** targeting rural development, agricultural reform, environmental stewardship and biodiversity, rather than being solely climate-focused measures. In the NC5s, Parties reported continued use of their previous **fiscal measures** (subsidies) **and regulations** (environmental codes) **for private lands, and public infrastructure and resource management rules and procedures for public lands**, to:

(a) Promote sustainable forest management, taking into account the need to enhance forest removals and to maintain and enhance biodiversity;

(b) Prevent forest fires;

(c) Afforest, reforest and manage forests, grassland, wetlands and cropland;

(d) Increase green urban areas.

178. The EU forestry strategy provides for **fiscal incentives** (grants) and **public infrastructure and resource management** (public land management schemes). The EU Common Agricultural Policy market and rural development policies provide fiscal incentives for actions that affect sinks in agricultural soils.

179. Numerous **regulations, fiscal incentives and information dissemination programmes** are used in Australia to reduce emissions from clearing native vegetation in Queensland and New South Wales. Slovakia uses regulations for sustainable forest management.

180. The PaMs directed at the LULUCF sector reported in the NC5s were **generally the same as those reported in the NC4s.** The most significant changes were in Australia, European Union and New Zealand. In Australia, voluntary projects relating to emissions from LULUCF are linked with ETS. In the European Union, there are new research and management plans. In New Zealand, grants are provided for afforestation measures. There are new research and management plans in the European Union and New Zealand.

Waste

181. In the NC5s, Parties reported the continued use of their previous **framework targets, regulations, fiscal incentives, voluntary enterprise partnerships, and public facilities, infrastructure and resource management** to reduce CH_4 emissions via:

(a) Waste minimization through reduced packaging and increased product and packaging reusability and recyclability;

(b) Waste reuse through the implementation of waste separation and recycling;

(c) Landfill minimization through processing and incineration;

(d) Landfill management with CH_4 capture or flaring.

182. The European Union uses **framework targets** and **regulations** to pursue the objectives listed in paragraph 181 above. The EU landfill directive mandates (regulation) waste acceptance procedures and technical configurations of landfills, and sets targets for reducing the amount of biodegradable municipal waste disposed of in landfills. The EU waste incineration directive sets (regulation) stringent operational conditions, technical requirements and emission limits for waste incineration, in order to reduce as far as possible any negative effects on the environment caused by the incineration and co-incineration of waste. The EU waste packaging directive sets targets that, by 2008, at least 60 per cent (by weight) of packaging waste be recovered or incinerated at waste incineration plants with energy recovery, and that 55 to 80 per cent (by weight) of packaging waste be recycled. The WEEE directive prescribes (regulation) extended responsibilities for producers and includes the target that by 31 December 2006 EU member States should have been achieving separate collection rates of at least 4 kg/capita/year WEEE from private households to be taken for reuse or recycling. The EU end-of-life vehicles directive regulates (mandates) the acceptance and recovery of used vehicles by their producers.

183. To meet the targets of the EU landfill directive,[32] EU member States are using **fiscal incentives** (landfill taxes and price supports for electricity from waste incineration), **regulations** (landfill quotas and tradable tipping certificates in the United Kingdom; waste acceptance standards; green certificates for electricity from waste incineration; and operating permits for landfills and compliance enforcement, including the closure of illegal sites) and **public infrastructure and resource management** (construction of collection facilities, incinerators and municipal waste treatment plants). To meet the waste packaging targets, EU member States are using fiscal incentives (deposit-return systems) and **regulations** (producer responsibility schemes). To meet the targets of the WEEE directive, EU member States are using **regulations** (producer responsibility for product take-back from collection facilities), **public infrastructure and resource management** (to establish

[32] Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste.

public collection facilities) and **fiscal incentives** (visible fees to fund the collection and management of older waste).

184. **Landfill regulations** are also used in New Zealand. The New Zealand National Environmental Standard for Landfill Methane requires landfills with a lifetime design capacity exceeding 1 Mt and a current stock capacity of 200,000 t to collect and destroy landfill gas.

185. Australia's federal, state, territorial and local governments use a combination of voluntary, regulatory and fiscal instruments in their waste management strategies.

186. **Voluntary enterprise partnerships** are used in Japan, where, in addition to employing more traditional recycling measures, the Government is encouraging manufacturers to improve the durability of and enhance the repair system for their products.

187. The PaMs directed at the waste sector reported in the NC5s **were generally the same as those reported in the NC4s.** The most significant changes were in European Union, New Zealand and Switzerland. The European Union introduced new framework regulations for waste, prohibiting the abandonment, dumping or uncontrolled disposal of waste, and promoting (with targets) waste prevention, recycling and processing for reuse. Switzerland implemented new regulations on waste incineration and recycling. New Zealand implemented new regulations to minimize waste, through a levy on all waste going to municipal landfills, mandatory product stewardship schemes, mandatory reporting on waste, and territorial responsibilities for waste minimization.

C. The limitation or reduction of emissions from aviation and marine fuels

188. Parties **reported on the steps taken to promote and/or implement decisions of ICAO and IMO** in order to limit or reduce GHG emissions from aviation and marine bunker fuels. The Parties defined their positions on the scope, principles and design of a possible global climate regime to regulate GHG emissions from international bunker fuels.

189. Parties noted **the progress made by ICAO and IMO** in this area. Some Parties (e.g. Canada, Denmark, Germany, Italy, Netherlands, Norway, Portugal, Spain, Sweden and Switzerland) reported on the progress made by ICAO and IMO in the development of technical, operational and market-based measures to limit or reduce GHG emissions from aviation and marine bunker fuels.

190. **Many Partie**s (e.g. Australia, Austria, Canada, Denmark, Finland, Germany, Greece, Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom) **stated their suppor**t for the steps taken to limit or reduce GHG emissions from aviation and marine bunker fuels by ICAO and IMO. A number of Parties (e.g. Australia, Canada, Denmark, Netherlands, Norway, Sweden, Switzerland and United Kingdom) stated their support for limiting or reducing GHG emissions from aviation and marine bunker fuels **using international approaches.**

191. Australia noted that it supports international measures and regulations that are non-discriminatory, do not disproportionately affect long-distance operations and do not introduce competitive distortions. Canada supported the development of guidance on the use of operational measures to reduce GHG emissions from international aviation under the Committee on Aviation Environmental Protection of ICAO. Denmark, Germany and Norway reported on submissions made to the Marine Environment Protection Committee of IMO on market-based measures. The Netherlands has been promoting international market-based measures to reduce GHG emissions from aviation under ICAO. Sweden stated that it supports the limiting of emissions from emissions within the framework of

ICAO and that it has assisted with work under IMO to develop a design index for newly built ships.

192. **A number of Parties** (e.g. Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland and United Kingdom) **reported on domestic PaMs to regulate GHG emissions from international bunker fuels**, such as measures aiming at the achievement of energy efficiency in international transport and the development of methodological approaches to calculate the carbon footprint of this sector, and the inclusion of aviation in the EU ETS.

193. Japan reported on its support for technical measures to improve the energy efficiency of new aircrafts and vessels. France and New Zealand provided information on operational measures to limit or reduce GHG emissions from aviation and Canada noted the launch of voluntary action with its domestic air carriers to achieve a cumulative improvement in fuel efficiency of 24 per cent. New Zealand is investigating methods for calculating GHG emissions from international shipping in order to analyse the carbon footprint of the international transport sector. In the United Kingdom, the Government announced a target to reduce the country's total CO_2 emissions from aviation to below the 2005 level by 2050.

194. The EU member States as well as Iceland and Norway reported that the European Commission adopted a directive[33] which aims at **the inclusion of GHG emissions from aviation activities in the EU ETS**. The EU ETS will cover flights between EU airports and all flights arriving at and/or departing from airports in the EU and other participating states (Iceland and Norway) as of 1 January 2012. Switzerland stated that it is exploring ways to integrate civil aviation into an ETS in line with the European aviation and transport policy. As regards maritime bunkers, some EU member States noted that, in the case that no international agreement under IMO or the UNFCCC, which addresses GHG emissions from international marine bunker fuels, is agreed upon by 31 December 2011, the European Commission will make a proposal to include international maritime emissions in the Community reduction commitment.[34]

D. Ways to minimize adverse effects of the implementation of policies and measures under Article 2 of the Kyoto Protocol

195. Reporting on the minimization of adverse effects is another element included in the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. According to decision 15/CMP.1, annex, paragraph 36, each Annex I Party shall provide information not reported elsewhere 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 and in particular those identified in Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention. As the reporting on the minimization of adverse effects under Article 7, paragraph 2, of the Kyoto Protocol is closely related to the reporting under Article 7, paragraph 1 of the Kyoto Protocol (Article 3, paragraph 14, of the Kyoto Protocol), a few

[33] Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community.

[34] Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community.

Parties used elements of the guidelines for reporting on Article 3, paragraph 14, of the Kyoto Protocol (decision 15/CMP.1, annex, paragraph 24) for their reporting under Article 2, paragraph 3, of the Kyoto Protocol.

196. A number of Parties (e.g. Austria, Belgium, Denmark, European Union, Finland, Germany, Greece, Italy, Latvia, Luxembourg, Netherlands, New Zealand, Poland, Portugal, Slovakia, Slovenia, Sweden, Switzerland and United Kingdom) provided information in their NC5s on how they are implementing the provisions of Article 2, paragraph 3, of the Kyoto Protocol.

1. Minimizing adverse effects of climate change

197. Parties pointed to the fact that the Kyoto Protocol was adopted in pursuit of the ultimate objective of the Convention and that hence its full implementation by Annex I Parties should contribute to preventing dangerous anthropogenic interference with the climate system. Ambitious mitigation goals that are necessary to ascertain a future for all countries are being set. Key examples of efforts and initiatives needed to minimize the adverse effects of climate change include a broad range of PaMs to reduce GHG emissions, including PaMs aiming at:

(a) Decreasing dependence on fossil fuels and reducing fossil fuel consumption through increased use of RES;

(b) Developing low-carbon energy systems by means of appropriate transition pathways with different governance patterns;

(c) Enhancing carbon sinks through afforestation, reforestation schemes, forest management, cropland management, and grazing land management or revegetation;

(d) Increasing the share of RES in the energy balance;

(e) Improving the efficiency of the use of energy resources;

(f) Developing environmentally friendly transport systems;

(g) Promoting the implementation of the best available techniques, environmentally friendly technologies and cleaner production;

(h) Promoting the implementation of environmentally sound agricultural methods that reduce direct GHG emissions;

(i) Establishing up-to-date municipal waste management systems, ensuring the collection of biogas at the municipal waste landfills;

(j) Participating in the Kyoto Protocol mechanisms;

(k) Promoting the implementation of environmental management systems.

198. Parties noted that if the above-listed and other relevant initiatives are carefully undertaken, they should result in positive impacts on all Parties, including making a sizeable contribution to limiting the global temperature increase to 2 °C by 2010.

2. Minimizing effects on international trade

199. According to decision 15/CMP.1, annex, paragraph 24, actions that may minimize adverse impacts, including effects on international trade due to response measures, can include: the progressive reduction or phasing out of market imperfections; fiscal incentives; tax and duty exemptions and subsidies in all GHG-emitting sectors, taking into account the need for energy price reforms to reflect market prices and externalities; and removing subsidies associated with the use of environmentally unsound and unsafe technologies.

200. Some Parties (e.g. Canada and New Zealand) reported that they hold regular **trade, economic and political consultations** with other governments, including those of developing countries, which provide opportunities for countries to raise concerns about possible or actual adverse impacts of policies and to find solutions within bilateral relationships. As reported by New Zealand, to date there have been no specific concerns raised about any negative impact of its climate change response policies. Finland mentioned that it has taken relevant steps with **the support of international organizations such as** the United Nations Conference on Trade and Development and through bilateral partnerships.

3. Minimizing social, environmental and economic impacts on other Parties

201. Measures to minimize social, environmental and economic impacts on other Parties can include:

(a) Cooperating in the technological development of non-energy uses of fossil fuels, and supporting developing country Parties to this end;

(b) Cooperating in the development, diffusion and transfer of advanced fossil-fuel technologies that emit less GHG emissions, and/or technologies, relating to fossil fuels, that capture and store GHGs, and encouraging their wider use;

(c) Facilitating the participation of the least developed countries and other Parties not included in Annex I to the Convention in this effort;

(d) Strengthening the capacity and resilience of developing countries identified in Article 4, paragraphs 8 and 9, of the Convention.

202. More than half of the Parties that reported information on such social, environmental and economic impacts in the NC5s indicated that before decisions to implement PaMs are taken, **impact assessments are carried out**. Such analysis includes, to the extent possible, assessing the risk of adverse effects on other countries. Sweden, for example, reported that its climate change strategy has a broad focus on many different types of measure covering the majority of sectors of society (both in and outside of the country). This approach minimizes the risk of adverse effects. Another example was a study to assess social and environmental impacts of the use of second-generation biomass fuels launched by the Swiss Centre for Technology Assessment. In addition, efforts have been made to identify adverse incentives in the Swiss tax system**,** with the aim of a gradual **elimination of such negative incentives** that could affect other Parties.

203. Some Parties reported on their technical and financial support for **adaptation activities** in vulnerable developing countries. A few Parties focussed on supporting adaptation in the energy sector in this context. The Netherlands, for example, set itself a target of providing 10 million people in developing countries with modern energy by 2015. It reported that, between 2004 and 2007, a variety of programmes funded 5.5 million people to make use of modern, sustainable forms of energy, including biogas installations, small-scale hydraulic power stations and solar panels. Estimations indicate that the total number of people benefiting from those programmes reached 6.3 million by the end of 2008.

204. **Support for the CDM in developing countries** was cited by many Parties as a vehicle for facilitating the sharing of efforts in reducing GHG emissions in the most cost-efficient way. Germany, for example, through its Federal Ministry for Economic Cooperation and Development, has created the Climate Protection Programme, which supports developing countries in building the infrastructure required for the implementation of the CDM and facilitates the investment of companies from industrialized countries in

projects (in relation to renewable energy, energy efficiency, and CH_4 emissions from landfills) in developing countries.

205. The European Union reported on its activities **that promote measures related to energy efficiency and CHP** by reducing energy costs and contributing to the improvement of air quality. PaMs for the promotion of renewable energy contribute to the reduction of dependence on fossil fuels, enhance electrification in rural areas and reduce ambient air pollutants. The European Union also reported on its **cooperation with China on** CCS within the framework of the Near-zero Emissions Power Generation Technology through the Carbon Dioxide Capture and Storage programme. This cooperation aims at demonstrating the CCS technology in China to enable deployment from 2020.

206. A project-based initiative, the Energy and Environment Partnership with Central America, that was launched during the United Nations World Summit on Sustainable Development in 2002 by the Government of Finland and the Central American partner countries was reported as a good example of **cooperation between Annex I and developing country Parties.** Within this collaborative framework, partial funding has been granted to 189 projects. These include research projects, such as feasibility studies, and pilot and demonstration schemes in all the main fields of renewable energy production in the Central American partner countries. Finland reported that it also provides financial support for district heating projects in China. The objective of the projects is to increase energy efficiency and to reduce emissions from heat production by introducing CHP generation and modern heat distribution systems.

207. The possibility of **negative impacts on developing countries as a result of the promotion of the use of biofuels** in Annex I Parties was noted by several Parties. To avoid or reduce such impacts, those Parties have adopted a number of regulations. The European Union, for example, agreed on a new renewable energy directive, which targets the use of a minimum of 10 per cent renewable energy in the transport sector by 2020 and established specific sustainability criteria for biofuels, in order to ensure that biofuels promoted within the European Union do not have negative impacts. Such sustainability criteria include a restriction on supporting biofuels from land with high biodiversity value (primary forest and wooded land, protected areas or highly biodiverse grasslands) or from land converted from wetlands, peatlands or continuously forested areas. Ireland reported its reduction of its target for biofuel use in the transport sector from 5.8 per cent to 4.0 per cent in 2010 with a view to mitigating a concern that a higher target could lead to an increased export of biofuels to the European Union from other parts of the world and could thus indirectly lead to negative economic, social and environmental impacts elsewhere. Germany too has undertaken a number of initiatives, providing technical advice and setting regulations, to prevent negative impacts on developing countries as a result of the use of bioenergy.

208. **Deforestation in developing countries** was identified by Parties (e.g. Australia, European Union, Italy and Netherlands) **as a key challenge** that requires urgent action. In October 2008, the European Union agreed on two major initiatives to protect forests worldwide. The first initiative set out proposals for tackling tropical deforestation, while the second initiative targeted a reduction of illegally logged timber imports. Also, the European Union proposed to work on the development of a Global Forest Carbon Mechanism, a financial instrument through which developing countries would be rewarded for emission reductions achieved by reducing deforestation and forest degradation.

VIII. Domestic and regional legislative arrangements and enforcement and administrative procedures to meet commitments under the Kyoto Protocol

209. In accordance with decision 15/CMP.1, annex, paragraph 37, each Annex I Party shall report any relevant information on its domestic and regional legislative arrangements and administrative procedures, established pursuant to the implementation of the Kyoto Protocol, according to its national circumstances. This information shall include: a description of any domestic and regional legislative arrangements and enforcement and administrative procedures put in place by the Party to meet its commitments under the Kyoto Protocol; a description of any provisions to make information on these legislative arrangements and enforcement and administrative procedures publicly accessible; and a description of any institutional arrangements and decision-making procedures in place to coordinate activities relating to participation in the Kyoto mechanisms.

210. Also, each Annex I Party shall provide a description of any national legislative arrangements and administrative procedures that seek to ensure that the implementation of activities under Article 3, paragraph 3, and any 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.

A. Overview of domestic and regional legislative arrangements and enforcement and administrative procedures

211. Since the NC4s, **all Parties have continued enhancing their comprehensive approaches to addressing climate change, strengthening the coordination and monitoring of national efforts, and advancing in the implementation of national climate change strategies**.

212. When reporting domestic and regional legislative arrangements and enforcement and administrative procedures to meet commitments under the Kyoto Protocol, Parties **focused on cross-sectoral legal, regulatory and institutional frameworks** for implementing mitigation PaMs under the Kyoto Protocol, institutions and systems to account for emissions and assigned amounts, and relevant arrangements for implementing the Kyoto mechanisms: emissions trading (including GIS), JI and the CDM. Also, all Parties provided elaborated information on their national registry and their national system for GHG inventory preparation and management (see paras. 95–106 above).

213. A number of Parties have taken steps that drive further progress towards becoming **a low-carbon economy and have set long-term emission reduction strategies**, such as the Low Carbon Transition Plan (2009) in the United Kingdom and the Long-term Climate and Energy Strategy (2008) in Finland. Australia formulated its response to climate change on the basis of a three-pillar approach: reducing GHG emissions, adapting to climate change that cannot be avoided and helping to shape a global solution to climate change.

214. Most Parties have **further promoted legislative and regulatory frameworks for the implementation of the Kyoto Protocol. These Parties established new cross-cutting instruments, such as** ETS (New Zealand and Switzerland) or the innovative approach of departmental carbon budgets and detailed carbon accounting to determine compliance with the carbon budgets (United Kingdom).[35] EU-wide legislative arrangements and

[35] A carbon budget is a cap on the total quantity of GHG emissions emitted in the country over a specified time period. Under a system of carbon budgets, every tonne of GHGs emitted over the time period is counted. Departmental carbon budgets cover every central government department and

programmes, known as common and coordinated PaMs, affecting GHG emissions include the EU ETS, the EU climate and energy package for the post-2012 period and EU decision 280/2004/EC[36] on the GHG monitoring mechanism. EU member States have implemented these arrangements at the national level, for example the national climate plan for 2009 to 2012 in Belgium and the Act on the use of the Kyoto mechanisms in Finland. Also, Canada has developed and adopted the Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act[37] and Japan has developed the Kyoto Protocol Target Achievement Plan.

215. Other examples of legislative arrangements include those that underpin the implementation of ETS in New Zealand, Norway and Switzerland. Similar to the EU ETS, Norway's ETS allows the companies under it to use the Kyoto mechanisms for compliance up to 13 per cent of their actual emissions. The effectiveness of New Zealand's ETS is monitored and the institutional arrangements are reviewed periodically. It is foreseen that New Zealand's ETS will cover all sectors by 2015. Also, Australia reported on its Government's intentions, in order to meet the country's Kyoto target and long-term emission reduction targets, to establish an ETS called the Carbon Pollution Reduction Scheme.

216. Climate policy implementing **institutions have been strengthened or reorganized** to reflect the increased importance of climate change in the governmental policy portfolio and intrinsic linkages with the mainstream energy policy (the creation of a Ministry of Energy and Climate Change in Denmark, Greece and United Kingdom, and the expansion of Switzerland's climate division of the Federal Office for the Environment (FOEN). Intergovernmental committees have been established to monitor and evaluate the progress towards meeting national emission reduction targets (e.g. the independent Committee on Climate Change in the United Kingdom). For most Parties, the role of the Ministry of Finance in the implementation of the Kyoto Protocol, namely in overseeing the trading of Kyoto units, has become more prominent (as, for example, in New Zealand).

217. Specific requirements are set for the **monitoring and evaluation of the progress** in achieving emission reductions. EU member States follow the GHG monitoring and evaluation requirements set out in EU decision 280/2004/EC, while New Zealand has established a five-year review cycle of its ETS. In Japan, expert councils under individual ministries[38] are in charge of overseeing the implementation of particular PaMs within the framework of the Kyoto Protocol Target Achievement Plan.

218. Compared with those reported in the NC4s, **efforts of stakeholders** in relation to climate change issues at all levels of multi-level governance and among non-governmental social partners **have increased**. In all Parties, **regional and local governments play a significant role** in climate change mitigation and adaptation and increasingly influence the development of the national climate change policy. For example, in Japan about two thirds of local governments have established mitigation action plans. Also prominent are the local initiatives to establish long-term GHG emission reduction targets in the cities of Tokyo and Kitakyushu in Japan, as well as the innovative initiative of the Tokyo Metropolitan

facilitate the management of GHG emissions stemming from the activities coordinated by each department.

[36] Decision 280/2004/EC of the European Parliament and of the Council of 11 February 2004 concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol.

[37] A Climate Change Plan for the Purposes of the Kyoto Protocol Implementation Act (2009) identifies the effects of PaMs/projections annually for 2008–2012.

[38] Including the Ministry of Environment; the Ministry of Economy, Trade and Industry; the Ministry of Culture, Sports, Science and Technology; the Ministry of Agriculture, Forestry and Fisheries; the Ministry of Land, Infrastructure and Transport; and the Ministry of External Affairs.

Government to launch the world's first urban ETS targeted at CO_2 emissions from the commercial building sector. A number of Parties have broadened the cooperation between their central governments and their regions and municipalities in developing and implementing climate change related PaMs (Austria, Canada, Denmark, Finland, Germany, Japan, Netherlands and United Kingdom).

219. An increasing number of climate change related initiatives, including mitigation activities, training and public-awareness campaigns, are being carried out **by non-governmental environmental and business organizations** in close cooperation with central and local governments. For example, the Government of the United Kingdom cooperates with its social partners (see Box 3) or the Government of Austria cooperates with the environmental non-governmental organization (NGO) Climate Alliance (Klima Alliance), which works with regions, cities, schools and businesses on climate change mitigation measures and public-awareness raising.

Box 3
Cooperation with social partners – Salix Finance, a United Kingdom success story

Salix Finance Ltd is a private company funded by the United Kingdom Government's Carbon Trust and aims to help the public sector invest in energy efficiency projects, including boiler improvements, cooling and heating projects, and insulation and lighting upgrades. The company also promotes knowledge-sharing and provides technical support and support for CO_2 accounting.

Through a mixture of loans and grants, Salix has to date engaged with 625 public-sector bodies and funded over 5,750 projects. These will provide the public sector with 470 million pounds sterling (GBP) in lifetime savings on its energy bills. When all Salix's existing programmes are fully committed, they should save the public sector as a whole GBP 700 million in energy bills and 4.2 Mt CO_2 over their lifetime. On average, Salix's projects will pay back their costs within 3.4 years. For every GBP 1 invested, some GBP 4 of savings are achieved.

220. All Parties have provisions to make **information on their legislative arrangements publicly accessible**. Also, all Parties have expanded information on the JI and CDM programmes and Kyoto units used on their national registry websites; the climate change related legislation and procedures are made publicly available on the websites of the decision-making or implementing agencies. A number of Parties indicated an increasing number of public actions related to climate change since 2005. Several authorities have provided comprehensive information on the Internet for households to stimulate action (Sweden). Norway noted that it has undertaken a number of steps to make climate information publicly available.

B. Institutional arrangements and decision-making procedures to coordinate activities relating to participation in the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol

221. Participation in the Kyoto mechanisms (JI, the CDM and emissions trading) offers Parties that use them a flexible and cost-efficient way to fulfil a part of their Kyoto Protocol commitments, while the host Party benefits from foreign investment and technology transfer. In particular, the project-based mechanisms, JI and the CDM, provide flexibility to

the Parties in choosing the project types and sectors, ensure additional emission reductions and engage the private sector in mitigation efforts.

222. For some Parties, **participation in the Kyoto mechanisms is essential** for meeting their Kyoto targets. As indicated in Table 4, 10 Parties expect to meet their Kyoto targets by using a combination of additional measures, the Kyoto mechanisms and LULUCF activities in addition to their domestic efforts. A few Parties may need to implement further PaMs and/or use the Kyoto mechanisms beyond the plans reported in the NC5s in order to reach their Kyoto targets. Canada does not elaborate in its NC5 on its plans to reach its Kyoto target (see box 1 above).

223. Most of the Parties that reported their use or their intention to use the Kyoto mechanisms **established the necessary institutional arrangements and procedures in accordance with the eligibility requirements for participation in the Kyoto mechanisms**.[39] Most Parties appointed a designated national authority (DNA) for the CDM and a designated focal point for JI (such as the Climate Change Commission in Portugal or the Pollution Control Authority in Norway). Project approval procedures have been adopted for JI and CDM projects in most of the Parties. Several Parties established legislative and institutional frameworks for emissions trading under Article 17 (see para. 231 below).

224. Parties have put in place various **approaches, instruments and programmes to facilitate the implementation of the Kyoto mechanisms and to acquire Kyoto units, including**:

(a) Governmental procurement programmes (such as Certified Emission Reduction Unit Procurement Tender (CERUPT) in the Netherlands and the joint implementation/clean development mechanisms programme in Austria (see Box 4);

(b) Participation in the work of the facilities at multilateral, regional, national and financial institutions (the Testing Ground Facility in the Nordic countries, and facilities at the International Bank for Reconstruction and Development and the International Finance Corporation).

Box 4
The Austrian joint implementation/clean development mechanism programme

It is estimated that the Austrian joint implementation/clean development mechanism (JI/CDM) programme will provide 45 million units from the mechanisms under the Kyoto Protocol in the period 2008–2012 to contribute to meeting Austria's target under the Kyoto Protocol. The whole amount of Kyoto units had already been contracted by 2010. Certified emission reductions (CERs) dominate in the purchasing portfolio (70 per cent), followed by emission reduction units and assigned amount units from green investment schemes (15 per cent each). The bulk of the CERs originate in China (45 per cent) and in Central or Eastern Asia (excluding China) (33 per cent). The JI/CDM programme applies strict sustainability criteria to the selection of projects.

225. Contribution to the dedicated carbon funds: the Prototype Carbon Fund, the Community Development Carbon Fund (CDCF), the BioCarbon Fund under the World

[39] Eligibility requirements, among others, include being a Party to the Kyoto Protocol, having an established assigned amount, having in place a national system for GHG estimation and a national registry, having submitted the supplementary information on GHG emissions and the assigned amount, and meeting methodological and reporting requirements under Article 5, paragraph 2 and Article 7, paragraph 1, of the Kyoto Protocol.

Bank, the Multilateral Carbon Credit Fund under the European Bank for Reconstruction and Development, the Carbon Fund for Europe under the World Bank and the European Investment Bank, and the Asia Pacific Carbon Fund of the Asian Development Bank. Most Parties that intend to use the Kyoto mechanisms for compliance purposes have created **dedicated funds or purchasing** programmes and set principles and priorities for the management of these funds. Examples include the Kyoto Funds of Finland and Luxembourg, the Italian Carbon Fund and the Portuguese Carbon Fund. Special programmes or funds have been created to fund domestic actions which contribute to emission reductions, such as the Kyoto Rotation Fund for the achievement of the Kyoto target in Italy.

226. Purchasing funds of some Parties (e.g. Belgium) have set **eligibility criteria** for projects based on sustainability criteria or on the "Gold Standard".[40] The Finnish Carbon Procurement Programme excludes projects reducing HFCs and requires projects to clearly identify sustainability-related benefits. Liechtenstein's National Climate Protection Strategy excludes the funding of JI and CDM projects that aim at the reduction of HFC-23 or at CCS and excludes the purchase of AAUs unless a GIS has been defined by the respective host country. Belgium has developed procurement strategies for Kyoto units, while the Swedish JI and CDM programme focuses on providing assistance through individual projects (in the areas of renewable energy and energy efficiency) and on participation in multilateral funds for the CDM and JI.

1. Participation in the clean development mechanism

227. The CDM is by far the most popular instrument among the Kyoto mechanisms and, hence, it delivers the most emission reductions. The majority of the projects are large-scale projects, with a focus on, among other things, the reduction of CO_2 emissions from the energy sector and the abatement of F-gases from the manufacturing sector. For example, projects funded by Denmark in a number of developing countries focus primarily on the promotion of RES, energy efficiency and technological innovations and the Netherlands has signed non legally binding memorandums of understanding for the implementation of the CDM with a number of developing Parties. Although, since the NC4s, the geographical distribution of CDM projects has become more balanced, still the majority of the projects are implemented in Brazil, China, Central Asia and India.

2. Participation in joint implementation

228. All Parties involved with JI projects have established the **necessary procedures and institutional arrangements** (Bulgaria, Czech Republic, Croatia, Estonia, Finland, France, Germany, Hungary, Latvia, Lithuania, New Zealand, Poland, Romania, Russian Federation, Slovakia, Spain and Ukraine). For example, Poland has developed legislation on the requirements for JI projects in and outside of Poland and on requirements for CDM projects outside of Poland. Several Parties, recipients of JI projects, have developed special national procedures of approval for JI projects under Track 1 (which do not require the involvement of the Joint Implementation Supervisory Committee). The Russian Federation and Ukraine have established procedures for JI projects that enable the utilization of the current extensive GHG reduction potential.

229. While most of the JI projects have been implemented between EIT Parties and Annex II Parties, there are several examples of JI projects between Annex II Parties, such as a project between the Netherlands and New Zealand.

[40] The "Gold Standard" is an internationally recognized criterion for projects that include environmental aspects, social sustainability and development, and economic and technological aspects.

230. The majority of the JI projects focus on CO_2 emissions from the energy sector (energy industries, energy distribution and energy demand, energy efficiency, energy saving and RES), upgrading industrial processes, and the collection and utilization of CH_4 from solid waste disposal on land and from manure management. Projects include the abatement of fugitive CH_4 emissions from oil and gas transportation and coal mining, the abatement of N_2O emissions from chemical industry and the recovery of CH_4 emissions from solid waste disposal on land.

3. Participation in emissions trading

231. Several Parties that intend to sell AAUs have established special schemes known as **GIS**. These schemes have been developed in a number of EIT Parties,[41] namely Czech Republic, Hungary, Latvia and Poland. They aim at ensuring that the revenue received from international emissions trading is used for environmental protection and climate change related activities. The remaining EIT Parties noted their preparations for the establishment of GIS: the legal framework has been established in Lithuania; GIS was acknowledged as an instrument to be used to fundraise for projects aiming at GHG emission reductions in Slovakia; a designated working group was created in Estonia; and a feasibility study has been carried out in Romania. Bulgaria reported that the development of its GIS is uncertain.

232. In Hungary, revenue from selling surplus AAUs is intended to be used for stimulating investments in energy efficiency in private and public buildings, including the construction of passive houses and the promotion of the use of renewable energy. Poland has legislation in place that stipulates that revenue from selling AAUs should be used for co-financing domestic projects or programmes related to mitigation of GHGs, adaptation to climate change and air protection measures.

233. There is no indication provided in the NC5s by the remaining Parties of how the revenue from selling AAUs will be used, for example whether there are any plans for 'greening' the investments made using the revenue. Also, most Parties that intend to purchase AAUs (e.g. Spain) have not reported, in their NC5s, specific sustainability or environmentally friendly requirements for the use of the revenue by the Party that is the seller of the AAUs.

C. National legislative arrangements and administrative procedures for the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

234. Activities under Article 3, paragraphs 3 (afforestation, reforestation and deforestation) and 4, (forest management, cropland management, grazing land management and revegetation) of the Kyoto Protocol **play a significant role in the implementation of the Kyoto Protocol** for a number of Parties. Activities under Article 3, paragraph 3, are mandatory and activities under Article 3, paragraph 4, could be elected by Parties. Thirteen Parties[42] have elected not to account for any activities under Article 3, paragraph 4, while 26 Parties have chosen to account for at least one of those activities. Most of those Parties (22) have elected to account for forest management; four Parties have elected to account for cropland management; three for revegetation; and two for grazing land management (see Table 5), and they have strengthened their efforts to account for these activities. Eight

[41] Since the publication of the NC5s, a GIS has been established or further developed in a number of EIT Parties, including Bulgaria, Estonia, Latvia, Lithuania, Poland and Ukraine.

[42] The amendment to the Kyoto Protocol with an emission reduction target for Belarus (decision 10/CMP.2) has not yet entered into force; information for Belarus is therefore not included in this report.

Parties (Australia, Denmark, France, Hungary, Liechtenstein, Monaco, Russian Federation and Switzerland) have elected to account for LULUCF activities on an annual basis, which requires even more arrangements to this effect.

Table 5
Activities under Article 3, paragraph 4, of the Kyoto Protocol elected by Parties

Elected activity under Article 3, paragraph 4, of the Kyoto Protocol	*Parties that have elected the activity, or have elected not to account for any activity*
No activity elected	Australia, Austria, Belgium, Bulgaria, Estonia, Greece, Ireland, Liechtenstein, Luxembourg, Monaco, Netherlands, New Zealand and Slovakia
Revegetation	Iceland, Japan and Romania
Forest management	Croatia, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Latvia, Lithuania, Norway, Poland, Portugal, Romania, Russian Federation, Slovenia, Spain, Sweden, Switzerland, Ukraine and United Kingdom
Cropland management	Canada, Denmark, Portugal and Spain
Grazing land management	Denmark and Portugal

235. The most substantial contribution from LULUCF activities to meeting the Kyoto target is expected in New Zealand (25.7 per cent of the base year emission level), Ireland (4.0 per cent), Denmark (3.1 per cent), Croatia (3.1 per cent), Norway (3.0 per cent), European Union (1.0 per cent) and Japan (1.0 per cent). For some Parties, like Australia, reduced emissions from deforestation in comparison with the base year sizeably contributed to the achievement of their Kyoto target, as they offset to a large extent increases in emissions from other sectors, such as the energy sector (according to the projections presented in Australia's NC5, emissions from LULUCF activities are expected to have decreased by 63 per cent in 2010 compared with 1990).

236. Most Parties **demonstrated progress in enhancing their estimation of emissions and removals from LULUCF activities**. They have further established legal and institutional arrangements to enable them to obtain reliable information for making such estimates. Many Parties have launched specific research projects, created databases or made additional contractual arrangements with forestry experts for the assessment of LULUCF activities. A few Parties (e.g. Austria) aligned the timing of the national forest inventory with the beginning and end of the first commitment period under the Kyoto Protocol.

237. As regards the conservation of biodiversity and the sustainable use of natural resources, the majority of the Parties reported that their **forest is managed according to the principles of sustainable forest management** and that in their forest regulations and programmes they have requirements for biodiversity conservation and the sustainable use of natural resources. Examples include the Forest Act and Forest Biodiversity Programme for Southern Finland and the Nature Conservation Act in the Netherlands.

238. The national legislation of some Parties sets strict requirements for deforestation. For example, in the Netherlands deforestation is allowed only when the negative consequences for biodiversity are minimized. In Spain, the Spanish Forestry Plan (2003–2032) 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 to be protected.[43] Norway noted its sustainable forest management strategy, aimed at maintaining or increasing forest carbon stocks in the long term, while producing an annual sustained yield of timber, fibre or energy from the forest.

[43] Report of the in-depth review of the fifth national communication of Spain FCCC/IDR.5/ESP.

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

239. According to decision 15/CMP.1, each Party in its national communication shall provide information on how its use of the Kyoto mechanisms is supplemental to domestic actions and how its domestic actions constitute a significant element of the effort made to meet its Kyoto target. **Parties that plan to use the Kyoto mechanisms for compliance with their Kyoto target** (17 Parties, see Table 6) **reported in their NC5s, or provided an indication therein, that the use of the Kyoto mechanisms is supplemental** to their domestic actions to reduce GHG emissions.

240. Many of the Parties defined supplementarity criteria, either in quantitative or in qualitative terms; however, **the way that supplementarity is defined varies** from Party to Party, mostly because of the use of different baseline assumptions to estimate the total effect of domestic actions. Parties that expect to reach their Kyoto target by domestic actions only have not elaborated on supplementarity in their NC5s. Canada, despite the fact that domestic measures will not be sufficient for it to reach its Kyoto target, did not indicate its intention to use the Kyoto mechanisms for compliance with its Kyoto target and did not elaborate on supplementarity (see box 1 above). In contrast, several Parties that do not necessarily need to use the Kyoto mechanisms for compliance have participated in emissions trading (Poland and Romania) and in the testing facilities (such as the Baltic Sea Region Testing Ground Facility) in order to build capacity and to share knowledge about the functionality of the carbon market.

241. Most of the EU member States that plan to use the Kyoto mechanisms for compliance **defined supplementarity in quantitative terms** as the possible use of the Kyoto mechanisms worth up to 50 per cent of the overall effort made to attain their Kyoto targets. Japan estimated that emission reduction as a result of domestic PaMs (around 120 Mt CO_2 eq/year) is by far greater than that resulting from the intended use of the Kyoto mechanisms (20 Mt CO_2 eq/year). The Netherlands, while explaining how "significant" domestic actions are, noted that, when taking into account only climate policy related efforts, the ratio of domestic efforts to the use of the Kyoto mechanisms is 62 to 13. The European Union stated that its planned use of the Kyoto mechanisms accounts for approximately one quarter of its overall effort to meet its Kyoto target. Norway pointed out that it has reduced domestic emissions by approximately 10 Mt CO_2 eq/year since 1990 and that it plans to use approximately 7 Mt CO_2 eq/year Kyoto units to achieve its Kyoto target. Spain noted that domestic PaMs will reduce emissions under the 'without measures' scenario by 33 per cent in relation to the base year level, while activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol will reduce emissions by 2 per cent and the Kyoto mechanisms by 20 per cent. Portugal highlighted that its intended use of Kyoto units (3.82 Mt CO_2 eq/year) is less than the estimated emission reduction resulting from its domestic implemented and additional PaMs (5.25 Mt CO_2 eq/year).

242. Overall, assessment of supplementarity is a challenging task in the absence of an agreed approach and reporting guidelines on how to set the baseline or 'without measures' scenario and quantitative threshold. Supplementarity criteria are discussed by the Parties in their NC5s, which are based on their assessment of the effect of domestic actions and comparing it with the overall effort needed to attain their Kyoto targets. The effect of domestic actions could be assessed by comparing the 'without measures' and 'with measures' scenarios or by summing up the effects of individual measures. The overall effort could be estimated by comparing the 'without measures' scenario, the contribution of domestic actions, LULUCF activities and the Kyoto mechanisms on one hand with the Kyoto target on the other hand.

243. However, many Parties face methodological difficulties in preparing a 'without measures' scenario, as no standard methodology has been agreed upon. Even when 'without measures' scenarios are reported, Parties use different starting points: for example, the Netherlands used 2000 and Denmark 2001.[44] When Parties are summing up the effects of individual measures to arrive at the aggregated effect of domestic actions they also face difficulties, as there are no standard approaches that have been agreed upon on how the overlaps and synergies across individual measures should be taken into account. The lack of reporting guidelines does not facilitate consistency in the reporting on supplementarity across Parties and hinders the comparability of the reported information. Several Parties (such as Norway) specifically noted these reporting challenges.

244. Notwithstanding these challenges, information reported in the NC5s broadly suggests that **Parties that are using the Kyoto mechanisms to meet their Kyoto targets are striving to adhere to the supplementarity criteria**. It should be noted, though, that this assessment is preliminary, as it is based on emission projections and intentions to use the Kyoto mechanisms based on the current emission projections. **Comprehensive assessment of the adherence to the supplementarity criteria can only be possible at the end of the additional period for fulfilling the commitments under the Kyoto Protocol, when each Party will retire units for use towards meeting its Kyoto target**. This will be done after the actual estimated GHG emissions for the period 2008–2012 have been reported and reviewed by the expert review teams and information on the actual use of the Kyoto mechanisms for compliance in the relevant retirement accounts has become available.

245. The private sector could contribute to the meeting of a Party's Kyoto target by purchasing Kyoto units. The EU member States, through the EU linking directive,[45] allow **companies covered by the EU ETS** to meet their emission reduction targets by reducing emissions, by acquiring emission allowances from the market and by using the Kyoto mechanisms. A limit on the use by the companies of Kyoto units is defined as a percentage of the cap set in the national allocation plan for the period 2008–2012 and varies from 10 per cent in Luxembourg, 15 per cent in Italy and 17 per cent in Denmark to 42 per cent in Spain. However, the amount of Kyoto units actually used by the companies is expected to vary depending on the actual emission levels of these companies in the period 2008–2012. In the case that the emissions of the companies decrease, for example as a result of efficiency measures or a decline in output, companies may choose not to purchase Kyoto units, and thus the amount of Kyoto units used by a Party to meet its Kyoto target may decrease accordingly.

246. Compared to their NC4s, in their NC5s Parties provided **more precise information on their plans to use the Kyoto mechanisms**. **The information suggests that** some Parties intend to use the Kyoto mechanisms to a lesser extent compared with the plans reported in the NC4s (Belgium, Finland, Netherlands and Norway) and some intend to use more (Denmark and Spain). For the EU-15, the European Union reported in its NC5 7 per cent less (93.10 Mt CO_2 eq/year) use of Kyoto units compared with that reported in the NC4 (100 Mt CO_2 eq/year). Also, some Parties expected that the use of Kyoto mechanisms could decline owing to the reduction in GHG emissions caused by the economic and financial downturn in recent years.

[44] During the review of the NC5 of Denmark (as reported in FCCC/IDR.5/DNK), the effect of the implemented PaMs in the period 1990–2001 was evaluated in relation to the actual level of emissions in 2001 and then compared with the expected average annual emissions for the period 2008–2012.

[45] Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms.

247. Also, compared with the information provided in the NC4s, **more detailed and complete information on the use of Kyoto mechanisms is provided in the NC5s**. Several Parties reported the amount of contracted or already delivered units. For example, Ireland has already acquired a sufficient amount of Kyoto units (8.3 Mt CO_2 eq) and has at present suspended its purchasing programme; while Japan has already contracted 97 per cent of its required Kyoto units for the period 2008–2012 (97 Mt CO_2 eq out of 100 Mt CO_2 eq). Italy had contracted 3.4 Mt CO_2 eq Kyoto units (out of 14.9 Mt CO_2 eq/year previously planned), Netherlands 12.3 Mt CO_2 eq/year (out of 13 Mt CO_2 eq/year previously planned) and Norway 12 Mt CO_2 eq (out of 25–30 Mt CO_2 eq planned for the period 2008–2012) by the end of 2009. The Spanish Government has so far contracted 29 Mt CO_2 eq Kyoto units. Table 6 presents the expected use of Kyoto mechanisms by Parties and the allocated funds for the acquisition of these units.

IX. Information under Articles 10 and 11 of the Kyoto Protocol

A. Transfer of technology and capacity-building

1. Overview

248. Annex II Parties are required to report information on the steps taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity, in order to facilitate the implementation of Article 10 of the Kyoto Protocol. This chapter focuses on the provisions of Article 10 relating to technology transfer.

2. Transfer of technology

249. All Annex II Parties provided information on practicable steps to promote, facilitate and finance the transfer to other Parties of, or their access to, environmentally sound technologies and know-how. They also provided examples of technology transfer programmes and projects. In providing this information, almost all of them followed the UNFCCC reporting guidelines. **Many Parties consider partnerships between various stakeholders as an effective channel for the successful transfer of technology to developing countries**.

250. Many of the Parties engage bilaterally with both developed and developing countries at all stages of the technology cycle, including R&D, demonstration, deployment, diffusion and transfer of technology, in support of action on mitigation and adaptation. **Work with developing countries focuses on the latter stages of the technology cycle**, usually in the form of efforts to share knowledge and foster enabling environments in order to transfer technologies, while many of the efforts **with other developed countries tend to focus on the early stages of the technology cycle**, in the form of collaborative research, development and demonstration in relation to new technologies.

251. **Many of the programmes and projects reported by Parties were implemented through multilateral cooperation**. Some of them focused on the development of specific technologies, such as particular renewable energy technologies, while others had a clear focus on fostering appropriate enabling environments for the deployment and diffusion of particular technologies. Some Parties presented various examples of cooperation at the regional level, aimed at promoting the exchange of knowledge and experiences within the regions and addressing specific regional technology needs (for examples, see FCCC/SBI/2011/INF.1/Add.2, chapter III).

Table 6

Summary of the planned use of the Kyoto mechanisms by Annex B Parties to meet their targets under the Kyoto Protocol for the first commitment period and the allocated financial resources

Party	*Expected use of the Kyoto mechanisms annually (Mt CO_2 eq)*	*Allocated financial resources for the period 2008–2012, if not otherwise specified*	*Comments*
Austria	9.00	EUR 531 million for the period 2003–2005	Government intends to use ERUs, CERs and AAUs. Financial resources had been fully contracted in 2010
Belgium	4.4	EUR 240 million for the period 2004–2009	Government intends to use ERUs, CERs and AAUs. Up to mid-2008 the Government committed a total of EUR 140 million for various initiatives for the procurement of units from the mechanisms under the Kyoto Protocol.
Denmark	8.50[a]	1.49 million Danish kroner for the period 2003–2009	Up to October 2008, 34 per cent of the total federal purchase commitment of Kyoto units had been contracted for
European Union (15)	93.10	EUR 2 962 million	
Finland	1.40	EUR 50 million	Government intends to use CERs and ERUs. An additional EUR 20 million were spent on a pilot programme (1999–2006)
Ireland	3.60 (1.7[b])	EUR 270 million	
Italy	14.9	Not available	Government intends to use ERUs and CERs. Alongside the estimated purchase by the Government (14.9 Mt CO_2 eq/year), it is assumed that operators under the EU ETS will purchase another 30.2 Mt CO_2 eq/year during the first commitment period of the Kyoto Protocol. Investments have already been made to purchase 3.4 Mt CO_2 eq Kyoto units
Japan	20.18	200 billion Japanese Yen	Contracts have been concluded for 97 Mt CO_2 eq out of a planned purchase of about 100 Mt CO_2 eq Kyoto units
Liechtenstein	0.05	Not available	Government intends to use ERUs, CERs and AAUs
Luxembourg	3.6	EUR 360 million	Government intends to use CERs, ERUs, and AAUs, preliminary planned at around 47 per cent, 28 per cent and 25 per cent, respectively. Alongside the estimated purchase by the Government (3.6 million/year), it is assumed that operators under the EU ETS will purchase another 0.11 million/year during the first commitment period of the Kyoto Protocol
Monaco	5 000 t CO_2 eq	Not available	Monaco reported its plans to implement a clean development mechanism (CDM) project in Tunisia and subsequently acquire 25,000 CERs by the end of 2012
Netherlands	13	EUR 600 million	Government intends to use ERUs, CERs and AAUs. From the total expected amount of Kyoto units (a maximum of 13 million/year), about two thirds is expected to be acquired from the CDM

Party	*Expected use of the Kyoto mechanisms annually (Mt CO_2 eq)*	*Allocated financial resources for the period 2008–2012, if not otherwise specified*	*Comments*
Norway	5.4	EUR 600 million	Government intends to use ERUs, CERs and AAUs and to purchase 25–30 Mt CO_2 eq Kyoto units (5.4 Mt CO_2 eq/year on average) over 2008–2012. The remaining gap of 1.8 Mt CO_2 eq is intended to be closed by using the Kyoto units purchased by the companies under Norway's emissions trading scheme. In total, Norway intends to use for compliance 7 Mt CO_2 eq/year Kyoto units
Portugal	3.82–4.44	EUR 125 million	Government intends to use ERUs, CERs and AAUs and plans to use 19.1–22.2 Mt CO_2 eq Kyoto units for the first commitment period (3.82–4.44 Mt CO_2 eq/year). The number 4.44 Mt CO_2 eq/year takes into account the uncertainties of the estimated emission projections and effects of PaMs
Spain	31.83	EUR 404.8 million for the period 2008–2012	Spain estimated its overall use of Kyoto units at 289.4 Mt CO_2 eq for the first commitment period (57.88 Mt CO_2 eq/year). The Government plans to purchase 55 per cent of these units, or 31.83 Mt CO_2 eq/year, and it is assumed that operators under the EU ETS will purchase the remaining units
Slovenia	1.1	Not available	Government intends to use ERUs, CERs and AAUs
Switzerland	2.0	Not available	Alongside the estimated purchase by the Government (2.00 Mt CO_2 eq/year), it is assumed that operators under the EU ETS will purchase up to 0.4 Mt CO_2 eq/year Kyoto units during the first commitment period of the Kyoto Protocol. The Government will purchase the Kyoto units through the Climate Cent Foundation, which has been being replenished with the revenue from the "climate cent" fee since 2005 (approximately 100 million Swiss francs/year) and is anticipated to continue to be replenished during the first commitment period of the Kyoto Protocol. The Climate Cent Foundation plans to use these funds for the implementation of emission reduction measures in Switzerland (for an emission reduction of at least 0.4 Mt CO_2 eq/year) and for purchasing 2 Mt CO_2 eq Kyoto units/year over the period 2008–2012

Abbreviations: AAU = assigned amount unit, CER = certified emission reduction, ERU = emission reduction unit, EU ETS = European Union emissions trading scheme, PaMs = policies and measures.

[a] The updated information provided during the in-depth review of the fifth national communication of Denmark (as reported in FCCC/IDR.5/DNK) indicates that only 3.7 Mt CO_2 eq Kyoto units are to be purchased, taking into account the recent economic and financial downturn.

[b] The updated information provided during the in-depth review of the fifth national communication of Ireland (as reported in FCCC/IDR.5/IRL) indicates that 1.7 Mt CO_2 eq Kyoto units are to be purchased, taking into account the recent economic and financial downturn.

252. The majority of the technology transfer programmes and projects reported by Parties targeted mitigation and involved technology transfer in the energy sector, in particular related to the deployment and diffusion of renewable energy and energy efficiency technologies. This is in line with the findings reported in the compilation and synthesis of NC4s. Most of the programmes and projects reported by Parties were implemented in Africa and Asia and the Pacific (see FCCC/SBI/2011/INF.1/Add.2, chapter III).

253. Many Parties reported on **success stories related to selected technology transfer programmes and projects**, and also highlighted factors which contributed to the successful implementation of these programmes and projects. The importance of **capacity-building and cooperation with local stakeholders** was frequently reported by Parties. Other factors contributing to the success of projects reported by Parties include: an integrated project approach; an adequate project preparation process, such as the preparation of feasibility studies; favourable enabling environments; the relevance, impacts and benefits of the project; access to information; replicability; and the market potential of the project.

3. Partnerships and cooperation between key stakeholders

254. Most of the technology transfer activities reported by Parties are managed by a number of government agencies and implemented by specialized agencies for development cooperation through partnerships with local stakeholders (for examples, see FCCC/SBI/2011/INF.1/Add.2, chapter III).

255. Many Parties consider partnerships between various stakeholders as an effective channel for the successful transfer of technology to developing countries. Stakeholders reported by Parties included developers, owners, suppliers, buyers, recipients and users of technology; financiers and donors; governments; international institutions; NGOs and community groups. The majority of the Parties provided details on networks and programmes built in partnership, in order to facilitate the transfer of technology and know-how, to support developing countries in their efforts to mitigate or adapt to the adverse impacts of climate change. Some Parties stated that many of their adaptation, mitigation, capacity-building and technology cooperation programmes are administered through bilateral partnerships.

256. Some Parties highlighted the **increased participation of civil society organizations** in development cooperation related programmes and projects. These Parties consider strategic, programmatic cooperation with civil society organizations as an effective channel through which to enhance technology transfer to developing countries.

4. The role of the private sector in enhancing the transfer of technologies

257. Many Parties highlighted the **prominent role of the private sector in enhancing the transfer of technologies**. Some Parties noted that, while public-sector funding for climate change activities is continuing to grow, it is private-sector investment that continues to lead, in terms of delivering resources, to addressing climate change in developing countries.

258. The following initiatives to facilitate private-sector participation in the transfer of environmentally sound technologies were most often reported by Parties:

(a) Providing assistance to governments in developing countries in creating enabling environments to ensure that the private sector can operate in an environment conducive to private-sector investment;

(b) Providing support for investment-promotion activities, including market studies, feasibility studies, job-related training and temporary management, clean energy information systems and trade missions;

(c) Setting up networks between businesses in developed and developing countries;

(d) Providing financing and business development services in developing countries;

(e) Providing financial incentives for projects and programmes, including grants, soft loans, export credit guarantees, equity investments and venture capital.

259. Some Parties highlighted programmes in which **partner countries cooperate with the private sector** to meet energy security and climate change resilience related goals in ways that promote sustainable development and poverty alleviation. These partnerships aim to strengthen the presence of the private sector in developing countries (for examples, see FCCC/SBI/2011/INF.1/Add.2, chapter III).

5. Capacity-building

260. Most Parties stressed that capacity-building is essential to enable developing countries to effectively implement the Kyoto Protocol, and they reported paying increased attention to capacity-building needs since their NC4s. Eight Parties included separate sections on capacity-building in their NC5s (Australia, Belgium, Italy, Japan, Netherlands, Norway, Portugal and Sweden). Other Parties reported capacity-building activities in their bilateral projects.

261. The areas of activity which received most support in the context of the implementation of the Kyoto Protocol are: **human and institutional development** (assistance for incorporating climate change issues into other development strategies and plans, such as the United Nations Millennium Development Goals and national adaptation programmes of action, as well as supporting capacity-building for developing countries' participation in the CDM); **adaptation to climate change** (technical assistance to develop understanding of climate change impacts, assessment of risks and vulnerabilities and development of adaptation options and methods for analysing precipitation regimes and validating climate models); **research, scientific and technology cooperation** (support for research on climate change, including climate prediction services, and the development of renewable energy technologies); **training and education** (related to disaster risk reduction, the sustainable use and management of natural resources, rural development, water management, forestation and soil deterioration and food security, and the effective participation of developing country representatives in meetings of the UNFCCC); **and knowledge-sharing and information exchange** (technical support for the development of climate databases and the support of regional networking approaches, in order to improve the development and exchange of knowledge among climate change focal points and climate change professionals).

262. Most Parties reported on the implementation of capacity-building activities to establish, strengthen and train DNAs. Parties have also produced national guidelines to build the capacity of local stakeholders to prepare and implement CDM projects, provided training in designing CDM projects and developed the capacity to successfully identify and secure funding sources for potential CDM projects. Parties have also organized workshops and training for stakeholders, such as government agencies, the private sector and civil society organizations, in order to share information on the CDM process and on how to effectively participate in the international carbon market.

263. One example of such capacity-building is the CDCFplus project, implemented by the World Bank within the context of CDFC and supported by eight Parties, which provides governments and the private sector with an opportunity to build local capacity to prepare small-scale CDM-eligible projects in the least developed countries and the poorer communities of all developing countries. Through targeted technical assistance, CDCFplus helps to build the local capacity needed to implement small-scale projects such as mini- and micro-hydro, wind energy, small municipal and agricultural waste, and clean transport.

B. Provision of financial resources

264. Article 11 of the Kyoto Protocol requires developed country Parties and other developed Parties included in Annex II to the Convention to report, in accordance with the provisions of Article 4, paragraph 3, and Article 11 of the Convention, information on the "new and additional" financial resources provided through bilateral, regional and other multilateral channels to meet the agreed full costs incurred by developing country Parties in advancing the implementation of existing commitments under Article 4, paragraph 1(a), of the Convention that are covered in Article 10(a) of the Kyoto Protocol.

265. Many Parties did not necessarily make a clear distinction between the financial support provided under the Convention and under the Kyoto Protocol; however, several Parties provided examples of how they are making use of the Kyoto Protocol's flexibility mechanisms (the CDM, JI and emissions trading) to mobilize financial resources for developing countries. This report focuses mostly on such examples and on the additional information on contributions to the Adaptation Fund of the Kyoto Protocol. More detailed information on the provision of funds under the Convention can be found in document FCCC/SBI/2011/INF.1/Add.2, chapter III.

266. All Annex II Parties reported on the financial flows mobilized during the reporting period **through bilateral and multilateral institutions** as well as through contributions to the GEF **Trust Fund**, the **LDCF** and the **SCCF**. Further, some Parties reported for the first time their contributions to the **Adaptation Fund** under the Kyoto Protocol.

267. In the area of **mitigation**, support was again mainly provided for projects and programmes aimed at promoting renewable energy technologies and supply, followed by transport and forestry. Several Parties reported their active participation in carbon finance schemes such as carbon funds in order to channel financial resources for mitigation activities in recipient countries.

268. In the area of **adaptation**, support was provided mainly for water management, supply and sanitation. Funding for adaptation under the Convention was channelled through the **SCCF** and **LDCF**, while many Parties highlighted the role of the **Adaptation Fund** under the Kyoto Protocol in catalysing funding for adaptation. Nonetheless, bilateral and multilateral institutions clearly remained the preferred channels through which to mobilize most climate finance. The **CIF** were highlighted by many Parties, which have one specific funding window for climate-resilient development.

269. As stated in paragraph 266 above, several Parties reported specifically on the use of mechanisms and institutions under the Kyoto Protocol for the provision of financial support. **Most of the examples and cases provided refer to the development of emission reduction projects in developing countries in the context of the CDM**. Nearly all of the Parties reported information on how they have encouraged private-sector activities and public–private partnerships, including examples of initiatives to stimulate private-sector participation in action on climate change.

270. Finland reported on its support for the development of CDM and JI projects. Denmark and Germany reported that, in addition to multilateral and bilateral support, finance is provided through private-sector initiatives. Luxembourg and Switzerland provided information on support for the CDM and JI and the Netherlands reported on EUR 3.3 million finance for capacity development for the CDM in the period 2005–2008. Japan highlighted such initiatives as CDM/JI feasibility studies and the promotion of the co-benefits of CDM projects. The United Kingdom reported on its efforts in Africa, working with the private sector to establish AfriCarbon, an initiative intended to work closely with local project developers to get CDM projects off the ground. Most Parties put great emphasis on the benefits of carbon market schemes in mobilizing financial resources for the developing world.

271. Information provided by Parties signals the effective implementation and operationalization of international carbon markets, which have been achieved through various means, including:

(a) The establishment of regional and national ETS that are effectively connected to the ITL via their national registries. EU member States, in particular, reported the importance of fully operationalizing the EU ETS and integrating it with the international emissions trading mechanism under the Kyoto Protocol in facilitating the development of carbon finance instruments;

(b) The setting up of various national and international carbon funds, which have been assigned under fiduciary management to the World Bank and other regional multilateral development banks.

272. Funding related to carbon finance, however, has not been limited to direct investments in projects generating emission reduction credits. Parties reported contributions to complementary activities such as:

(a) Capacity-building for the use of the CDM and transfer of clean technologies;

(b) Feasibility studies (for potential CDM and JI projects);

(c) Promotion of co-benefits arising from CDM projects;

(d) Support for the establishment of DNAs.

273. Since the **Adaptation Fund** became fully operational towards the end of the reporting period, some countries provided information on their contributions to the Adaptation Fund. Finland reported on its EUR 0.1 million contribution to the Adaptation Fund in 2008, which supported the participation of developing countries in meetings of the Adaptation Fund Board. Japan reported on its support provided for clerical expenses and personnel contributions to the Adaptation Fund in 2008, while Switzerland reported a contribution of 0.2 million Swiss francs in the same year. The United Kingdom provided finance of GBP 1 million for the start-up phase of the Adaptation Fund and Norway 1 million Norwegian kroner for the same purpose in 2008. The Netherlands reported on its annual contributions for the period 2006–2008.

C. Other commitments under Article 10 of the Kyoto Protocol

1. Research and systematic observation

274. As indicated in document FCCC/SBI/2011/INF.1/Add.2, chapter IV, almost all Annex I Parties cooperate and participate actively in scientific and technical research on a wide array of climate change topics related to, for example, the climate system, climate change impacts and socio-economic aspects of climate change. Similarly, almost all Parties

have contributed to the systematic observation of the climate, and they reported on their respective national activities and programmes, including with regard to data access and archiving.

275. Cooperation within relevant international climate observation programmes and international and regional climate change research programmes and organizations was highlighted by many Parties. The regional research programmes and organizations, in particular, play an important role in fostering cooperation on climate change research, as shown by the extensive information on and examples of activities provided by Parties participating in regional research activities. Further relevant details are provided in document FCCC/SBI/2011/INF.1/Add.2, chapter IV.C).

276. Since the NC4s, most Parties have generally continued to strengthen their participation in regional and international and intergovernmental efforts on activities related to climate change science and systematic observation. In this regard, many Parties reported on support provided in the form of capacity-building activities in developing countries, including the development and improvement of regional research networks and climate projections, the identification of regional research projects, and the gathering of climate-related information through strengthened systematic observation systems.

2. Education, training and public awareness

277. Some Parties reported information on the support provided by them to developing country Parties in the area of education, training and public awareness. The reporting is focused mainly on the level of financial assistance provided in supporting the organization of training workshops or implementing specific projects focused on education and outreach activities. In their reports, Parties confirmed their commitment to playing an active and constructive role in relation to addressing climate change issues in developing countries.