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

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

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Contents

I. Introduction and summary

A. Introduction

1. For Switzerland the Convention entered into force on 21 March 1994 and the Kyoto Protocol on 16 February 2005. Under the Kyoto Protocol, Switzerland committed itself to reducing its greenhouse gas (GHG) emissions by 8 per cent in relation to the base year[1] level during the first commitment period from 2008 to 2012.

2. This report covers the in-country in-depth review (IDR) of the fifth national communication (NC5) of Switzerland, coordinated by the UNFCCC secretariat, in accordance with the guidelines for review under Article 8 of the Kyoto Protocol (decision 22/CMP.1). The review took place from 17 to 22 May 2010 in Bern, Switzerland, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: Ms. Sumana Bhattacharya (India), Ms. Eimear Cotter (Ireland), Ms. Medea Inashvili (Georgia) and Mr. Pekka Tervo (Finland). Ms. Bhattacharya and Mr. Tervo were the lead reviewers. The review was coordinated by Ms. Ruta Bubniene, Ms. Inkar Kadyrzhanova and Ms. Xuehong Wang (UNFCCC secretariat).

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

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

B. Summary

5. The ERT noted that Switzerland's NC5 mostly complies with the "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications" (hereinafter referred to as the UNFCCC reporting guidelines). As required by decision 15/CMP.1, supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol is provided in the NC5. The ERT acknowledges Switzerland's high degree of coherent and consistent reporting.

6. The supplementary information on the minimization of adverse impacts referred to in paragraph 3 above is fairly complete and transparent and was provided on time. During the review, Switzerland provided further relevant information.

1. Completeness

7. The NC5 covers all the sections and almost all the mandatory reporting requirements set out by the UNFCCC reporting guidelines and all the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. The ERT noted that completeness could be

[1] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for all gases. The base year emissions include emissions from sectors/source categories listed in Annex A to the Kyoto Protocol.

improved in the Party's reporting of projections (see para. 75 below) and its reporting under Article 3, paragraph 14, of the Kyoto Protocol (see para. 108 below) and recommends that Switzerland enhance the completeness of its reporting by providing this information in its next national communication.

2. Transparency

8. The ERT acknowledged that Switzerland's NC5, including supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, is comprehensive, well structured, concise and mostly transparent. The NC5 provides clear information on all aspects of implementation of the Convention and its Kyoto Protocol. It is structured following the outline contained in the annex to the UNFCCC reporting guidelines and supplementary information submitted under Article 7, paragraph 2, of the Kyoto Protocol is easily identifiable.

9. In the course of the review, the ERT formulated a number of recommendations and encouragements that could help Switzerland to further increase the transparency of its reporting with regard to policies and measures (PaMs) (see para. 49 below), projections (see paras. 67 and 69 below), vulnerability and adaptation (see para. 85 below), financial resources and technology transfer (see para. 89 below) and minimization of adverse impacts of response measures (see para. 110 below).

3. Timeliness

10. The NC5 was submitted on 14 December 2009, before the deadline of 1 January 2010 mandated by decision 10/CP.13.

II. Technical assessment of the reviewed elements

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

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

1. National circumstances

12. In its NC5, Switzerland has provided a description of its national circumstances and information on how these national circumstances affect GHG emissions and removals in the country and how changes in national circumstances affect GHG emissions and removals over time. Information has been provided on the government structure, population, geography, economy and relevant economic sectors. The ERT noted that the emission trends in Switzerland have been influenced by its economic growth, an increase in population, and an increase in diesel consumption for passenger transport, which more than offset a decrease in gasoline consumption. Emission reductions were driven by PaMs such as a carbon dioxide (CO_2) levy, various measures aiming at improving energy efficiency and increasing the use of renewable energies in buildings, a ban on landfills, reduced use of fertilizer in agriculture, a heavy-vehicle fee, and voluntary as well as binding emission reduction agreements by some industries. However, one of the key drivers for the change in

emission levels in Switzerland is the annual variation in the energy consumption of the country's residential and commercial sectors, which is influenced by inter-annual fluctuation in the number of heating degree days. Table 1 illustrates the national circumstances of the country by providing some indicators relevant to GHG emissions and removals.

13. Switzerland is a federation, representing three political levels: federal level, canton level (26 cantons) and commune level (2,596 communes). The overall responsibility for climate change policymaking lies within the Federal Office for the Environment (FOEN), and a number of national institutions are involved in the implementation of such policy, including the Federal Office for Agriculture, the Federal Office of Energy, the Federal Office of Meteorology and Climatology, the Federal Office for Spatial Development, the State Secretariat for Economic Affairs (SECO) and the Swiss Agency for Development and Cooperation (SDC). Implementation of the Kyoto Protocol is underpinned by the implementation at federal level of the Federal Act on the Reduction of CO_2 Emissions (the CO_2 Act) and the measures therein, and the SwissEnergy programme. Following the principle of subsidiarity, development and implementation of a number of PaMs, such as building codes or fiscal measures in the private transport sector, are within the competence of the cantons. Further legislative arrangements and administrative procedures, including those for the national system and the national registry, are presented in chapters II A 2, II A 3 and II B of this report.

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

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

	1990	*1995*	*2000*	*2005*	*2007*	*2008*	*Change 1990–2000 (%)*	*Change 2000–2008 (%)*	*Change 1990–2008 (%)*
Population (million)	6.8	7.0	7.2	7.4	7.5	7.7	5.3	7.7	13.4
GDP (2000 USD billion using PPP)	204.8	205.8	227.7	242.6	259.2	265.8	11.2	16.8	29.8
TPES (Mtoe)	23.8	23.6	24.4	25.9	25.7	26.7	2.7	9.2	12.2
GDP per capita (2000 USD thousand using PPP)	30.1	29.3	31.8	32.7	34.5	34.5	5.6	8.4	14.5
TPES per capita (toe)	3.5	3.4	3.4	3.5	3.4	3.5	–2.5	1.4	–1.1
GHG emissions without LULUCF (Tg CO_2 eq)	53.0	51.3	51.9	54.0	51.6	53.2	–2.0	2.6	0.5
GHG emissions with LULUCF (Tg CO_2 eq)	50.0	47.7	52.9	53.2	51.8	53.4	5.8	1.1	6.9
CO_2 emissions per capita (Mg)	6.5	6.2	6.1	6.2	5.8	5.8	–6.2	-4.8	–10.7
CO_2 emissions per	0.2	0.2	0.2	0.2	0.2	0.2	–11.2	–12.2	–22.0

	1990	1995	2000	2005	2007	2008	Change 1990–2000 (%)	Change 2000–2008 (%)	Change 1990–2008 (%)
GDP unit (kg per 2000 USD using PPP)									
GHG emissions per capita (Mg CO_2 eq)	7.8	7.3	7.2	7.3	6.9	6.9	–7.0	–4.7	–11.4
GHG emissions per GDP unit (kg CO_2 eq per 2000 USD using PPP)	0.3	0.2	0.2	0.2	0.2	0.2	–11.9	–12.1	–22.6

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

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

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

15. Total GHG emissions excluding emissions and removals from land use, land-use change and forestry (LULUCF) increased by 0.5 per cent between the base year and 2008 (from 53.0 Gg CO_2 eq to 53.2 Gg CO_2 eq), while total GHG emissions including net emissions or removals from LULUCF increased by 6.9 per cent (from 50.0 Gg CO_2 eq to 53.4 Gg CO_2 eq). Over the same period, CO_2 emissions remained broadly stable, increasing by 1.2 per cent only. Methane (CH_4) emissions decreased by 16.9 per cent and emissions of nitrous oxide (N_2O) decreased by 7.5 per cent. Emissions of fluorinated gases (F-gases) accounted for 0.5 per cent of total GHG emissions in 1990 and 1.9 per cent in 2008; they increased by 317.0 per cent over the period 1990–2008, albeit starting from very low levels. Table 2 provides an overview of GHG emissions by sector from 1990 to 2008 (see also discussion of sectoral trends in chapter II B).

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

Sector	GHG emissions (Tg CO_2 eq)						Change (%)		Shares[a] by sector (%)	
	1990	1995	2000	2005	2007	2008	1990–2008	2007–2008	1990	2008
1. Energy	42.1	41.7	42.4	44.4	41.9	43.4	3.0	3.4	79.5	81.5
A1. Energy industries	2.5	2.6	2.9	3.5	3.5	3.7	44.7	5.6	4.8	6.9
A2. Manufacturing industries and construction	6.4	5.9	6.3	6.4	6.4	6.4	–0.7	1.0	12.1	12.1
A3. Transport	14.6	14.2	15.9	15.8	16.2	16.6	13.8	2.2	27.5	31.2
A4.–A5. Other	18.1	18.5	17.0	18.3	15.6	16.4	–9.4	5.2	34.1	30.8
B. Fugitive emissions	0.5	0.4	0.3	0.3	0.3	0.3	–46.4	3.0	1.0	0.5

Sector	*GHG emissions (Tg CO_2 eq)*						*Change (%)*		*Shares[a] by sector (%)*	
	1990	*1995*	*2000*	*2005*	*2007*	*2008*	*1990–2008*	*2007–2008*	*1990*	*2008*
2. Industrial processes	3.3	2.6	2.9	3.2	3.2	3.3	1.1	2.5	6.2	6.2
3. Solvent and other product use	0.5	0.4	0.3	0.2	0.2	0.2	–53.6	-0.8	0.9	0.4
4. Agriculture	6.1	5.8	5.5	5.5	5.6	5.7	–6.9	1.6	11.5	10.7
5. LULUCF	–3.0	–3.6	1.0	–0.8	0.1	0.2	–107.2	46.2	–5.6	0.4
6. Waste	1.0	0.8	0.7	0.7	0.6	0.7	–34.6	0.2	1.9	1.2
7. Other	0.01	0.01	0.01	0.01	0.01	0.01	18.5	0.1	0.02	0.02
GHG total with LULUCF	**50.0**	**47.7**	**52.9**	**53.2**	**51.8**	**53.4**	**6.9**	**3.2**	**NA**	**NA**
GHG total without LULUCF	**53.0**	**51.3**	**51.9**	**54.0**	**51.6**	**53.2**	**0.5**	**3.1**	**100.0**	**100.0**

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

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

[a] The shares of sectors are calculated relative to GHG emissions without LULUCF; for the LULUCF sector, the negative values indicate the share of GHG emissions that was offset by GHG removals through LULUCF.

2. National system

16. In accordance with decision 15/CMP.1, Switzerland provided in its NC5 a description of how its national system is performing the general and specific functions defined in the guidelines for national systems under Article 5, paragraph 1 (decision 19/CMP.1). The Party also provided a reference to its 2009 annual submission, which contains a more detailed description of the national system. The description includes all the elements as required by decision 15/CMP.

17. FOEN is the single national entity with overall responsibility for the national inventory system. Switzerland informed the ERT that the national system for preparation of the inventory follows ISO 9000 standards. Further, the climate division of FOEN has been expanded with a view to covering domestic and international climate-related activities and now includes three sections: "CO_2 Act implementation", "Climate policy" and "Climate reporting and adaptation".

18. The ERT took note of the recommendations made in the report of the individual review of the annual submission of Switzerland submitted in 2009[2] (ARR 2009) on various improvements, including enhancing the quality assurance/quality control (QA/QC) procedures implemented. During the review, the ERT noted that the Party is making continuous efforts to implement QA/QC procedures. The ERT concluded that the national system continued to perform its required functions as set out in decision 19/CMP.1.

[2] FCCC/ARR/2009/CHE.

3. National registry

19. In its NC5, Switzerland has provided information on its national registry, including a description of how its national registry performs the functions defined in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and how it complies with the requirements of the technical standards for data exchange between registry systems. The description of the national registry includes all the elements of the information on national registries as per decision 15/CMP.1, paragraph 32 (a–j).

20. During the review, Switzerland provided additional information on the measures put in place to safeguard, maintain and recover registry data. The ERT noted the security measures employed in the registry to prevent unauthorized data manipulation and to protect the registry against security compromises. Test procedures related to the performance of the national registry and to the recording of the changes and discrepancies of the national registry are also in place. In response to questions raised by the ERT, Switzerland demonstrated how it records the changes related to the national registry and how it maintains these records. The ERT noted that updates of databases and applications, implemented security measures and changes to the national registry software are documented on a regular basis by responsible staff.

21. The ERT noted that Switzerland has followed the recommendation made in the ARR 2009 and the standard independent assessment report (SIAR) that the Party indicate on the website of the national registry that no projects under Article 6 of the Kyoto Protocol exist in the country. The ERT reiterates the recommendation made in the SIAR (2009) that Switzerland should explicitly state that no replacement of temporary certified emission reductions and long-term certified emission reductions has occurred.

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

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

23. As required by the UNFCCC reporting guidelines, Switzerland has provided in its NC5 comprehensive and well-organized information on its PaMs implemented, adopted and planned in order to fulfil its commitments under the Convention and its Kyoto Protocol. Each sector has its own textual description of the principal PaMs, supplemented by summary tables on PaMs by sector. Switzerland has also provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals, consistent with the objective of the Convention. The ERT noted that, in general, when planning and implementing its PaMs, Switzerland strives to tailor them to its economic, energy and emission profile. The NC5 includes estimates of the effects of the PaMs by sector and by gas. During the review, the ERT received further updated information on the effects of the PaMs at the federal and canton levels.

24. The ERT noted that Switzerland has changed its approach to climate change policy from relying mostly on voluntary approaches towards making wider use of fiscal, market and regulatory instruments, which are more likely to deliver the needed emission reductions. In addition to undertaking domestic measures, Switzerland has established a system to purchase carbon units under the Kyoto Protocol. The ERT acknowledged that, to enhance the efficiency of its fiscal measures, Switzerland allocated a part of the revenue coming from a levy on fuel used for transportation, called the 'climate cent', to the Climate Cent Foundation, which is mandated by the Government to purchase Kyoto units (see para.

51 below). A part of the revenue from the CO_2 levy on heating and process fuels[3] is earmarked for the National Building Refurbishment Programme, which started in 2010.

25. The ERT commends Switzerland for its comprehensive research on and modelling of the economic impacts of Swiss climate policy until 2020 based on energy analysis and econometric models. The research provided the Government with necessary information on the level of CO_2 levy on heating fuel that would contribute significantly to reaching the country's emission reduction target, and on economic impacts of the proposed climate policy on gross domestic product (GDP), welfare, households, exports, imports and the output of different sectors.

26. The PaMs that were reported in Switzerland's fourth national communication (NC4) are still in place and the implementation of most of them has been advanced. Table 3 summarizes the major PaMs described in the NC5.

1. Policy framework and cross-sectoral measures

27. At the federal level, climate change policy is the responsibility of FOEN. Other government offices are also involved in the policymaking, especially the offices for energy, transport, agriculture, forestry, finance and foreign affairs. Cantons also actively participate in the policymaking process through consultations. Within their competencies, set by the federal legislation, cantons have a great deal of leeway to adopt their own energy regulations and PaMs within the established boundaries. Initially this resulted in a diversity of cantonal PaMs; however, recently cantonal PaMs have become increasingly harmonized.

28. The key component of the legal framework for Switzerland's climate change PaMs is the CO_2 Act, supported by the Federal Energy Act. The CO_2 Act, as the principal legal framework for achieving the country's Kyoto Protocol target, covers CO_2 emissions from fossil fuel use for transport and heating, which constitute about 80 per cent of total national GHG emissions. The CO_2 Act sets the basis for such measures as the heavy-vehicle fee and the National Building Refurbishment Programme. It is complemented by the Federal Energy Act, which provides a legal framework for federal energy policy and sets the responsibilities at the federal and cantonal levels. Key plans in the energy sector are the Action Plan for Energy Efficiency and the Renewable Energy Action Plan.

29. The CO_2 Act sets a target of reducing the emissions covered by it by 10 per cent compared with 1990 levels in the first commitment period of the Kyoto Protocol. This reduction target is higher than the target defined by the Kyoto Protocol (an 8 per cent reduction in GHG emissions during the period 2008–2012 compared with 1990 levels) in order to offset the effect of the expected stable emission levels in the sectors other than CO_2 emissions from fossil fuel use for transport and heating (these other sectors contribute about 20 per cent of total national emissions). In addition to the overall reduction target for CO_2 emissions from fuel use for transport and heating, the CO_2 Act sets sector-specific targets, such as to reduce the emissions from heating and process fuels by 15 per cent and those from transport fuels by 8 per cent in 2010 compared with 1990 levels.

30. Switzerland has set up a national emissions trading scheme (ETS) for 2008–2012, which covers about 400 large companies that wished to gain exemption from the CO_2 levy and thus committed to a binding emission cap under the national ETS. The total annual emissions of the companies covered by the ETS amount to about 3.4 Mt CO_2 eq. Within the national ETS, emission allowances are allocated free of charge; companies negotiate the

[3] "Heating and process fuels" include fossil fuels combusted in stationary sources for space heating purposes, as well as fossil fuels combusted for generating heat required by technical processes, in energy industries, manufacturing industries and construction, and other sectors (commercial, institutional and residential).

emission cap on the basis of, among other things, the emission reduction level taking into account an estimate of the technologically feasible and economically viable CO_2 reduction potential. The ERT notes that the effectiveness of the national ETS is currently limited, owing to the very small national market and the bottom-up cap-setting principle for individual companies, which does not provide significant incentives for the covered companies to fully explore different options for reducing emissions. Switzerland informed the ERT of its intention to enhance the effectiveness of the national ETS by linking it with the European Union emissions trading scheme (EU ETS) as of 2013 and stated that the official negotiations on the linking of the ETSs should begin in mid-2010.

31. In addition to the large companies covered by the national ETS, about 500 small- and medium-sized enterprises that wished to gain exemption from the CO_2 levy committed themselves to a binding energy efficiency target without participation in the ETS.

32. Switzerland gives high priority to and supports research and development in the area of energy. One objective of this research is to create a secure and sustainable energy supply and strengthen Switzerland's position in the energy technology market.Following the Federal Energy Research Framework Programme 2008–2011, which defines goals for research areas, including the ambitious goal of reducing energy consumption per capita by half by the second half of this century and a goal for increasing the use of renewable energy sources (see paras. 42–43 below), recent research has focused on energy efficiency and renewable energies. In total, about 20 million Swiss francs (CHF) per year is allocated for almost 20 different research programmes on energy efficiency and renewable energies. In addition, the public authorities spend about CHF 160 million a year on energy research.

33. Various short-term measures (so-called 'stability packages') against an economic downturn have also been put in place. These stability packages, adopted in 2008 and 2009, include funds for the implementation of additional climate change related measures, such as flood protection, improving the energy efficiency of buildings, specific renewable energy projects (replacement of electric heating systems, district heating and small-scale photovoltaic installations, and installation of heat pumps) and occupational training of energy experts, and additional funds for research and development in relation to clean technologies and intelligent materials.

34. In the short term, among the existing PaMs, revised building codes and building programmes at the canton level, the CO_2 levy on heating and process fuels, the National Building Refurbishment Programme (launched at the beginning of 2010 aiming to support energy efficiency measures and promote the use of renewable energy in the residential and public sectors) and voluntary and binding agreements with trade and industry are regarded as the most effective Swiss energy- and climate-related PaMs. The CO_2 levy is projected to deliver savings of 0.7 Mt CO_2 eq in 2010, through reduced demand for heating fuels and choice of less carbon-intensive fuels. The revised building codes are projected to deliver savings of 0.62–1.11 Mt CO_2 eq in 2010, by limiting the energy use required per m^2 to 4.8 litres heating oil equivalent for new buildings and approximately 9 litres heating oil equivalent for fully refurbished buildings. Voluntary agreements with trade and industry companies under the SwissEnergy framework are expected to deliver savings of 0.55–0.82 Mt CO_2 eq in 2010; binding agreements tied to the exemption from the CO_2 levy are expected to add savings of a further 0.38–0.50 Mt CO_2 eq in 2010; and the National Building Refurbishment Programme is expected to deliver savings of 0.3 Mt CO_2 eq in 2010.

35. In the medium term (by 2020), as indicated in the revised CO_2 Act, the National Building Refurbishment Programme (2.2 Mt CO_2 eq per year) and the continuation of the CO_2 levy on heating and process fuels (1.1 Mt CO_2 eq per year) are expected to deliver the most emission reductions. It is expected that the ETS for energy-intensive companies (with an annual reduction of the emission cap by 1.74 per cent), emission performance standards

for new passenger cars (i.e. emissions from all newly registered cars should not exceed 130 g CO_2/km by 2015) and an obligation for producers and importers of fossil fuels to offset 25 to 30 per cent of CO_2 emissions by CO_2 credits will also significantly contribute to the 2020 emission reduction target.

36. The ERT considers that the National Building Refurbishment Programme is a particularly good example of an effective climate change measure in the medium term. However, the Party's full implementation and delivery of its PaMs by 2020 is subject to some uncertainty, given that Switzerland is currently considering its medium-term climate change measures and that the revised CO_2 Act is still being discussed in Parliament.

2. Policies and measures in the energy sector

37. The major share of Switzerland's total emissions (79.5 per cent in 1990 and 81.5 per cent in 2008) comes from the energy sector. Between 1990 and 2008, GHG emissions from the energy sector increased by 3.0 per cent (1,243.93 Gg CO_2 eq), mainly driven by increasing emissions from the transport sector (by 13.8 per cent or 2,017.36 Gg). The most significant sectors are residential and commercial, and transport, which each contribute around 30 per cent of the total national GHG emissions.

38. Emissions from the transport sector grew by 9.0 per cent between 1990 and 2000, and since then the increase has been nominal (4.4 per cent), strongly correlating with the annual growth of GDP (about 2 per cent per year for the period 2000–2007). Emissions from the residential and commercial sectors, mainly resulting from the use of fuel oil for heating, decreased, owing to the implementation of energy efficiency measures and the use of renewable energy. However, the emission levels in these sectors are influenced by the inter-annual variation in energy use driven by the number of heating degree days each year. The sharp increase in heating oil prices in 2007 combined with the mild winter resulted in a drop in emissions from these sectors during 2007–2008. Emissions from energy industries increased by 44.7 per cent in 1990–2008 and the increase was very sharp, by 25 per cent during 2003–2008, owing to increased waste incineration, which contributes a major part of the emissions from this category. Despite this increase, energy industries contributed only 6.9 per cent of the total national GHG emissions in 2008, as electricity generation in Switzerland relies mainly on nuclear and hydropower.

39. Energy intensity in Switzerland has remained relatively constant in recent decades, implying that energy consumption has increased in line with GDP. However, since 2005 GDP and final energy consumption have begun to decouple, owing to the improvements in energy efficiency and the reallocation of some energy-intensive industries to other countries. For example, in 2007 the ratio of CO_2 emissions to GDP (0.15 kg CO_2/USD (2000 prices) using purchasing power parity) was the second smallest among the European member countries of the Organisation for Economic Co-operation and Development (OECD) and the ratio of electricity consumption to GDP (0.218 kWh per 2000 USD) was the fifth smallest among the OECD countries.

Table 3
Summary of information on policies and measures

Major policies and measures	*Examples/comments*
Framework policies and cross-sectoral measures	
Integrated climate policy	CO_2 Act (2000), which defines measures to limit CO_2 emissions from fossil fuel use for transport and heating
	National Strategy and Action Plan for Sustainable Development (2008)
	Short-term measures aimed at reducing greenhouse gas (GHG) emissions (2008 and 2009) as part of 'stability packages'

Major policies and measures	*Examples/comments*
	Swiss interdepartmental committee for climate policy (2008)
	Emissions trading scheme
Energy/electricity/ emissions taxation	CO_2 levy on heating and process fuels (2008) (emission reduction potential of 0.7 Mt CO_2 in 2010 and 1.1 Mt CO_2 per year by 2020)
	'Climate cent' – fee on fossil fuel used for transportation (additional effect of domestic projects financed by the 'climate cent' until 2012: –0.2 Mt CO_2 per year, with lasting effect of the order of –0.1 Mt CO_2 per year by 2020)
	Mineral oil tax incentive for natural gas and biofuels (2008)
	Allocation of a part of the CO_2 levy revenue to the National Building Refurbishment Programme (2010)
Flexible mechanisms and domestic emissions trading	Domestic emissions trading scheme
	Swiss Flex Programme, established and managed by the Climate Unit of the Federal Office for the Environment (2007)
	Contract with the Climate Change Foundation to deliver additional CO_2 credits
Other	Federal Act on the Protection of the Environment
	Spatial Planning Act
	Road Traffic Act
Energy sector	
Energy	Energy Act (update in 2008 of the 1999 Act)
	Nuclear Energy Act; decommissioning of first nuclear plant in 2019
	Electricity Supply Act (2008)
	Energy 2000 Programme (1990–2000); SwissEnergy Programme (2001–2010) (emission reduction potential in 2010 of 0.55–0.82 Mt CO_2 eq, and by 2020 of 0.45–0.75 Mt CO_2 eq per year)
	Binding agreements with trade and industry (emission reduction potential in 2010 of 0.38-0.50 Mt CO_2 eq, and by 2020 of 0.45–0.60 Mt CO_2 eq per year)
Energy efficiency	Decree on compulsory compensation of all CO_2 emissions from combined cycle gas power stations (until 31/12/2010)
	2000-Watt Society Vision programme
	Action Plan for Energy Efficiency (2008)
	National Building Refurbishment Programme (energy efficiency measures) (2009) (emission reduction potential in 2010 of 0.1 Mt CO_2 eq, and by 2020 of 0.7 Mt CO_2 eq per year)
	Cantonal Building Programme (emission reduction potential in 2010 and by 2020 of 0.17–0.29 Mt CO_2 eq per year)
	Building codes at canton level (2010) (emission reduction potential in 2010 of 0.62–1.11 Mt CO_2 eq, and by 2020 of 1.33–2.17 Mt CO_2 eq per year)
Renewable energy	National Building Refurbishment Programme (renewable energy measures) (2009) (emission reduction potential in 2010 of 0.14 Mt CO_2 eq, and by 2020 of 1.5 Mt CO_2 eq per year)
	Renewable Energy Action Plan (2008)
	Feed-in tariff for renewables (2009)
Transport	

Major policies and measures	*Examples/comments*
Standards and labelling	European emission standards
	Environment label for new vehicles (2007)
Agreements	Voluntary agreements under the SwissEnergy Programme on energy efficiency of new cars (2002)
Promotion of modal shift	The RAIL 2030 project (2006)
	New rail link through the Alps
	Modal Shift Act; Heavy Vehicle Fee Act
	Heavy-vehicle fee (emission reduction potential in 2010 of 0.13–0.18 Mt CO_2 eq, and by 2020 of 0.15–0.20 Mt CO_2 eq per year)
	'Climate cent' (see also under Framework policies and cross-sectoral measures above)
	Leisure transport programme (2009)
	Non-motorized transport; Railway reform II
Promotion of fuel shift	Mineral oil tax reduction on biofuels and natural gas (emission reduction potential in 2010 and by 2020 of 0.10 Mt CO_2 eq per year)
	Agreement on biogas introduction by gas distributors (2003)
Industry	
Pollution prevention and control	Ordinance on Chemical Risk Reduction (2005)
	Ordinance on Aerosol Dispensers (2005)
	Ordinance on Air Pollution Control
	Deposit on synthetic GHGs
	Ordinance Relating to Environmentally Hazardous Substances
Agriculture	
	Agriculture Act
	Agricultural reform (1990s)
	Ecological standards
	Resource Programme
Waste management	
	Federal Act on the Protection of the Environment
	Technical Ordinance on Waste Disposal (emission reduction potential in 2010 of 0.11 Mt CO_2 eq, and by 2020 of 0.18 Mt CO_2 eq per year)
	Municipal waste incineration-Climate Charta
Forestry	
	Forest area conservation programmes
	Forest Act (1993)
	National Forest Programme (2004)
	Parliament decision to choose forest management as an activity under Article 3, paragraph 4, of the Kyoto Protocol
	Wood Resource Policy (2008)
	Wood 21 Programme
	Wood Action Plan (emission reduction potential in 2010 of 0.45 Mt CO_2 eq, and by 2020 of 1.2 Mt CO_2 eq per year)

40. ***Energy supply***. Electricity consumption grew rapidly over the period 1990–2008 and demand grew more rapidly than the production capacity. As a result, the country's net export of electricity has decreased substantially since the mid-1990s. Electricity production in Switzerland is based almost entirely on hydropower and nuclear power and, therefore, is almost CO_2-free. The oldest nuclear power plants will reach the end of their lifetime at the beginning of the 2020s and will have to be replaced with new power supply capacity. In addition, the increasing electricity consumption creates a further challenge for the country's long-term power supply capacity.

41. Switzerland plans to decide on the long-term structure of its electricity sector in the referendum which will take place in 2013. Given the limited potential for renewable energy sources (see para. 42 below), two options are under consideration: construction of new gas-fired power plants or construction of new nuclear power plants. With regard to new gas-fired power plants, Switzerland is considering continuing the current regulation on the compulsory compensation of all CO_2 emissions from combined cycle gas power stations.

42. ***Renewable energy sources***. One of the key objectives of the SwissEnergy Programme (2001–2010) is to increase renewable electricity production by 0.5 TWh annually and heat production from renewables by 3.0 TWh annually by 2010. The objective of the Renewable Energy Action Plan under this programme is to increase the share of renewable energy consumption in total energy consumption from 16 per cent in 2005 to 24 per cent in 2020. The plan includes several measures in the areas of heat production for buildings, a strategy for producing energy from biomass, measures to promote hydropower, support for research, technology development, and education and training.

43. Large increases in hydropower production are not possible in Switzerland for environmental reasons. The option for wind power production is also rather limited because of economic and environmental reasons. Owing to the difficulty of accessing some forest areas, the use of biomass for heating purposes is also limited, although the Federal Energy Research Framework Programme 2008–2011 has set a goal for 2050, among others, to triple the use of biomass for energy purposes. By 2020, new capacity is expected to be phased in to produce 3,000 GWh electricity annually from renewables, consisting of an approximately equal share of biomass, wind and small hydropower as well as a small input from photovoltaic power. By 2030, it is expected that an additional 5,400 GWh electricity will be produced annually from renewable energy other than large hydropower and that 2,000 GWh electricity will be produced annually from large hydropower.

44. One of the measures of the Renewable Energy Action Plan is the feed-in tariffs. The feed-in tariff is based on the difference between the actual technology cost and the market price of electricity. Depending on the technology, feed-in tariffs are granted to operators for a period of 20 to 25 years. A quota system could be introduced in 2014 if the renewable electricity production target (see para. 42 above) is not achieved by current feed-in tariffs. The budget for the tariffs is about CHF 300 million per year. However, the ERT noted that there has been limited evidence to date that the current feed-in tariff is an effective measure to promote renewable energy sources.

45. ***Residential and commercial sectors***. In Switzerland, around 30 per cent of the total national GHG emissions come from the residential and commercial sectors, within which buildings account for the major share of the emissions and offer very high potential for energy efficiency, in particular with regard to building heating.

46. The Action Plan for Energy Efficiency encompasses 15 measures in the areas of buildings, mobility, appliances, training and further education, research and technology transfer. A major contribution to the increase in energy efficiency and the use of renewable energies in buildings is the earmarking of up to CHF 200 million from the CO_2 levy. A further CHF 100 million is financed from the cantonal budgets.

47. The main measures to reduce emissions from the residential and commercial sectors include the CO_2 levy on heating and process fuels, which provides funding for the National Building Refurbishment Programme (launched at the beginning of 2010). The CO_2 levy on heating and process fuels was introduced on 1 January 2008 (at the level of CHF 12/ t CO_2) and was tripled (to CHF 36/t CO_2) as of 1 January 2010. The National Building Refurbishment Programme, which is implemented jointly by the federation and the cantons, is a 10-year programme that is designed to achieve emission reductions of around 2.2 Mt CO_2 eq per annum by 2020. The subsidies under the programme are directed at improving the energy efficiency of buildings and promoting the use of renewables in heating. From 2010, the funds available annually for the programme are estimated at about CHF 300 million, of which CHF 200 million is financed from the CO_2 tax revenue. Notwithstanding existing measures, including taxes and incentives, mitigating emissions from buildings remains a challenge in Switzerland, as those existing measures did not provide sufficient incentive for fuel switching and heating of buildings in Switzerland continues to depend on fuel oil for heating, more than in many other industrialized countries.

48. In addition to the National Building Refurbishment Programme, the Conference of Cantonal Energy Directors adopted strict revised building codes for new buildings in 2008. In most cantons the revised building codes were implemented at the beginning of 2010 through relevant regulations.

49. ***Transport sector***. Passenger transport in Switzerland accounts for around 80 per cent of the total emissions from transport and freight transport accounts for the remaining 20 per cent. The ERT noted that domestic PaMs in the area of passenger road transport focus primarily on the provision of a high-quality transport system (both public transport and roads) and the integration of spatial planning and transport investment (e.g. RAIL 2000 and the Agglomeration Programme), rather than specifically on reducing emissions. The ERT further noted that the impact of these measures has not yet been quantified and, therefore, encourages Switzerland to do so and to report the results in its next national communication.

50. The heavy-vehicle fee is a key measure to control the growth in freight transport; it is applied to vehicles of more than 3.5 t and is determined based on distance travelled on Swiss roads, specific maximum authorized gross weight and emissions. This and investment in the rail network are a key part of the overall strategy in the transport sector, which aims to shift freight transport from road to rail. This is an area in which the effort of Switzerland is noteworthy.

51. The key policy in the transport sector that has combating climate change as the main objective is the 'climate cent' fee, managed by the Climate Cent Foundation, which has committed to providing 12 Mt worth of credits over the period 2008–2012 to offset transport emissions. Of these, only 2 Mt needs to be compensated by emission reductions through domestic measures within Switzerland; the remainder is planned to be compensated by using of Kyoto mechanisms.

52. In the longer term, reaching the target of a maximum emission level of 130 g CO_2/km, on average, for new passenger cars by 2015 is seen as the key domestic policy in the transport sector. As currently there are no binding limits on the CO_2 emission levels of new passenger cars and the effect of a voluntary agreement between the Swiss automobile importers and the Federal Department of the Environment, Transport, Energy and Communications was insufficient, regulations limiting the CO_2 emission levels of new cars are being considered in Parliament. The proposed regulations are consistent with the relevant European Union (EU) regulations.

53. The NC5 has addressed emissions from international aviation by noting that, within the European Civil Aviation Conference, European Aviation Safety Agency and International Civil Aviation Organization, Switzerland strives for internationally coordinated measures to limit GHG emissions from aviation, and that the Party has adopted European civil aviation legislation within the framework of the bilateral transport agreement between Switzerland and the EU.

54. ***Industrial sector***. Whereas Switzerland used to address energy-related emissions from industry through voluntary measures, recently the main measures are the CO_2 levy on heating and process fuels and the national ETS. Industrial companies can choose between two alternatives: either pay the CO_2 levy or agree to a binding emission reduction target. Initially the proceeds from the CO_2 levy were fully and equally channelled back to the Swiss population (per capita) and businesses in proportion of wages paid); however, since 2010 up to CHF 200 million of the revenue is earmarked to go to the National Building Refurbishment Programme to fund CO_2 reduction measures in the building sector.

3. Policies and measures in other sectors

55. Between 1990 and 2008, GHG emissions from industrial processes (including solvent and other product use), agriculture and waste decreased by 9.0 per cent (976.0 Gg CO_2 eq). The trend in GHG emissions from industrial processes showed a slight increase, which was more than offset by decreases in emissions from the waste, agriculture, and solvent and other product use sectors.

56. ***Industrial processes***. In line with industrial output, overall emissions from this sector showed a decreasing trend during the period 1990–1997 and a rebound between 1998 and 2008. Overall, between 1990 and 2008, GHG emissions from the industrial processes sector increased by 1.1 per cent (37.17 Gg CO_2 eq), with the sector's share of total national emissions remaining almost constant over this period of time. Mineral products (mainly cement) remains the dominant emission source among the industrial processes, although its emissions decreased by 26.4 per cent in the period 1990–2008. This decrease was possible owing to the substantial enhancement of the efficiency of the process and the use of alternative fuels, which were both driven by the implementation of binding commitments in order to gain exemption from the CO_2 levy.

57. Emissions from the solvent and other product use sector decreased by 53.6 per cent (250.89 Gg CO_2 eq) between 1990 and 2008; however, the share of F-gases in total GHG emissions increased from 0.5 per cent in 1990 to 1.9 per cent in 2008, primarily because of the substitution of chlorofluorocarbons by hydrofluorocarbons (HFCs). The Ordinance of Chemical Risk Reduction, introduced in 2005, provides for measures to control emissions of F-gases in almost all sectors and it is expected that as a result of its implementation emissions of F-gases will remain constant until 2015, with a slow decrease thereafter.

58. ***Agriculture***. Cattle farming is the main activity in Swiss agriculture. In 2008, 10.7 per cent of total national GHG emissions came from agriculture, the most important sources being CH_4 from enteric fermentation and N_2O from agricultural soils. Between 1990 and 2008, GHG emissions from the agriculture sector decreased by 6.9 per cent (418.33 Gg CO_2 eq). Within this period, between 1990 and 2004 emissions decreased by 10.8 per cent, while since 2005 they have rebound and increased by 3.3 per cent, driven by increasing CH_4 emissions from the enteric fermentation of cattle, which is in turn due to increased numbers of cattle driven by market demand. The decrease in N_2O emissions from soils resulted from the reduced application of mineral fertilizers as a direct effect of the introduction of the Required Standard of Ecological Performance Act in 2005.

59. Currently there is no PaM specifically targeting GHG emissions from the agriculture sector. A climate strategy for agriculture has been under preparation in 2010 and is

expected to be finalized by the end of the year. The strategy will evaluate and prioritize fields of action, give recommendations for implementation in agricultural policy and in research programmes and education.

60. ***LULUCF***. One third of the country's area is covered by forests, and the forest area has increased by 5 per cent since 1995. The LULUCF sector was a net sink (3.0 Mt CO_2 eq) in 1990 and it became a net source in 2008 (0.2 Mt CO_2 eq). Increased wood harvesting and slightly reduced growth of living biomass have resulted in a trend of diminishing forest carbon removal since 2000. This was a side effect of the implementation of the national programmes to promote ecologically and economically effective wood use, including the use of wood as a substitute for fossil fuels. Swiss forest laws and policies prescribe sustainable forest management, ban deforestation and aim at reducing CO_2 emissions by substituting wood for fossil fuels, rather than by enhancing sink capacity in the forests.

61. Switzerland elected to account for activities related to forest management under Article 3, paragraph 4, of the Kyoto Protocol. Projections reported in the NC5 show that forest is expected to become a net source by 2020, with annual CO_2 emission estimates ranging from 0.7 to 1.2 Mt CO_2. During the review, the ERT noted the recent development in the Party's model projections, which incorporate more realistic scenarios to reflect the economic, social and environmental dimensions of forest management and resource utilization. The updated projections confirmed that LULUCF will probably remain a net source in the future. The ERT encourages Switzerland to provide the most recent projections for the LULUCF sector in its next national communication.

62. ***Waste management***. Emissions from the waste sector contributed only 1.2 per cent of total national GHG emissions in 2008. Switzerland is among the countries with an advanced policy in the waste sector that has primarily environmental objectives (e.g. reducing pollution of soils and contamination of underground waters) but also the ancillary benefit of substantial GHG emission reductions. Indeed, between 1990 and 2008, GHG emissions from the waste sector decreased by 34.6 per cent (344.05 Gg CO_2 eq). This decrease was a result of several implemented measures: separation of hazardous and household waste, increased waste recycling, waste incineration following a ban on landfilling of waste (in 2000), and increased waste disposal charges.

63. The ERT noted that a modern waste disposal infrastructure exists in all regions and more than 50 per cent of urban solid waste is recycled. In order to run the waste incinerators to full capacity, Switzerland incinerates waste not only generated in the country itself but also waste from neighbouring countries. The heat and electricity produced is used for domestic purposes.

4. Minimization of adverse effects

64. Switzerland, in its NC5, reported supplementary information on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects on other Parties. The national inventory report (NIR) of the 2010 annual submission also provides supplementary information on the minimization of adverse impacts on developing country Parties in accordance with Article 3, paragraph 14, of the Kyoto Protocol. Technical assessment of the information provided in the NIR is presented in chapter II I of this report.

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

65. The GHG emission projections have been updated since the NC4, using new and updated models and input parameters. A new short-term econometric model is used to

develop emission projections for the first commitment period of the Kyoto Protocol which captures short-term developments in terms of key socio-economic parameters such as GDP, population and energy prices.

1. Projections overview, methodology and key assumptions

66. The GHG emission projections provided by Switzerland in the NC5 constitute a complete set of information, including a 'with measures' scenario to 2030 that encompasses currently implemented and adopted policies. A 'with additional measures' and a 'without measures' scenario to 2020 are also provided, but they are shown in a graphical format only. All scenarios are presented relative to actual inventory data for 2007. For the 'with measures' scenario, projections are presented on a sectoral basis, using the same sectoral categories used in the PaMs section, and on a gas-by-gas basis for CO_2, CH_4, N_2O, perfluorocarbons (PFCs), HFCs and sulphur hexafluoride (SF_6). The projections are also provided in an aggregated format for each sector as well as for a national total, using global warming potential values. Emission projections related to fuel sold to aircraft engaged in international transport were reported separately and not included in the totals. Switzerland does not have any international maritime transport. Emissions projections for indirect GHGs are also presented.

67. Switzerland has reported all mandatory information on emission projections required by the UNFCCC reporting guidelines. However, the ERT encourages Switzerland to provide a complete 'with additional measures' scenario disaggregated by sector for 2010, 2015 and 2020.

68. ***Scenarios***. Switzerland clearly defined the three scenarios reported in the NC5. The 'with measures' scenario includes all the measures adopted by mid-2009. It shows the expected effects of these measures up to 2030. The 'with additional measures' scenario includes the expected effects of the revised CO_2 Act, which is currently under discussion in Parliament. The 'without measures' scenario provides an estimate of emissions up to 2020 in the absence of the climate- and energy-related PaMs implemented since 1990. Switzerland prepared short-term projections for the first commitment period of the Kyoto Protocol, including the following factors: economic growth, winter temperatures, effects of measures, energy prices, difference in price of transport fuel between Switzerland and Germany, and export growth. The sensitivity analysis carried out indicates a margin of ±1.8 Mt CO_2 eq for the mean value of the emission projections (±3.5 per cent) for the first commitment period of the Kyoto Protocol. A sensitivity analysis was also a major part of the Swiss Energy Outlook report.

69. ***Methodology***. Switzerland uses two models to develop GHG emission projections, which is a new development since the NC4. A short-term econometric model provides emission projections for 2008–2012 for transport and heating and process fuels. It is updated on an annual basis and includes parameters related to CO_2 emissions from fuel combustion. The emissions from other sectors are estimated using different approaches. A long-term outlook is provided using a long-term model that comprises sectoral bottom-up models for all sectors, including energy. Consistency between these bottom-up models is ensured by coordinated use of the data from the policy document entitled Swiss Energy Perspectives 2035. The ERT notes that a complete update of the long-term model and related projections is carried out every 8–10 years, with interim updates conducted in line with changes to key socio-economic parameters. The ERT encourages Switzerland to consider updating the long-term model and related projections more regularly in order to support the monitoring of progress towards national 2020 targets and the assessment of energy supply.

70. ***Assumptions***. The key economic and demographic assumptions for the scenarios are provided in the NC5 and these have been updated since the NC4. The projections are based

on the assumption that GDP will decrease by 2.7 per cent in 2009 and by 0.4 per cent in 2010, and increase thereafter. However, more recent data show that this overestimates the impact of the economic recession in Switzerland. Switzerland expressed its intention to incorporate the updated assumptions into forthcoming emission projections. The impact of 'tank tourism' (the purchase of fossil fuel for cars and other vehicles by drivers of neighbouring countries, thus increasing apparent fuel consumption and the corresponding GHG emissions in Switzerland), which depends on the exchange rate between the Swiss franc and the euro, could also be taken into account in the assumptions. The long-term forecasts assume a constant oil price of USD 55/barrel up to 2020, which the ERT notes is conservative and thus may lead to an overestimation of emissions by 2020.

2. Results of projections

71. Total GHG emissions are projected at 50.86 Mt CO_2 eq on average for the period 2008–2012 under the 'with measures' scenario. Switzerland projected that it will meet its Kyoto Protocol target (48.57 Mt CO_2 eq) under the 'with measures' scenario through a combination of domestic efforts, the use of flexible mechanisms and the use of credits for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol. The reduction commitment of 8 per cent compared with 1990 levels corresponds to a 4.2 Mt CO_2 eq annual reduction for 2008–2012. Over the first commitment period of the Kyoto Protocol, the implementation of domestic PaMs is projected to deliver a 2.1 Mt CO_2 eq average annual reduction; these measures primarily include the impact of the CO_2 levy, building refurbishments and the increase in the share of renewable energy (wood, solar and geothermal) generated in existing buildings, and the revised building codes. Planned use of flexible mechanisms and credits for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol is expected to fill in the remaining gap to the required 4.2 Mt CO_2 eq annual reduction (see para. 78 below). Table 4 and the figure below demonstrate that Switzerland is expected to meet its target under the Kyoto Protocol.

72. Medium-term (2020) emission reduction targets and the necessary policy instruments are set out in the revised CO_2 Act, which, after adoption by the Swiss Parliament, should become effective as of 2013. According to the draft revised CO_2 Act, Switzerland will reduce its GHG emissions by 20 per cent below 1990 levels by 2020. In addition, Switzerland has indicated that, in line with the intention of the EU, it is willing to increase its reduction target to 30 per cent, if other countries – especially the most important trading partners of Switzerland – strengthen their emission reduction commitments. Switzerland's GHG emissions under the 'with additional measures' scenario are expected to decrease by 14 per cent (under 20 per cent reduction target) to 18 per cent (under 30 per cent reduction target) between 1990 and 2020, which shows that the country could meet both the 20 per cent and the 30 per cent target by 2020, depending on the extent to which new policies are implemented. Obviously, long-term targets depend on the key decisions to be taken on the medium-term climate policy.

73. As regards projections by gas, under the 'with measures' scenario CO_2 emissions are expected to decrease, overall, by approximately 5 per cent between 1990 and 2020, with a further 5 per cent reduction between 2020 and 2030. Overall, CH_4 emissions are expected to decrease by 25 per cent from 1990 to 2030, but by only 7 per cent from 2007 to 2030, influenced by the expected stabilization of CH_4 emissions from the agriculture sector and a decrease in emissions from the waste sector. Meanwhile N_2O emissions are expected to decrease, overall, by 15 per cent in the period 1990–2030 and by 5 per cent in the period 2007–2030, driven by a decrease in emissions from the agriculture sector. The projections in F-gas emissions between 2010 and 2030 are uncertain. HFC emissions may be reduced in the most important sectors, such as refrigeration and air conditioning, as a result of technological development, while the projections in PFC and SF_6 emissions are expected to remain stable.

Table 4
Summary of greenhouse gas emission projections for Switzerland

	Greenhouse gas emissions (Tg CO_2 eq per year)	*Changes in relation to base year level (%)*
Inventory data 1990[a]	52.95	0.3
Inventory data 2008[a]	53.22	0.8
Kyoto Protocol base year[b]	52.79	NA
Kyoto Protocol target[b]	48.57	–8.0
'Without measures' projections for 2010[c]	55.18	4.5
'With measures' projections for 2010[c]	50.7	–4.0
'With additional measures' projections for 2010[c]	NA	NA
'Without measures' projections for 2020[c]	55.39	4.9
'With measures' projections for 2020[c]	49.5	–6.2
'With additional measures' projections for 2020[c]	45.2[d]	–14

Abbreviation: NA = not available.

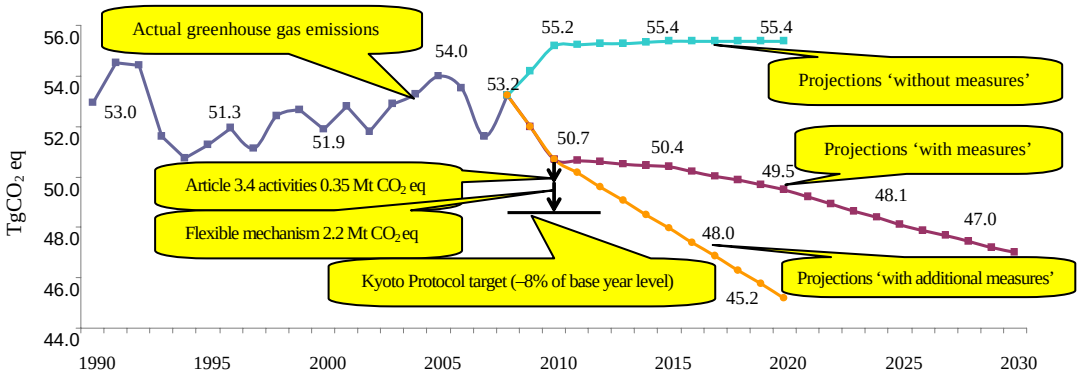
[a] *Data source*: Switzerland's 2010 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry.

[b] *Data source*: Based on the initial review report contained in document FCCC/IRR/2007/CHE.

[c] *Data source*: Switzerland's fifth national communication.

[d] Excludes anticipated purchase of carbon credits and corresponds to 20 per cent reduction target.

Greenhouse gas emission projections



Sources: (1) Data for the years 1990–2008: Switzerland's 2010 greenhouse gas inventory submission; the emissions are without land use, land-use change and forestry; (2) Data for the years 2009–2020: Switzerland's fifth national communication; the emissions are without land use, land-use change and forestry.

3. Total effect of policies and measures

74. In the NC5, Switzerland presents the estimated and expected total effect of implemented and adopted PaMs compared with a situation without such PaMs. It does this by comparing the 'with measures' and 'without measures' scenarios. Information is presented in terms of GHG emissions avoided in 1995 (0.32 Mt CO_2 eq), 2000 (0.68 Mt CO_2 eq), 2005 (1.94 Mt CO_2 eq), 2010 (4.48 Mt CO_2 eq), 2015 (4.99 Mt CO_2 eq) and 2020 (5.89 Mt CO_2 eq).

75. In general, Switzerland presents relevant information on factors and activities that affect emission levels for each sector for the years 1990 to 2020. Table 5 provides the projected effects of planned, implemented and adopted PaMs in 2010 and 2020 by sector and in total. However, the ERT noted that Switzerland did not provide relevant information on the factors and activities influencing GHG emissions from the transport sector that are projected to stabilize between 2015 and 2030. The ERT recommends that the Party provide a more complete assessment and description of the factors influencing projected emissions for key sources such as transport.

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

Sector	*Effect of implemented and adopted measures (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of planned measures (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of implemented and adopted measures (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*	*Effect of planned measures (Tg CO_2 eq)*	*Relative value (% of 1990 emissions)*
	2010				*2020*			
Energy (without CO_2 from transport)	3.22	6	NA	NA	4.16	8	2.7	5
Transport – CO_2	0.63[a]	1	NA	NA	0.70[a]	1	1.5	3
Industrial processes	0.52	1	NA	NA	0.85	2	0.1	0
Agriculture	0	0	NA	NA	0	0	0	0
Land-use change and forestry	0	0	NA	NA	0	0	0	0
Waste management	0.11	0	NA	NA	0.18	0	0	0
Total	**4.48**	**8**			**5.89**	**11**	**4.3**	**8**

Source: Switzerland's fifth national communication (projected effects are aggregated from tables 38 and 42).

Note: The total effect of implemented and adopted policies and measures is defined as the difference between the 'without measures' and 'with measures' scenarios; the total effect of planned policies and measures is defined as the effect of the 'additional measures' that were outlined to meet the proposed 20 per cent reduction target in 2020.

Abbreviation: NA = not available.

[a] Does not include the purchase of carbon credits by the Climate Cent Foundation.

76. In 2010, the relative share of total national emissions by major sector remained broadly the same as in 2008: transport, with its 32 per cent share, and other sectors (residential and commercial services), with its 30 per cent share, remained by far the most significant sources of emissions, followed by industry (11 per cent share) and agriculture (10 per cent share). Energy industries, other, fugitive emissions, industrial processes and waste accounted for the remaining 17 per cent of total national projected emissions.

77. Switzerland has estimated that, to reach its mid-term target of a 20 per cent reduction in emissions compared with 1990 levels by 2020, it must reduce its emissions by 8.3 Mt CO_2 eq annually on average. To reach the more ambitious target of a 30 per cent reduction by 2020, it must reduce its emissions by 13.1 Mt CO_2 eq annually on average.

4. Supplementarity relating to mechanisms pursuant to Articles 6, 12 and 17

78. In its NC5, Switzerland provided implicit information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action. The Party reported that a reduction commitment of 8 per cent compared with 1990 levels corresponds to a 4.2 Mt CO_2 eq reduction per year, of which 2.0 to 2.4 Mt CO_2 eq per year may be achieved by the use of Kyoto mechanisms. Switzerland also reported its intention to use credits (at present, estimated to amount to approximately 0.35 Mt CO_2 eq) from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

79. During the review, Switzerland clarified that the Ordinance on the Crediting of Foreign Emission Reductions includes a limit on the credits that can be used towards achieving the national emission reduction target. This limit consists of two components: an annual limit of 2 million credits, which is planned to be purchased through the Climate Cent Foundation, and an annual limit for credits purchased by facilities covered by the national ETS (see para. 80 below). The Climate Cent Foundation has been being replenished with the revenue from the 'climate cent' fee since 2005 (approximately CHF 100 million per year) and is anticipated to continue to be replenished during the first commitment period of the Kyoto Protocol.

80. Facilities covered by the national ETS (with some exceptions) are allowed to use carbon credits of up to 8 per cent of their annual reduction target (estimated at up to 0.4 Mt worth of carbon credits per year). Switzerland considers the use of flexible mechanisms to be supplemental to domestic action if the limit referred to in paragraph 79 above (approximately 2.4 million) is respected.

81. The ERT noted that a combination of domestic actions (2.1 Mt CO_2 eq) (see para. 71 above) and credits from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol (0.35 Mt) will bridge 2.45 Mt of the projected gap of 4.2 Mt CO_2 eq to the country's Kyoto Protocol target. This implies that the purchase of a maximum 1.75 Mt worth of Kyoto units might be required for compliance with the Kyoto target, should all domestic PaMs and activities under Article 3, paragraphs 3 and 4, deliver as projected.

D. Vulnerability assessment, climate change impacts and adaptation measures

82. In its NC5, Switzerland has provided the required information on the expected impacts of climate change in the country and on action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. Table 6 summarizes the information on vulnerability and adaptation to climate change presented in the NC5.

83. Switzerland, in its NC5, provided information on the current and projected (using a model) changes in basic climate parameters (temperature and precipitation) derived from a regional climate scenario for northern and southern Switzerland with a seasonal time resolution for the years 2030, 2050 and 2070. On the basis of this scenario, a vulnerability assessment based on expert judgement was conducted for nine different sectors. More detailed assessments (e.g. for natural hazards) are based on model calculations. The ERT encourages Switzerland to enhance its efforts in the quantitative assessment of vulnerability for the areas most sensitive to climate change.

84. Switzerland has applied numerous adaptation measures in areas identified as vulnerable, including areas outlined in the Strategy Natural Hazards Switzerland by the National Platform for Natural Hazards. In addition, Switzerland made improvements to extreme weather alerts, issuing legislation in 2009 on the compulsory dissemination of the alerts from the federal agencies via the appropriate channels (e.g. television and radio).

Furthermore, Switzerland launched information campaigns on precautionary measures in case of heat-waves. Research is ongoing on water resources, hydropower generation, insurance, business and tourism. However, Switzerland acknowledges the need, given the 'post-event' and reactive character of current response measures, to shift from a reactive to a proactive approach to adaptation. Therefore, Switzerland is developing a national adaptation strategy, which will include nine sectoral strategies (in the areas of water management, natural hazards, agriculture, forestry, biodiversity, energy, health, tourism and rural development).

85. The ERT noted that such a national adaptation strategy reflecting the country's policy on adaptation to climate change is under preparation and is expected to be completed in 2011. New high-resolution regional climate scenarios are being calculated. The ERT encourages the Party to enhance its efforts to finalize the adaptation strategy in order to elaborate and implement the relevant action plan in a timely manner.

86. Switzerland's activity in supporting developing countries in adapting to climate change is being led mainly through its governmental agency SDC and SECO, implementing projects and programmes on a bilateral and multilateral basis, as reflected in chapter II E of this report.

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

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture and food security	*Vulnerability*: Changes in temperature/precipitation patterns are expected to cause more changes in agriculture, including some advantageous changes if the temperature rise does not exceed 2 to 3 ^{o}C by 2050 and provided that enough water is available. If temperature increases by more than 2 to 3 °C, the impacts will be unfavourable: risk of water scarcity, decrease of crop and livestock husbandry, and damage from natural disasters *Adaptation*: Research work is ongoing for the elaboration of the sectoral strategy for adaptation
Biodiversity and natural ecosystems	*Vulnerability*: Changes in temperature/precipitation patterns are expected to cause more changes in biodiversity *Adaptation*: A strategy is being developed
Drought	*Vulnerability*: Drought may become more frequent *Adaptation*: Concepts for catchment area wide water resources management are being developed
Forests	*Vulnerability*: Extreme weather events and changes in precipitation patterns are expected to cause more changes *Adaptation*: A research programme "Forest and Climate Change" is ongoing
Human health	*Vulnerability*: A number of natural hazards, heat-waves and cases of infectious diseases caused by changes in temperature/precipitation patterns are expected to increase *Adaptation*: Public awareness raised, recommendations elaborated and a campaign on precautionary measures in case of heat-waves carried out
Infrastructure and economy	*Vulnerability*: Changes in climatic parameters are causing more and more damage to the economy and infrastructure (traffic infrastructure, hydropower generation, tourism and insurance, for example, fall into this category) *Adaptation*: Nationwide hazard maps are being completed and will have to be implemented in the coming years. The existing protective structures (e.g. dams and avalanche protective structures) are continuously being renewed,

Vulnerable area	*Examples/comments/adaptation measures reported*
	taking into consideration available information about climate change. The Strategy Natural Hazards Switzerland is being implemented. Research projects on the impacts of climate change on infrastructure and the economy are being conducted
Water resources	*Vulnerability*: Changes in temperature/precipitation patterns are expected to change the run-off pattern and influence water resources in the long term *Adaptation*: Research projects and a survey of water resources are ongoing; recommendations and guidance are being elaborated

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

87. In its NC5, Switzerland provided details on measures taken to give effect to its commitments under Article 4, paragraphs 3, 4 and 5, of the Convention and under Article 11 of the Kyoto Protocol. In particular, it provided information on financial resources and transfer of technology related to the implementation of the Convention through bilateral, regional and other multilateral channels, including UNFCCC-related funds and the Global Environment Facility (GEF). The ERT noted that completeness and transparency have been improved in the NC5 compared with in the NC4 and encourages Switzerland to further enhance transparency in its reporting on bilateral and regional financial contributions by including the information listed in table 5 of the UNFCCC reporting guidelines in its next national communication.

88. At the federal level, SDC and SECO are primarily responsible for managing development aid and, together with FOEN, they coordinate the provision of climate change related financial resources and technology. Switzerland identified three strategic priorities in the area of development and cooperation: reducing poverty; promoting human security and reducing security risks; and contributing to pro-development globalization. The Party indicated that climate change related activities are an important part of its development and cooperation policy.

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

89. The information provided in the NC5 covers all issues on which information is required under the Convention and its Kyoto Protocol and is presented in the format recommended by the UNFCCC reporting guidelines. Switzerland has provided information on the assistance it gives to developing country Parties that are particularly vulnerable to the adverse effects of climate change to help them meet the costs of adaptation to those adverse effects. Although Switzerland has reported all the required elements, the ERT encourages it to distinguish, in its next national communication, information on its contribution to developing country Parties to enable such Parties to comply with their obligations under Article 12, paragraph 1.

90. In its NC5, Switzerland specifies which resources are considered as "new and additional" pursuant to Article 4, paragraph 3, namely that contributions to the funds under the Convention and the Kyoto Protocol that are managed by the GEF are considered as "additional" resources and the payments to the Special Climate Change Fund (SCCF), committed on the basis of a political declaration signed by Switzerland jointly with the EU, Iceland, Norway, New Zealand and Canada at the sixth session of the Conference of the Parties (COP), are considered as "new".

91. Switzerland also provided information on other financial resources related to the implementation of the Convention provided through bilateral, regional and other multilateral channels. This information was supplemented with additional information provided during the in-country visit. The NC5 presents information on financial contributions to the UNFCCC-related funds, financial contributions to multilateral institutions and programmes, and bilateral and regional financial contributions. Table 7 summarizes information on financial resources and technology transfer.

Table 7
Summary of information on financial resources for 2005–2008
(Millions of Swiss francs)

Channel of financial resources	*2005*	*2006*	*2007*	*2008*
Official development assistance (ODA)	2 207	2 063	2 022	2 235
Climate-related aid in bilateral ODA	70.5	71.9	65.1	70.6
Climate-related support programmes	IE	IE	IE	IE
Contributions to UNFCCC climate funds managed by the GEF	2	2	1.5	1.5
JI and CDM under the Kyoto Protocol (funded through the Climate Cent Foundation)	NA	5.1	9.8	20.0

Abbreviations: CDM = clean development mechanism, GEF = Global Environment Facility, IE = included elsewhere, JI = joint implementation, NA = not applicable.

92. During the period 2005–2008, the flow of financial resources to the UNFCCC-related funds slightly decreased and contributions to different funds and organizations were restructured. During the review, Switzerland explained that the restructuring was caused by changes in priorities and programmes and projects financed through different funds. The Party also expressed its intention to consider the possibility of increasing its contributions to the UNFCCC-related and other funds, subject to the availability of additional resources. Switzerland also noted its intention to allocate financial resources to the climate change related funds set up under the Copenhagen Accord.

93. During the review, the Party provided the ERT with a description of clean development mechanism (CDM) projects ongoing and/or implemented in different developing countries. Most of the projects relate to the promotion of renewable energy and the improvement of energy efficiency. The host countries include Brazil, Chile, China, Colombia, Ecuador, Honduras, India, Malaysia, Mexico, Nicaragua, Panama, Peru, Thailand, Uganda and Viet Nam.

94. The ERT encourages Switzerland to provide more transparent information on bilateral assistance and provision of financial resources as listed in table 5 of the UNFCCC reporting guidelines in its next national communication, in order to more easily identify trends in the provision of financial resources by developing countries and supported sectors.

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

95. In its NC5, Switzerland, as a Party included in Annex II to the Convention, provided details of technology transfer to developing countries. The information on multilateral and bilateral technology transfer has been reported in the required textual format and tables. Switzerland provided references (and links) to all the information presented in the NC5 on financial resources and technology transfer, such as examples of the promotion of international standards for agricultural commodities in developing countries. Switzerland

promotes, facilitates and finances the transfer of environmentally sound technologies to developing countries, or their access to them, according to the set financing priorities.

96. Switzerland clearly distinguishes between activities related to transfer of technology undertaken by the public and private sectors, as required by the UNFCCC reporting guidelines. The ERT commends Switzerland for its actions to promote investment in addressing climate change by the private sector given that the private sector owns a significant share of the modern technologies in the country.

97. SDC and SECO, as the main governmental bodies coordinating and implementing technology transfer to developing countries, lead climate change activities for both mitigation and adaptation, with the priority given to mitigation. The priority areas in relation to mitigation are energy efficiency and renewable energy and these have been reflected in the ongoing or implemented CDM projects.

98. The ERT noted the activities in the area of technology transfer targeted at developing and enhancing endogenous capacities and technologies of developing countries, also noting that Switzerland focused on the 'soft' aspect of technology transfer. Examples include transfer of new CDM methodologies, provision of technical assistance to help with the establishment of a designated national authority, preparation of a life cycle database for biofuels, and the launching of 'green credit line' schemes for banks. The ERT encourages the Party to continue to enhance its efforts in supporting developing country Parties, including in the area of technology transfer, and to report accordingly in its next national communication.

F. Research and systematic observation

99. Switzerland has provided information on its actions relating to research and systematic observation and described both domestic and international activities, including, inter alia, those undertaken by the World Meteorological Organization (WMO), the World Glacier Monitoring Service, the European Space Agency, the European Organisation for the Exploitation of Meteorological Satellites, the Global Climate Observing System (GCOS) and the Intergovernmental Panel on Climate Change.

100. Research falls under the federal competence and is funded by the Federal Government as well as by international institutions through multilateral research programmes and projects. Research on climate change is led and coordinated by two governmental National Centres of Competence in Research (NCCRs), namely NCCR Climate and NCCR North-South, in cooperation with local and international scientific and research organizations. The research is a part of the country's activities in the area of climate change and includes mitigation, adaptation and modelling for climate projections. The Action Plan for Energy Efficiency (see para. 42 above) and the Renewable Energy Action Plan (see para. 46 above), for example, each include a research component.

101. In Switzerland, systematic observation of climate has a long tradition and an immense database. The NC5 reports that Switzerland is substantially contributing to GCOS, co-sponsored by a number of international institutions (the United Nations Environment Programme, WMO, the United Nations Educational, Scientific and Cultural Organization and the International Council for Science).

102. During the review week, Switzerland provided additional information about its actions taken to support capacity-building and the establishing and maintaining of climate observing systems in developing countries, as required by the UNFCCC reporting guidelines. The ERT encourages Switzerland to enhance these efforts, given the country's scientific and technical potential.

G. Education, training and public awareness

103. The ERT notes that, in accordance with decision 7/CP.10 and Articles 4, paragraph 1(i), 6 and 12, paragraph 1(b), of the Convention, Switzerland has provided information on education, research, training and public awareness in the country. Awareness of the risks of climate change in Switzerland has increased over the years. The Swiss population ranks climate change among the three main national concerns. In 1994, 54 per cent of the population considered climate change as a high or very high risk, while in 2007 this rose to 82 per cent.

104. Information on education, research and training activities being carried out at the federal, canton and local levels has been provided in the NC5. At the canton and local levels, primary and secondary schools have introduced specific courses on climate change. Education and training of architects, civil engineers, system planners, tradesmen and building maintenance personnel have helped to minimize energy consumption in buildings. Awareness in relation to climate change issues has been enhanced through numerous publications and websites, for example, those of scientific advisory bodies such as ProClim.

105. The private sector has also put forward many initiatives, through which the companies are made aware of the challenges and business opportunities represented by climate change. The objective is to foster innovation, sustainable development and the competitiveness of the Swiss economy in the long run. Some Swiss companies (e.g. a climate-neutral hotel chain) have decided to voluntarily compensate their (unavoidable) CO_2 emissions, mainly by using carbon offset projects. Another example of a private-sector initiative is the availability in Switzerland of climate-neutral products such as food and drink, t-shirts and bouquets of flowers.

106. During the review, three industry associations and three non-governmental organizations made presentations on their activities, which indicated that they have influence on the policy decisions on climate change issues in Switzerland.

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

107. Switzerland has provided all the supplementary information under Article 7, paragraph 2, of the Kyoto Protocol in its NC5. The supplementary information is placed in different sections of the NC5. Table 8 provides references to the NC5 chapters in which this supplementary information is provided. The technical assessment of the information reported under Article 7, paragraph 2, is contained in the relevant sections of this report.

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

Supplementary information	*Reference*
National registry	Section 3.5, pages 83–87
National system	Section 3.4, pages 73–83
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Section 5.3, pages 148 and 149
Policies and measures in accordance with Article 2	Section 4, pages 93–119
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	Section 4.2, page 93
Information under Article 10	Section 3.4 – Article 10a,

Supplementary information	*Reference*
	pages 73–83 Sections 4.3 and 6.3 – Article 10b, pages 93 and 171 Section 7.4 – Article 10c, page 190 Section 8 – Article 10d, page 199 Section 9 – Article 10e, page 217
Financial resources	Section 7, pages 186–189

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

108. Switzerland reported the information requested in section H. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the annex to decision 15/CMP.1 as a part of its 2010 annual submission. It has not reported, however, how it gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14. During the in-country review, Switzerland provided the ERT with the additional information on how it strives to implement its commitments under Article 3, paragraph 1, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. The ERT considers the reported information to be mostly transparent and complete and encourages the Party to continue exploring and reporting on the adverse impacts of its response measures.

109. The NIR 2010 and the additional information provided during the review presented Switzerland's efforts to minimize the adverse effects of its PaMs on the environment and society, to protect valuable ecosystems and solve conflicts between competing interests. Various studies are being carried out on possible conflicts and synergies between PaMs and ecological and/or social interests (e.g. between energy production and land management, and between biodiversity protection and mitigation measures (renewable energies)) in order to identify further areas of application of such measures. A position paper assessing competing interests between PaMs to mitigate climate change and biodiversity protection was published by the Swiss Academy of Sciences in 2008, giving recommendations on how to take advantage of synergies. Switzerland also reported that it is aiming to identify and reduce potential negative incentives within Switzerland's tax system with regard to the environment.

110. The Party has also provided information on measures taken to minimize impacts on international trade and social, environmental and economic impacts on other Parties. The ERT recommends that Switzerland report on how it gives priority to the actions taken to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol and encourages Switzerland to provide further information on the minimization of adverse impacts in accordance with Article 3, paragraph 14.

III. Conclusions and recommendations

111. The ERT concludes that the NC5 provides a good overview of the national climate policy of Switzerland. The information provided in the NC5 includes almost all mandatory information required by the UNFCCC reporting guidance and all supplementary information required under Article 7, paragraph 2, of the Kyoto Protocol. During the

review, the Party provided the additional information on all chapters of the national communication.

112. Switzerland's emissions for 2008 were estimated to be 0.5 per cent above its 1990 level excluding LULUCF and 6.9 per cent above including LULUCF. The increase in emissions was driven by economic and population growth. A major share of the country's emissions comes from the transport sector, mainly from passenger cars and from combustion of heating oil in the residential sector.

113. The projections indicate that Switzerland can meet its Kyoto Protocol target (which is 8 per cent below the base year level) under the 'with measures' scenario only through a combination of domestic efforts, the use of flexible mechanisms and the accounting for activities under Article 3, paragraph 4. Reaching the national target set for CO_2 emissions from transport and heating and process fuels of a 10 per cent reduction compared with 1990 levels by 2010 and sectoral targets defined for emissions from transport and heating and process fuels contribute significantly to the achievement of the Kyoto Protocol target, and these targets create preconditions for the achievement of the medium- and longer-term targets.

114. Switzerland is using the Kyoto Protocol mechanisms to meet its target for the first commitment period of the Kyoto Protocol. The NC5 contains implicit information on how the country's use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic actions. During the review, Switzerland informed the ERT that a limit of approximately 2.4 Mt per year is set by the Ordinance on the Crediting of Foreign Emission Reductions on the purchase of carbon credits. The ERT noted that a combination of domestic actions (2.1 Mt eq, see para. 72) and credits from activities under Article 3, paragraphs 3 and 4 of the Kyoto Protocol (0.35 Mt) will bridge 2.45 Mt out of the projected gap of 4.2 Mt eq to the Kyoto Protocol target. This implies that purchases of, maximum, 1.75 Mt of Kyoto units might be required for compliance with the Kyoto target should all domestic policies and measures and activities under Article 3, paragraphs 3 and 4 deliver as projected. Therefore, Switzerland considers the use of flexible mechanisms to be supplemental to domestic action.

115. The NC5 presents GHG emission projections for the period from 1990 to 2030 under a 'with measures' scenario. A 'with additional measures' and a 'without measures' scenario to 2020 are presented, but in a graphical format only. The impact of existing PaMs is reported for 1995, 2000, 2005, 2010, 2015 and 2020, while the impact of additional PaMs is reported for 2020 only. The projected reductions in GHG emissions, in relation to the base year, under the 'with measures' and 'with additional measures' scenarios are 6 per cent and 14 per cent, respectively, by 2020.

116. Switzerland has designed and implemented a comprehensive package of PaMs targeted at reducing GHG emissions in all sectors. The ERT noted that Switzerland has shifted from what is traditionally a key aspect of climate change mitigation policy – voluntary agreements with trade and industry – to new fiscal, market and regulatory instruments. As the residential and public sectors have considerable emission reduction potential, the ERT acknowledges that the CO_2 levy on heating and process fuels and the National Building Refurbishment Programme are the most effective measures. Given that Switzerland has allocated its emission reduction efforts to different sectors, the ERT notes that Switzerland may wish to further analyse the economic impacts of proposed measures by sector. The ERT welcomes recent policy and methodological developments in the agriculture, waste and LULUCF sectors.

117. Presently, Switzerland is elaborating its long-term climate strategy, which is enshrined in the CO_2 Act, which is currently under revision. The draft revised CO_2 Act defines a national emission reduction target of a 20 per cent reduction (30 per cent if other

Parties make similar commitments) compared with 1990 levels by 2020. In addition, the energy action plans that are currently under implementation encompass targets for renewables and energy efficiency. The further development of the national ETS by means of a potential link to the EU ETS by 2013 is currently being evaluated.

118. Switzerland has provided information on observed and expected climate change impacts. Since the submission of the NC4, adaptation measures have been implemented in several sectors and a common Internet platform on natural hazards has been developed. A set of new adaptation measures in the area of health has been elaborated and implemented. For coordination of the numerous adaptation activities, Switzerland is developing a national adaptation strategy, which is expected to be completed in 2011. This strategy will facilitate the country's adaptation to climate change and will include nine sectoral adaptation strategies for the sectors which are considered to be particularly vulnerable to climate change.

119. During the period 2005–2008, the flow of financial resources to the UNFCCC-related funds slightly decreased and contributions to different funds and organizations were restructured. During the review, Switzerland explained that these changes stemmed from changes in priorities and programmes and projects financed through different funds. Contributions to the funds under the Convention and the Kyoto Protocol that are managed by the GEF are considered as "additional" resources and the contribution to the SCCF, committed on the basis of a political declaration signed by Switzerland jointly with the EU, Iceland, Norway, New Zealand and Canada at COP 6, are considered as "new".

120. The ERT notes that, in accordance with decision 7/CP.10 and Articles 4, paragraph 1(i), 6 and 12, paragraph 1(b), of the Convention, Switzerland has provided information on education, training and public awareness. It carries out public-awareness programmes, education and training at the federal and canton levels at schools and higher-education institutions. These activities have resulted in the Swiss public having a high awareness of the adverse impacts of climate change. Governmental, local and international scientific and research organizations are actively engaged in climate change research in Switzerland, including research on mitigation, adaptation and modelling for projections. Given the extensive experience of Swiss scientists in systematic observation, Switzerland may wish to enhance its support for climate observing systems in developing countries.

121. The ERT concluded that Switzerland's national system continues to perform its required functions as set out in decision 19/CMP.1, and that the national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol. The ERT noted that updates of databases and applications, implemented security measures and changes to the national registry software are documented on a regular basis by nominated responsible persons.

122. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol provided by the Party in its 2010 annual submission is mostly complete and mostly transparent. The ERT encourages Switzerland to further enhance its reporting on Article 3, paragraph 14, including by indicating the prioritization of the action taken in implementing its commitments under Article 3.

123. In the course of the IDR, the ERT formulated a number of recommendations relating to the completeness and transparency of Switzerland's reporting under the Convention and the Kyoto Protocol. The key recommendations[4] are that Switzerland:

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

(i) Providing a more complete assessment and description of the factors influencing projected emissions for key sectors such as transport;

(ii) Providing information on how it gives priority to the actions taken in implementing its commitments under Article 3, paragraph 14;

(b) Improve the transparency of its reporting by:

(i) Providing complete information for the 'with additional measures' scenario disaggregated by sector for 2010, 2015 and 2020;

(ii) Updating the long-term projections of GHGs more regularly to support the achievement of national 2020 targets;

(iii) Undertaking a quantitative assessment of vulnerability across various sectors of the economy;

(iv) Providing further information on bilateral and regional financial contributions related to adaptation and mitigation by including the information listed in table 5 of the UNFCCC reporting guidelines.

124. The ERT encourages Switzerland to undertake a number of improvements regarding the transparency and completeness of its reporting. The most important of these are that the Party:

(a) Provide, and report thereafter on, further support to developing countries for establishing and maintaining observing systems and related data and monitoring systems;

(b) Advance the development of the national adaptation strategy;

(c) Provide further information on the minimization of adverse effects and impacts in accordance with Article 2, paragraph 3, and Article 3, paragraph 14, of the Kyoto Protocol.

IV. Questions of implementation

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

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

Annex

Documents and information used during the review

A. Reference documents

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

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

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

FCCC/SBI/2006/INF.2. Synthesis of reports demonstrating progress in accordance with Article 3, paragraph 2, of the Kyoto Protocol.
Available at <http://unfccc.int/resource/ docs/2006/sbi/eng/inf02.pdf>.

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

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

FCCC/ARR/2009/CHE. Report of the individual review of the annual submission of Switzerland submitted in 2009.
Available at <http://unfccc.int/resource/docs/2010/arr/che.pdf>.

FCCC/IRR/2007/CHE. Report of the review of the initial report of Switzerland. Available at <http://unfccc.int/resource/docs/2007/irr/che.pdf>.

FCCC/IDR.3/CHE. Report on the in-depth review of the third national communication of Switzerland. Available at <http://unfccc.int/resource/docs/idr/che03.pdf>.

Fourth national communication of Switzerland.
Available at <http://unfccc.int/resource/ docs/natc/swinc4.pdf>.

Report demonstrating progress of Switzerland.
Available at <http://unfccc.int/resource/ docs/dpr/swi1.pdf>.

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

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Andreas Götz, Mr. Thomas Kolly, Mr. Paul Filliger, Mr. Reinhard Gasser, Ms. Sophie Hoehn, Mr. Roland Hohmann, Ms. Blaise Horisberger, Mr. Michael Hügi, Ms. Isabel Junker, Ms. Beat Müller, Ms. Susanne Riedener, Mr. Jose Romero, Ms. Regine Röthlisberger, Ms. Reto Schafer, Mr. Canosa Xavier Tschumi, Mr. Richard Volz and Mr. Mike Weibel (Federal Office for the Environment), Mr. Ueli Balmer (Swiss Federal Office for Spatial Development), Mr. Daniel Felder (Federal Office for Agriculture), Mr. Jürg Heldstab (Infras consulting), Ms. Gabriela Seiz (Federal Office of Meteorology and Climatology), Mr. Urs Neu (Forum for climate and global change), Mr. Anton Hilber (Swiss Agency for Development and Cooperation), Mr. Stefan Denzler (State Secretariat for Economic Affairs), Mr. Lukas Gutzwiller (Swiss Federal Office of Energy), Mr. David Stickelberger (Association for solar energy), Mr. Urs Näf (economiesuisse (economic association)), Ms. Gabi Öbu Hildesheimer (Network for a sustainable economy), Mr. Rolf Hartl (Erdölvereinigung (petroleum organization)), Mr. Oliver Wimmer (Agency for renewable energy and energy efficiency) and Mr. Friedrich Wulf (Pro Natura (Friends of the Earth)), including additional material on updated policies and measures, greenhouse gas projections, the national registry and recent climate policy developments in Switzerland. The following documents[1] were also provided by Switzerland:

Federal Department of Economic Affairs, State Secretariat for economic affairs, Climate change and economic development. *A SECO commitment*. 2009.

OcCC 2007. *Klimaanderunge und die Schweiz 2050*. Erwartete Auswirkungen auf Umwelt, Gesellchaft und Wirtschaft. <http://proclimweb.scnat.ch>.

Climate cent foundation, Project funding programmes. Available at <www.klimarappen .ch>.

Climate cent foundation, Kyoto Certificates. Available at <www.klimarappen.ch/en/ rogrammes/Kyoto-certificates.html>.

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Swiss Agriculture. 2010. *Pocket Statistics 2010.* Federal Statistical Office. Neuchatel.

Federal Statistical Office FSO. 2009. *Forestry in Switzerland*. Pocket Statistics 2009. Neuchatel.

Federal Office for the Environment. 2010. *Swiss climate policy at a glance*. Condensed version of Switzerland ‘s Fifth National Communication submitted to the United Nations Climate Change Secretariat in 2009.

Federal Office for the Environment. 2007. *The CO_2 Effects of the Swiss Forestry and Timber Industry*. Scenarios of future potential for climate-change mitigation.

[1] Reproduced as received from the Party.