Switzerland's Initial Report under Article 7, paragraph 4 of the Kyoto Protocol

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SWISS CONFEDERATION

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Foreword

Switzerland ratified the Kyoto Protocol to the UN Framework Convention on Climate Change on 9 July 2003. The Kyoto Protocol entered into force on 16 February 2005. According to Annex B of the Protocol, Switzerland has to ensure that its overall greenhouse gas emissions are reduced on average by 8 per cent below 1990 levels in the commitment period 2008 to 2012.

Decision 13 of the first Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol[1] requires each Party included in Annex I with a commitment inscribed in Annex B to submit to the secretariat, prior to 1 January 2007, a report to facilitate the calculation of its assigned amount pursuant to Article 3, paragraphs 7 and 8, for the commitment period and demonstrate its capacity to account for its emissions and assigned amount. At the same time, the report is to contain several elements of information as required by paragraphs 7 and 8 of the annex attached to decision 13/CMP.1, including a complete inventory of its greenhouse gas emissions by sources and removals by sinks for all years from 1990, prepared in accordance with Article 5, paragraph 2 (see the annex to this report).

The present report was prepared by the Federal Office for the Environment (FOEN). It was sent to all ministries of the Swiss Government in July 2006, to consult them on their opinions. At its meeting on 8 November 2006, the Federal Council approved the report and authorized the FOEN to submit it to the UNFCCC Secretariat.

[1] Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol (FCCC/KP/CMP/2005/8/Add.2)

Part I

A) Greenhouse gas inventories 1990 – 2004

1 Inventory submission

A complete inventory of greenhouse gas (GHG) emissions and removals for the years 1990 – 2004 is provided as an annex to this report. This inventory serves as the basis for the calculation of Switzerland's assigned amount. It includes the following elements:

- **Common Reporting Format tables for the years 1990 – 2004**
- **National Inventory Report 2004**
- **Description of the Swiss QA/QC System**

Inventory submissions are prepared in accordance with the UNFCCC "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories (following incorporation of the provisions of decision 13/CP.9)"[2]. The methodologies used for the preparation of the greenhouse gas inventory are consistent with the:

- Revised 1996 Guidelines for National Greenhouse Gas Inventories (IPCC 1997a, 1997b, 1997c)
- Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC 2000)
- Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC 2003)

2 Development and current state of the inventory

2.1 Past development

The present inventory is the result of a development process that started with the submission of the first National Communication in 1994. Switzerland's first National Communication included an estimate of the 1990 GHG emissions. The second National Communication published in 1997 presented overview tables of the GHG inventories for 1990 – 1995. The submissions in 1998 and 1999 (i.e. the inventories of 1996 and of 1997) were based on tables from the IPCC 1996 Guidelines. From the 2000 submission on, Switzerland used Common Reporting Format (CRF) tables to report the inventory. In 2004, for the first time, Switzerland submitted a National Inventory Report (NIR) including a full set of CRF tables for the years 1990–2002. This inventory was subjected to an UNFCCC in-depth review in late 2004. Most of the improvements recommended by the UNFCCC experts (UNFCCC 2004) have been implemented during inventory preparation in 2005 and 2006. For the preparation of the inventory submitted together with this Initial Report, the CRF Reporter software has been used for the first time.

2.2 Completeness

The estimation of major sources of Swiss GHG emissions, mainly in the energy sector, relies on long-term, well-established statistics that often started well before 1990. The main source categories have been complete since the beginning of inventory reporting under the UNFCCC. However, some small source categories were lacking in the 2004 submission and therefore completeness has been an issue in the development of the inventory following the UNFCCC in-depth review. In 2005 and 2006, the last lacking source categories were included. Another important step was the introduction of the new

[2] FCCC/SBSTA/2004/8

LULUCF CRF tables in 2006, which brought LULUCF reporting in line with inventory guidelines. According to current knowledge, the Swiss GHG inventory (as per November 2006) is complete.

2.3 Transparency

Since the submission of the first NIR in 2004, there have been many extensions and improvements regarding the transparency of the Swiss GHG inventory. However, improvements are still needed in the documentation of the planning and preparation of the inventory. In the present submission, the Swiss national air pollution data base (EMIS) starts to play an important role for quality assurance, serving as the central documentation tool for the GHG inventory. The EMIS database was redesigned and extended during 2005 and can now serve the purposes of both air pollution control and climate policy. The CRF tables of the present inventory have for the first time been generated with EMIS using the UNFCCC CRF Reporter software. The EMIS data base replaces the so-called internal GHG inventory files, which were used previously.

2.4 Time series consistency

Due to the availability of well-established long-term activity data statistics, the time series in the Swiss GHG inventory are characterized by a high degree of consistency. This is especially true for total emissions by sector. For some sectors time consistency constituted a problem at the sub-sector level (e.g. in the energy sector). Several projects to resolve this problem were started in 2003 and have since been successfully completed. There is now time series consistency throughout the inventory.

2.5 Accuracy

In 2005, a quantitative uncertainty analysis was performed. It followed a Tier 1 approach with error propagation equations according to IPCC (2000, chapter 6). In 2006, in addition to the updated Tier 1 approach, a Tier 2 Monte Carlo simulation was carried out. This simulation enables the attribution of correlations and probability distributions of any possible shape and width and is more appropriate to the inventory data.

Tier 2 uncertainty analysis resulted in an overall uncertainty of 4.0% for 2004 emissions. This value is somewhat greater than the result of the Tier 1 uncertainty analysis (3.3%). The trend uncertainty of Tier 2 analysis (5.8%) is also greater than that of Tier 1 analysis (2.4%). In contrast to Tier 1, Tier 2 uncertainties reflect autocorrelations between activity data and between emission factors. Direct and indirect emissions of N_2O from Agricultural Soils, CO_2 from 1A Fuel Combustion Activities (Other Fuels) and CH_4 from Enteric Fermentation have been identified as the main contributors to total uncertainty.

2.6 QA/QC

Since 2004, implementation of a QA/QC system has been underway. The main objectives of the system are the improvement of transparency, consistency, comparability, completeness and accuracy (the 'inventory principles') in Swiss GHG inventories. The QA/QC system and its status of implementation is documented in the "Description of the Swiss QA/QC System" annexed to this report.

2.7 Recalculations

Since the beginning of inventory reporting, recalculations have been performed regularly with a view to improving the choice of methodologies, emission factors and data quality. Due to extensive improvements made during the last three years, virtually all sectors have been subject to small changes. The Swiss GHG inventory has now reached a consolidated state, through the consideration of the last source categories that had been lacking, the implementation of the Inventory Development Plan, and the re-establishment of the EMIS data base. Once the assigned amount has been fixed, recalculations will be handled very restrictively.

2.8 Reporting, record keeping and archiving

With the implementation of the new EMIS data base, which contains all the data of the GHG inventory, reporting is now possible by means of the UNFCCC CRF Reporter software. Record keeping and archiving is ensured daily by automatic backups. The traceability of changes is provided by systematic saving of different versions of the inventory and documentation of changes. Since 2005,

the results of all QA/QC activities and procedures have been documented and archived in the IDM central documentation and archiving tool of the Federal Office for the Environment. All information is kept available for consultation by reviewers.

2.9 Inventory development plan

Based on the findings of the in-depth review in 2004, an Inventory Development Plan was established. Since then, most of the items in the plan have been implemented. The plan is included as an annex to the NIR in order to document the improvement process.

3 Base year inventory (1990) and time series 1991 – 2004

Tables A.1 to A.3 give an overview of key data from the Swiss GHG inventory.

Table A.1 Base year (1990) emissions by gas and by sector

Emissions and Removals 1990	**CO_2**	**CH_4**	**N_2O**	**HFCs**	**PFCs**	**SF_6**	**Total**
	CO_2 equivalent (Gg = 1000 tonnes)						
1 All Energy	41'261	563	268				42'092
2 Industrial Processes	2'831	9	174	0	100	144	3'258
3 Solvent and Other Product Use	357		109				466
4 Agriculture		3'042	2'861				5'903
6 Waste	62	756	212				1'030
Total (without LULUCF)	**44'512**	**4'370**	**3'623**	**0**	**100**	**144**	**52'749**
5 Land Use, Land-Use Change and Forestry (LULUCF)	-1'711	2	5				-1'704
International Bunkers	3'066	2	30				3'098

Table A.2 GHG emissions in CO_2 equivalent (Gg) by gas, 1990–2004

Greenhouse Gas Emissions	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
	CO_2 equivalent (Gg = 1000 tonnes)									
Gross CO_2 emissions (without LULUCF)	44'512	46'155	46'189	43'590	42'804	43'327	44'049	43'401	44'619	44'833
CH_4	4'370	4'347	4'236	4'094	4'001	3'983	3'935	3'850	3'794	3'745
N_2O	3'623	3'642	3'617	3'570	3'565	3'494	3'541	3'417	3'418	3'397
HFCs	0	0	6	13	30	152	193	258	311	360
PFCs	100	85	69	30	18	15	17	24	28	40
SF_6	144	146	148	126	112	81	82	122	152	138
Total (without LULUCF)	**52'749**	**54'375**	**54'265**	**51'424**	**50'530**	**51'052**	**51'817**	**51'072**	**52'322**	**52'513**

Greenhouse Gas Emissions	**2000**	**2001**	**2002**	**2003**	**2004**
	CO_2 equivalent (Gg = 1000 tonnes)				
Gross CO_2 emissions (without LULUCF)	43'910	44'692	43'796	44'893	45'326
CH_4	3'692	3'707	3'647	3'601	3'550
N_2O	3'423	3'402	3'400	3'315	3'320
HFCs	418	492	502	538	617
PFCs	93	52	51	89	77
SF_6	186	234	209	194	175
Total (without LULUCF)	**51'721**	**52'580**	**51'606**	**52'631**	**53'065**

Table A.3 Annual percentages of total gross emissions (without LULUCF) by source category in CO_2 equivalent (Gg), selected years

Source Categories	1990		1995		2000		2004	
	Gg CO_2 eq	%	Gg CO_2 eq	%	Gg CO_2 eq	%	Gg CO_2 eq	%
1 Energy	42'092	79.8%	41'658	81.6%	42'440	82.1%	43'776	82.5%
1A1 Energy Industries	2'545	4.8%	2'620	5.1%	2'886	5.6%	3'384	6.4%
1A2 Manufacturing Industries and Construction	6'065	11.5%	5'544	10.9%	5'855	11.3%	5'817	11.0%
1A3 Transport	14'599	27.7%	14'151	27.7%	15'774	30.5%	15'608	29.4%
1A4 Other Sectors (Residential, Commercial)	17'844	33.8%	18'338	35.9%	16'924	32.7%	18'007	33.9%
1A5 Other (Offroad)	519	1.0%	613	1.2%	668	1.3%	676	1.3%
1B Fugitive emissions from oil and natural gas	520	1.0%	392	0.8%	334	0.6%	285	0.5%
2 Industrial Processes	3'258	6.2%	2'527	5.0%	2'819	5.5%	3'051	5.7%
3 Solvent and Other Product Use	466	0.9%	367	0.7%	281	0.5%	236	0.4%
4 Agriculture	5'903	11.2%	5'638	11.0%	5'409	10.5%	5'258	9.9%
6 Waste	1'030	2.0%	861	1.7%	772	1.5%	744	1.4%
Total (without LULUCF)	**52'749**	100.0%	**51'052**	100.0%	**51'721**	100.0%	**53'065**	100.0%

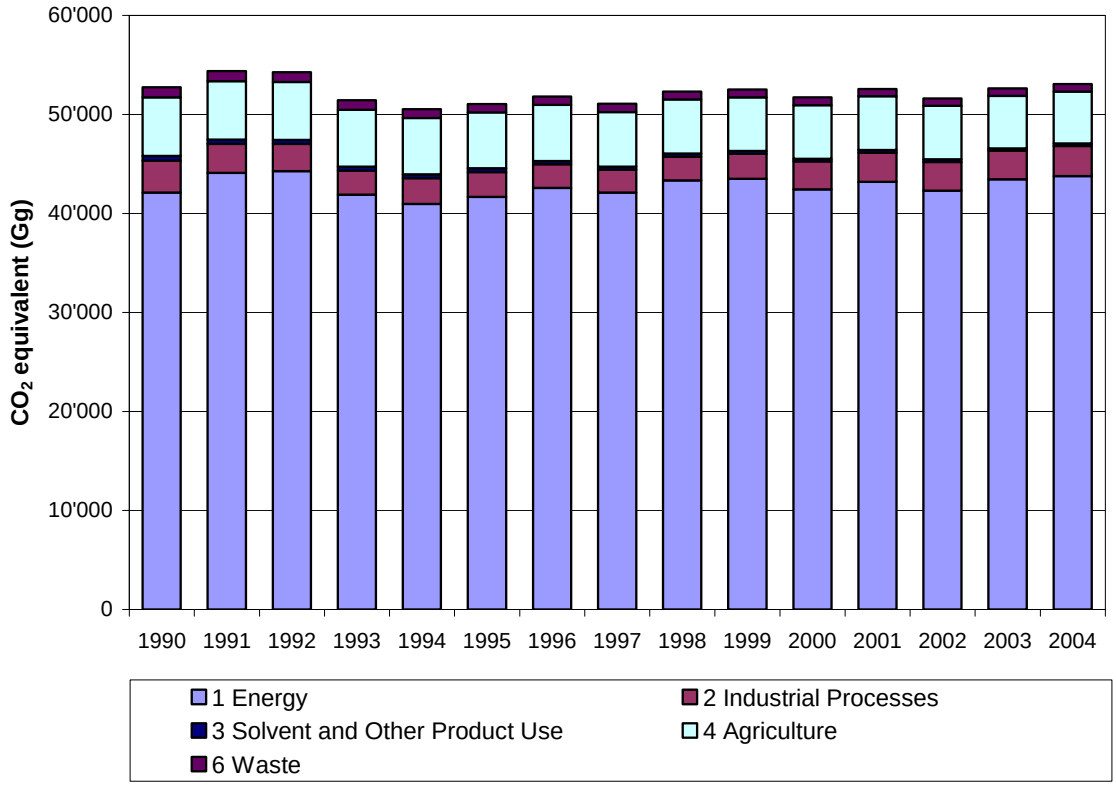

Figure A.1 Switzerland's GHG emissions by main source category in CO_2 equivalent (Gg), 1990–2004 (without CO_2 from LULUCF).

In Switzerland, the **Energy** sector is the most relevant greenhouse gas source. In 1990, 42'092 Gg CO_2 equivalent or 79.8% of total emissions were emitted by this sector. This contribution increased to 82.5% in 2004. Energy data are mainly taken from the Swiss overall energy statistics (e.g. SFOE 2005), which are well-established statistics that have been collected in detail since the 1970s. These statistics account for production, imports, exports, transformation and stock changes. Hence, all figures for energy consumption, on which the Swiss GHG inventory is based, correspond to apparent consumption figures.

The **Industrial Processes** sector emitted 3'258 Gg CO_2 equivalent in 1990 which corresponded to 6.2% of total emissions. This contribution decreased to 5.7% in 2004. Non-energy CO_2 emissions from cement production are the most important source in this sector. Data on clinker production rely on detailed statistics for the cement industry. Consumption of HFCs and SF_6 are of increasing importance. The FOEN has defined a special project for reporting halocarbons. In order to obtain the most reliable data, two different approaches are applied: a 'top down' approach using import statistics or estimates on the Swiss market from experts and associations and a 'bottom up' approach by means of questionnaires sent to companies involved in the importation, production and maintenance of appliances. HFC emissions from refrigeration and air conditioning equipment are calculated using a life cycle model. Input data for the model are updated every year.

The **Solvent and Other Product Use** sector is of minor importance (1990: 466 Gg CO_2 equivalent, 0.9%; 2004: 236 Gg CO_2 equivalent, 0.4% of total emissions). The decrease correlates with the success of air pollution control in the field of NMVOC emissions. The sector includes CO_2 emissions from thermal afterburning of NMVOC as well as CO_2 formed by atmospheric decomposition of NMVOC emissions (indirect CO_2 emissions). Emission calculations are based on NMVOC statistics.

The **Agriculture** sector emitted 5'903 Gg CO_2 equivalent in 1990 and 5'258 Gg CO_2 equivalent in 2004, which correspond to 11.2% and 9.9% of total emissions, respectively. Emission calculations are based on two detailed methodological studies carried out in the 1990s. The methods for calculating the methane emissions from enteric fermentation and manure management were revised in 2006. The revised methane data are included in the submission annexed to this report. The model input is updated every year using input data from the statistics of the Swiss Farmers Association, which are very detailed, well-established statistics.

The **Waste** sector emitted 1'030 Gg CO_2 equivalent (2.0%) in 1990 and 744 Gg CO_2 equivalent (1.4%) in 2004. Solid waste disposal on land is the most important source. Methane emissions are calculated by a waste model that was completely re-built in 2004. Activity data are derived from waste statistics that have been available in detailed form since 1990. Methane emissions from waste disposal are decreasing strongly. This is due to changes in the legislative framework, making incineration the mandatory disposal option for municipal solid waste and banning its disposal in landfill sites since 1 January 2000. Emissions caused by municipal solid waste incineration are reported in the Energy sector.

The **Land Use, Land-Use Change and Forestry (LULUCF**) sector constitutes a net sink (1990: -1'704 Gg CO_2 equivalent). In this sector, the implementation of the IPCC "Good Practice Guidance for LULUCF" (2003) and the adoption of the reporting design required by decision 13/CP.9[3] were the most important improvements made in 2006. The Swiss Land Use Statistics of the Swiss Federal Statistical Office were used to establish land-use change matrices. The underlying land use data sets were collected in three detailed surveys of the entire Swiss territory (the last of them has recently been launched). For Forest Land, data for carbon stocks and carbon fluxes were derived from the first and the second Swiss National Forest Inventories (NFI). In 2007, first results from the third NFI will be available to be considered in LULUCF reporting. For all other source categories of this sector, carbon stocks and carbon fluxes are provided by the Swiss Federal Research Station for Agroecology and Agriculture.

[3] Good practice guidance for land use, land-use change and forestry in the preparation of national greenhouse gas inventories under the Convention (FCCC/CP/2003/6/Add.1)

B) Selected base year for HFCs, PFCs and SF_6

The time series for emissions of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) in Switzerland are illustrated in Table B.1. From 1990 to 1994 there was a decrease in emissions of F-gases, followed by a strong increase from the mid 1990s on, mainly due to the more widespread use of HFCs.

Table B.1 Actual emissions of HFCs, PFCs and SF_6, 1990 – 2004 (CO_2 equivalent; in Gg)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	Gg CO_2 equivalent														
HFC	0	0	6	13	30	152	193	258	311	360	418	492	502	538	617
PFC	100	85	69	30	18	15	17	24	28	40	93	52	51	89	77
SF_6	144	146	148	126	112	81	82	122	152	138	186	234	209	194	175
Total F-gases	244	231	224	169	160	248	292	404	492	538	697	779	762	822	869

Article 3.8 of the Kyoto Protocol gives Parties the option of selecting 1995 instead of 1990 as the base year for F-gases. In Switzerland, the 1990 and 1995 emissions differ only slightly, 1995 emissions being 4 Gg CO_2 equivalent higher than in 1990. However, the 1990 emission estimates are assumed to be more precise than the 1995 emission estimates. In 1990, HFCs were not yet in use, leading to a very precise HFC estimate for that year. In 1995 in contrast, HFC use started to become important. At that point, actual HFC emissions are difficult to estimate due to relatively uncertain model input parameters.

Considering the above-mentioned aspects and for consistency reasons (same base year for all gases), Switzerland has chosen 1990 as the base year for emissions of HFCs, PFCs and SF_6.

C) Calculation of the assigned amount

The assigned amount is calculated according to Article 3, paragraphs 7 and 8 of the Kyoto Protocol.

Article 3, paragraph 7 of the Kyoto Protocol stipulates that Parties for whom land-use change and forestry constituted a net source of GHG emissions in 1990 shall include these emissions in their base year for the purposes of calculating their assigned amount. In Switzerland, the LULUCF sector was a net sink in 1990 (see Table A.1 in section A). Thus, the LULUCF sector is not included in base year emissions for the purposes of calculating the assigned amount.

With respect to the choice offered by Article 3, paragraph 8, Switzerland has decided to use 1990 as the base year for all gases (see section B).

In line with Article 3, paragraph 7 of the Kyoto Protocol "the assigned amount for each Party included in Annex I shall be equal to the percentage inscribed for it in Annex B of its aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A in 1990 (…) multiplied by five". Switzerland's assigned amount is calculated as shown in Table C.1.

Table C.1 Calculation of Switzerland's assigned amount

Base year emission [Gg CO_2 equivalent]	Base year emission times 5 [Gg CO_2 equivalent]	Percentage according to Annex B [%]	Calculated assigned amount [Gg CO_2 equivalent]
52'749	**263'745**	**92 %**	**242'645**

The calculated assigned amount of Switzerland is 242'645 Gg CO_2 equivalent (242.645 million tonnes CO_2 equivalent).

Part II

D) Calculation of the commitment period reserve

The commitment period reserve is calculated in accordance with paragraph 6 of the annex to decision 11/CMP.1[4]. It reads: "Each party included in Annex I shall maintain, in its national registry, a commitment period reserve which should not drop below 90 per cent of the Party's assigned amount calculated pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, or 100 per cent of five times its most recently reviewed inventory, whichever is lower."

Switzerland understands the "most recently reviewed inventory" to mean the inventory, which is part of the present Initial Report and which will be reviewed before the beginning of the commitment period.

Both methods to calculate the commitment period reserve are presented in Table D.1

Table D.1 Calculation of the commitment period reserve

Method 1	Method 2
90 % of the assigned amount (see Table C.1) [Gg CO_2 equivalent]	Total of 2004 emissions without LULUCF (see Table A.2) times 5 [Gg CO_2 equivalent]
242'645 x 0.9 = **218’380**	53’065 x 5 = **265’325**

Method 1 results in the lower value.

The commitment period reserve of Switzerland is calculated as 218'380 Gg CO_2 equivalent (218.38 million tonnes CO_2 equivalent).

[4] Modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol (FCCC/KP/CMP/2005/8/Add.2)

E) Selected definitions for reporting under Article 3, paras 3 and 4

Definition of forest

For activities under Article 3, paragraphs 3 and 4 of the Kyoto Protocol, the Marrakech Accords (in the annex to decision 16/CMP.1[5]) list the definitions to be specified by Parties. For forest, Switzerland chooses the following definition (see left-hand side of Figure E.1):

Forest is
(a) a minimum area of land of 0.0625 ha with crown cover of at least 60 % and a minimum width of 25 m, or
(b) a minimum area of 0.25 ha with crown cover of 20 to 60 % and a minimum width of 50 m.
In addition, the minimum height of the dominant trees must be at least 3 m.

The following forest areas are not subject to the criterion of minimum stand height: shrub forest consisting of dwarf pine (*Pinus mugo prostrata*) and alpine alder (*Alnus viridis*). The following forest areas are not subject of the criteria of minimum stand height and minimum crown cover, but must have the potential to achieve it: afforested, regenerated, as well as burned, cut or damaged areas. Although orchards, parks, camping grounds, open tree formations in settlements, gardens, cemeteries, sports and parking fields may fulfil the (quantitative) forest definition, they are not considered as forests.

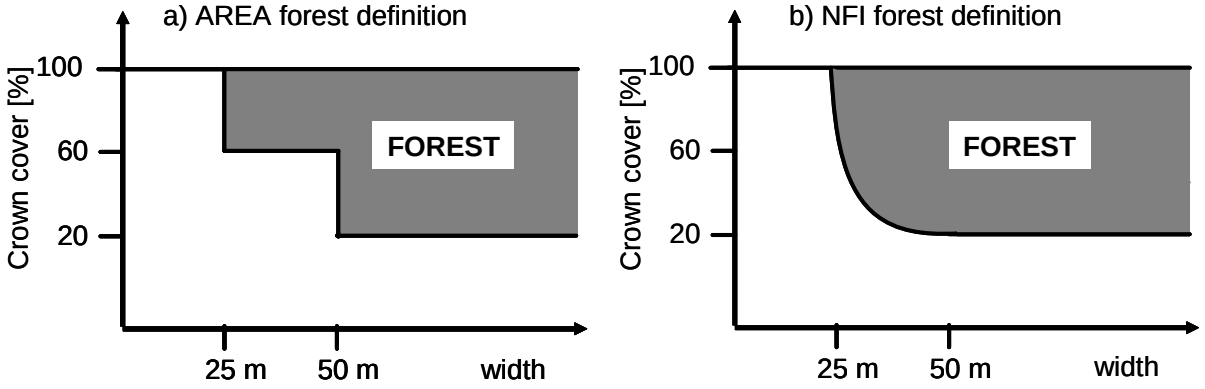

Figure E.1 Forest definition applied in a) the Swiss Land Use Statistics (AREA) of the Swiss Federal Statistical Office (to be used for Kyoto reporting), and b) the Swiss National Forest Inventory (used for reporting to the Food and Agriculture Organization).

For reporting under the Convention and the Kyoto Protocol, Switzerland applies the forest definition of the Swiss Land Use Statistics (AREA) of the Swiss Federal Statistical Office. AREA provides an excellent data base to derive accurate, detailed information of not only forest areas, but all types of land use and land cover. Thus, AREA offers a comprehensive, consistent and high quality data set to estimate the surface area of the different land use categories in reporting under the Kyoto Protocol. The use of the AREA data set implies the choice of the corresponding forest definition.

Quantitative data about forest growing stock, increment, harvesting and mortality reported to the Kyoto Protocol as well as to the Food and Agriculture Organization (FAO) of the United Nations are derived from the first and the second National Forest Inventories (NFI I: 1983-1985; NFI II: 1993-1995).

[5] Definitions, modalities, rules and guidelines relating to land use, land-use change and forestry activities under the Kyoto Protocol (FCCC/KP/CMP/2005/8/Add.3)

The AREA forest definition is a simplification of the NFI forest definition (Figure E.1). The difference between the two definitions affects small areas of forest (width of the area between 25 m and 50 m) with crown cover of between 20% and 60%. Such areas are classified as forest according to the NFI definition of forest, but as non-forest according to the AREA definition of forest. Compared to the rest of the forest, in such areas the growing stock and increment are below average. Therefore, including these areas in estimating growing stock and increment slightly reduces the estimate of growing stock and increment. This leads to a conservative estimate of growing stock and increment for the forest area.

Definition of afforestation and reforestation

Reforestation does not occur in Switzerland. Switzerland chooses the following definition of afforestation:

Afforestation is

the conversion to forest of an area not fulfilling the definition of forest for a period of at least 50 years if
(a) the definition of forest in terms of minimum area (625 m^2) is fulfilled, and
(b) the conversion is a direct human-induced activity.

Natural forest regeneration due to abandonment of land is not considered to be a direct human-induced activity.

For more than 100 years, the area of forest in Switzerland has been increasing, and a decrease in forest area as a result of deforestation is prohibited by the Federal Law on Forests (WaG; Swiss Confederation 1991). Therefore, reforestation of areas not forested for a period of at least 50 years does not occur in Switzerland. To ensure that the total area of forest does not decrease (WaG, Art. 3), areas affected by direct human-induced deforestation have to be compensated (WaG, Art. 7), mainly by afforestation of the same spatial extent. The annual rate of afforestation since 1990 is assessed by AREA. Natural forest regeneration due to abandonment of land, mainly occurring in the Alpine area, is not counted as afforestation and is therefore not counted under Article 3, paragraph 3 of the Kyoto Protocol.

Definition of deforestation

Switzerland chooses the following definition of deforestation:

Deforestation is

the permanent conversion of areas fulfilling the definition of forest in terms of minimum forest area (625 m^2) to areas not fulfilling the definition of forest as a consequence of direct human influence.

In Switzerland, human-induced deforestation is subject to authorization (WaG, Art. 5). Therefore, for the annual area and the purpose of human-induced deforestation data are provided by the Swiss Statistics of Deforestation (FOEN 1985-2005) and the Swiss Land Use Statistics (AREA). Construction of pipelines and power supply lines in a forest area requires an authorization for deforestation. Authorizations include the obligation to regenerate the forest area within a few years. Therefore, these areas do not fulfil the definition of deforestation. The loss of growing stock is accounted for under Article 3, paragraph 4 of the Kyoto Protocol. Deforestation for any other purposes is classified as permanent deforestation and accounted for under Article 3, paragraph 3 of the Kyoto Protocol.

F) Elected activities under Article 3, para. 4

Switzerland has chosen to account for forest management under the elective activities of Article 3, paragraph 4 of the Kyoto Protocol.

Definition of forest management

Forest management as defined by the Marrakech Accords is a "system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner".

Forest management

includes all activities serving the purpose of fulfilling the Federal Law on Forests (Swiss Confederation 1991, Art. 1c), i.e. the obligation to conserve forests and to ensure forest functions - such as wood production, protection against natural hazards, preservation of biodiversity, purification of drinking water and maintenance of recreational value - in a sustainable manner.

According to the Swiss Federal Law on Forests, the extent and the spatial distribution of the total forest area in Switzerland has to be preserved (WaG, Art. 1). Therefore, any change of the forested area has to be authorized. Therefore, all forests in Switzerland are subject to forest management as defined above.

Forest areas under forest management are subdivided into forests usable for wood production (productive forests) and forests not usable for wood production (unproductive forests). As average soil and climatic conditions of productive forests are better than those of unproductive forests, average productive forests have greater growing stocks, and the increment of unproductive forests is assumed to be zero.

Method of identification of land areas

Since all forests in Switzerland are subject to forest management, the area of managed forest corresponds to the forest area derived from the Swiss Land Use Statistics (AREA) of the Swiss Federal Statistical Office (see section E).

G) Choice of accounting periodicity for activities under Article 3, paras 3 and 4

According to paragraph 25 of the annex to decision 13/CMP.1[6], Parties have to determine for each activity of the LULUCF sector whether removal units (RMUs) shall be issued annually or for the entire commitment period. The decision of a Party shall remain fixed for the entire first commitment period.

Switzerland has chosen to account annually for emissions and removals from the LULUCF sector.

[6] Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol (FCCC/KP/CMP/2005/8/Add.2)

H) Description of the National Inventory System

The description of the Swiss National Inventory System (NIS) follows the structure of the "Guidelines for National Systems under Article 5, paragraph 1, of the Kyoto Protocol"[7]. The relevant (sub)paragraphs are mentioned in the title of each section or subsection.

1 General functions (cf Decision 19/CMP.1, annex para. 10)

1.1 Institutional, legal and procedural arrangements (para. 10a)

The Swiss National Inventory System (NIS) is developed and managed under the auspices of the Federal Department of the Environment, Transport, Energy and Communications (DETEC). It is hosted by a DETEC agency, the Federal Office for the Environment (FOEN). As stipulated in the Ordinance on the Internal Organization of DETEC of 13 December 2005, this agency has the lead within the federal administration regarding climate policy and its implementation.

As part of a comprehensive project (Swiss Climate Reporting Project), the FOEN directorate mandated its Economics, Research and Environmental Observation Division in early 2004 to design and establish the NIS in order to ensure full compliance with the reporting requirements of the UNFCCC and the Kyoto Protocol by 2006. Having regard to the provisions of Article 5, paragraph 1 of the Kyoto Protocol, the project encompassed the following elements:

- arrangements with partner institutions, relating to
  - roles and responsibilities,
  - participation in the inventory development process,
  - data use, communication and publication
- Inventory Development Plan
- setting-up of a QA/QC system
- official consideration and approval of data
- upgrading and updating of the national air pollution data base (EMIS)
- data documentation and storage

The project comes to an end with the establishment of the present report and its formal approval by the Federal Council.

Institutional setting

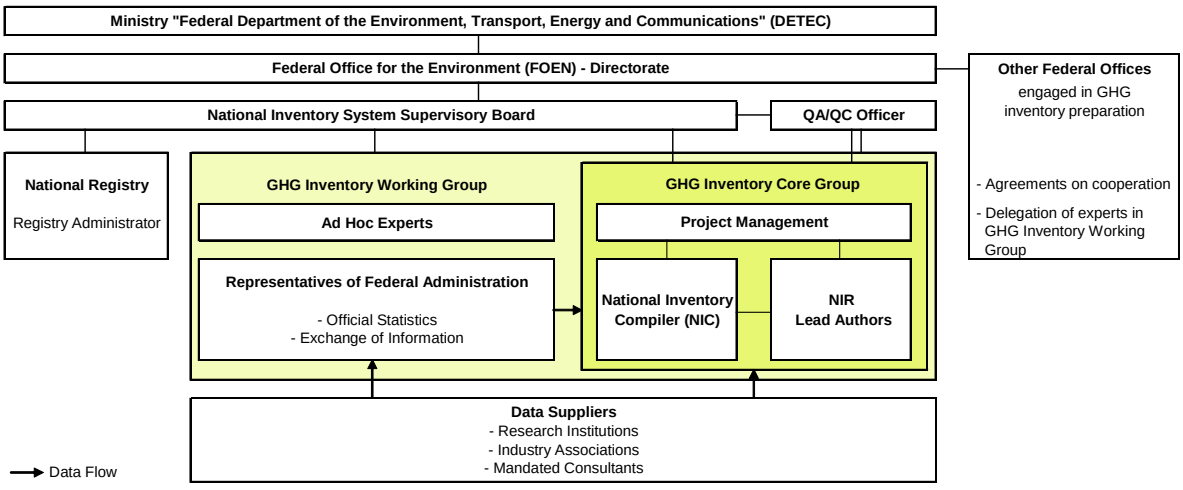

Figure H.1 Institutional setting of the National Inventory System

[7] Decision 19/CMP.1, annex, paragraphs 10–17 (FCCC/KP/CMP/2005/8/Add.3)

The **NIS Supervisory Board** was established by decision of the FOEN Directorate in summer 2006. The Board oversees activities related to the GHG Inventory and to the National Registry. It is independent of the inventory preparation process and, by its composition, combines technical expertise and political authority. According to its mandate, the main tasks of the NIS Supervisory Board are:

- official consideration of the annual inventory submission and recommendation of the inventory for official approval by the FOEN Directorate;
- assessment and approval of the recalculation of inventory data;
- handling of any issues arising from the UNFCCC review process that cannot be resolved at the level of the Inventory Project Management;
- facilitation of any non-technical negotiation, consideration or approval processes involving other institutions within the federal administration.

The **QA/QC Officer** is responsible for enforcement of the defined quality standards. He / she also advises the NIS Supervisory Board on matters relating to the conformity of the inventory with reporting requirements. His / her tasks and competencies are described in detail in the Description of the Swiss QA/QC System, annexed to this report.

The **GHG Inventory Working Group** encompasses all technical personnel involved in the inventory preparation process or representing institutions that play a significant role as suppliers of data. The group as a whole meets at least once per year to take stock of the state of the inventory, discuss priorities in the inventory development process, and to address specific issues of general interest that arise, e.g., from domestic or international reviews.

The **GHG Inventory Core Group** comprises the inventory experts employed at the FOEN or mandated on a regular basis, who are entrusted with specific, major responsibilities for inventory planning, preparation and/or management. The Core Group consists of

- the Inventory Project Management (with overall responsibility for the integrity of the inventory, communication of data, and information exchange with the UNFCCC secretariat);
- the National Inventory Compiler (responsible for the EMIS inventory data base and for the CRF tables);
- the NIR Lead Authors (responsible for the Inventory Report and carrying out centralized data assessments such as uncertainty analysis and key category analysis).

The GHG Inventory Core Group coordinates and integrates the activities of data suppliers within and outside the FOEN as well as those of mandated experts. Further data suppliers contributing to the inventory are research institutions and industry associations (Figure H.1). The latter are obliged by Art. 46 of the Federal Law relating to the Protection of the Environment (Swiss Confederation 1983) to provide the authorities with the information needed to enforce the law and, if necessary, to carry out inquiries or to cooperate by providing information for inquiries.

Further details of the function of the Core Group and the roles and responsibilities of its members are given in the Description of the Swiss QA/QC System, section 2.2.

Formal arrangements for cooperation

The following arrangements have been established to consolidate and formalize cooperation between the relevant partners contributing to, or involved in, the inventory preparation process (Table H.1). For some data suppliers of minor importance no formal arrangements are in place.

Table H.1 Formal arrangements for cooperation within the National Inventory System

Partner of FOEN or its competent Division	Subject/Sector	Type of arrangement	Duration
Institutions of the federal administration			
Swiss Federal Office of Energy (SFOE)	Energy statistics	Agreement	2014
Federal Office of Civil Aviation (FOCA)	Aviation emissions	Agreement	2014
Agroscope Reckenholz-Tänikon, Research Station ART	Agriculture emissions and removals	Contract	2009 (to be renewed bi-annually)
FOEN Air Pollution Control and Non-Ionizing Radiation Division	- EMIS inventory data base & archive - Energy emissions - Industrial process emissions (without synthetic gases) - Solvent and Other Product Use emissions - Waste emissions	Documentation of roles and responsibilities	2014
FOEN Forest Division	Forestry emissions and removals	Documentation of roles and responsibilities	2014
Private companies			
Carbotech	Synthetic gas emissions	Contract	to be renewed annually
Sigmaplan / Meteotest	LULUCF data compilation	Contract	to be renewed annually
EBP / Infras	- NIR - Uncertainty analysis and key category analysis	Contract	to be renewed annually
CEPE / Basics	Energy data Industry and Commercial Sector	Contract	to be renewed annually

There exists a general agreement on cooperation between the Swiss Federal Statistical Office (SFSO) and the FOEN. This agreement assigns responsibility for collection, processing and management of greenhouse gas data to the FOEN. The contribution of the SFSO to the Swiss GHG Inventory consists of the elaboration and provision of the Swiss Land Use Statistics (AREA). Due to the long-term nature of these statistics with on-going data collection and processing already defined up to the year 2013, it was not deemed necessary to conclude a formal agreement with the SFSO.

1.2 Capacity for performance of general functions of the NIS (para. 10b)

A description of the different bodies making up the NIS and their respective roles and responsibilities is given in the previous subsection. Capacity in terms of manpower, financial resources and technical competence has evolved in parallel with the establishment and completion of the NIS. In particular, it has been possible to significantly reduce the previous dependency on individual experts, e.g. in the area of data management and CRF compilation. Provision of training, e.g. by means of participation in international expert workshops and reviews, and the creation of a knowledge pool through the involvement of new experts in domestic reviews are items covered by the quality management system.

The federal offices directly involved in inventory preparation have committed themselves to make available the necessary resources to perform their tasks until 2014 by signing the respective

agreements with the FOEN. The resource requirements of the NIS have also been formally taken note of by the government along with the approval of the present report.

1.3 Entity with overall responsibility (para. 10c)

Since the entry into force of the UNFCCC in spring 1994, the Federal Office for the Environment (FOEN) has assumed responsibility for coordinating the implementation of any related reporting commitments. By the Federal Council Decision of 8 November 2006, the FOEN was formally designated as the entity with overall responsibility for the national GHG inventory.

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Website: www.climatereporting.ch

1.4 Provision of information (paras 10d + 10e)

Since the submission of its first National Communication, Switzerland has always submitted the information and data due under the UNFCCC on time. In 2005, additional information was submitted as required following the entry into force of the Kyoto Protocol. The long established standards of compliance with reporting requirements have been integrated into the NIS as part of the information duties of the Inventory Project Management. They will also be applied to the supplementary information to be submitted under Article 7 of the Kyoto Protocol.

2 Specific functions (cf Decision 19/CMP.1, annex paras 11-17)

2.1 Inventory planning (paras 12–13)

2.1.1 Entity with overall responsibility; contact information (paras 12a + 12b)

See section 1.3 above.

2.1.2 Roles, responsibilities, and arrangements for cooperation (para. 12c)

The specific roles and responsibilities of the different contributors to the inventory are listed in sections 2.2 and 2.4 of the Description of the Swiss QA/QC System, annexed to this report.

An overview of the institutional, legal and procedural arrangements made to prepare the inventory is given in section 1.1 of chapter H.

2.1.3 QA/QC plan (para. 12d)

In 2002, a total quality management (TQM) system was introduced within the FOEN. The GHG inventory was registered as a process to be managed in line with the principles of the TQM system. In 2004, the process was subjected to an audit. Subsequently, the establishment of a QA/QC system in line with the structure proposed in the IPCC 2000 Good Practice Guidance was initiated. The present state of implementation of the QA/QC system is documented in sections 2.2 to 2.6 of the Description of the Swiss QA/QC System, annexed to this report.

Table H.2 illustrates the annual cycle of inventory preparation including the timelines for the performance of QA/QC activities.

Table H.2 QA/QC plan

	Year n								Year n+1				
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Meeting of NIS Supervisory Board					◆							◆	
Meeting of GHG Inventory Core Group		◆			◆				◆			◆	
Annual Meeting of GHG Working Group										◆			
Consideration of UNFCCC Synthesis & Assmt. Report													
Data Collection			Energy Data				Non-Energy Data						
Quality Check of Energy Data													
Quality Check of Non-Energy Data													
Calculation of Emissions/Removals													
Compilation/Editing of NIR													
Generation of NIR Tables (EMIS)									◆				
Generation of CRF Tables (EMIS)									◆				
Completion of Checklists and other QC Activities													
Expert Peer Review						Not linked to specific phase							
Implementation of Individual Inventory Review													
Uncertainty Analysis													
Key Category Analysis													
Internal NIR Review													
Official Consideration and Approval												◆	
Submission												◆	
Publication and Archiving													

2.1.4 Official consideration and approval; response to the Art. 8 review (para. 12e)

The process for the official consideration and approval of the inventory as well as any recalculations is defined in the mandate of the NIS Supervisory Board (see section 1.1 of chapter H). Any issues raised by the review process under Article 8 will be first addressed by the GHG Inventory Core Group. The group will also make arrangements to involve further experts, as necessary. In the event that an issue cannot readily be settled between the GHG Inventory Core Group and the review team, the NIS Supervisory Board will support the process with a view to reaching an agreement with review experts or the Compliance Committee.

2.1.5 **Inventory improvement (para. 13)**

Switzerland has made big efforts in the last few years to achieve conformity of its inventory with defined quality standards, and to honour the principles of transparency, consistency, completeness, comparability and accuracy (see also chapter A of this report). In this context, the national data base (EMIS) was fully redesigned, extended to incorporate more data sources, updated and migrated to a new software platform. Based on new studies, all activity data and all emission factors were checked and updated at the same time. On the basis of the results of the in-depth review of the 2002 GHG inventory, a comprehensive Inventory Development Plan was established and implemented (see annex 6 of the NIR annexed to this report). This plan will be continuously updated on the basis of QA/QC activities as well as any domestic and international review results.

2.2 Inventory preparation (paras 14–15)

2.2.1 **Key source categories (para. 14a)**

The key category analysis is performed on the basis of the IPCC Good Practice Guidance (IPCC 2000, chapter 7). The approach to key category analysis is documented in detail in Annex 1 of the NIR annexed to this report.

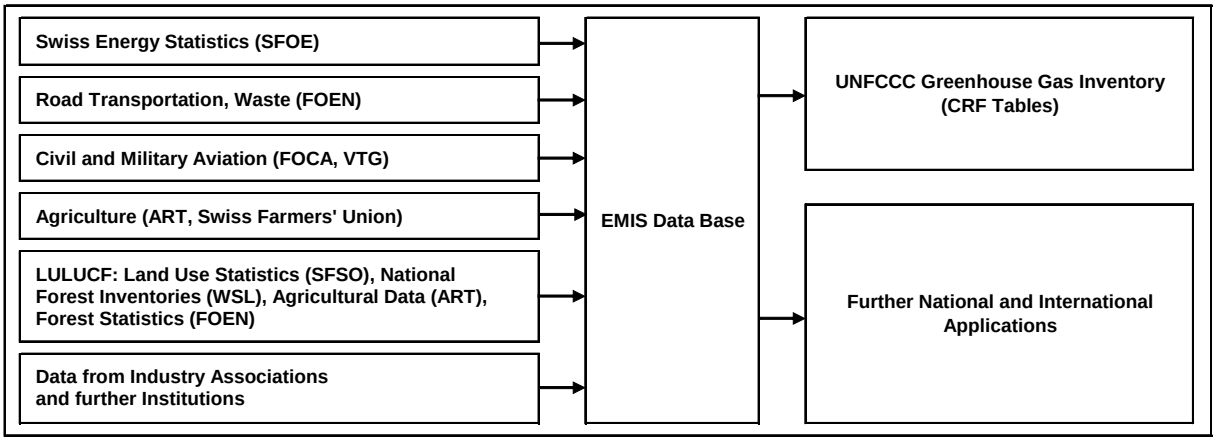
2.2.2 **Implementation of IPCC Guidelines and Guidance (para. 14b)**

Emissions are calculated on the basis of the standards and procedures of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 1997a, 1997b, 1997c) and IPCC Good Practice Guidance (IPCC 2000, 2003), as adopted by the UNFCCC. An overview of methods used is given in chapter 1.4 of the NIR annexed to this report.

2.2.3 **Data collection and inventory compilation (paras 14c + 14f)**

The Air Pollution Control and Non-Ionizing Radiation Division at the FOEN maintains the EMIS data base, which contains all the basic data needed to prepare the GHG inventory in the CRF. At the same time, background information on data sources, activity data, emission factors and methods used for emission estimation is documented in the data base and/or the NIR.

Figure H.2 illustrates in a simplified manner the data flow leading to the CRF tables required for reporting under the UNFCCC.



Note: for acronyms see the glossary in the NIR as annexed to this report

Figure H.2 Data collection and processing flow chart

Roles and responsibilities in data collection and compilation are defined in the arrangements listed in Table H.1 (see section 1.1 of chapter H). A list of data suppliers and related inventory categories is presented in section 2.2 of the Description of the Swiss QA/QC System as annexed to this report.

2.2.4 **Uncertainty assessment (para. 14d)**

In preparing the GHG Inventory, Tier 1 and Tier 2 methodologies, as suggested in the IPCC Good Practice Guidance (IPCC 2000, chapter 6) are used for calculating uncertainties. Detailed information is given in chapter 1.7 of the NIR annexed to this report.

2.2.5 **Recalculations (para. 14e)**

Recalculations were performed in the past on an *ad hoc* basis, driven by the permanent improvement process of the inventory. Meanwhile, the inventory has reached a consolidated state. In the future, recalculations will follow strict rules. All data suppliers and the National Inventory Compiler will have to apply for recalculations to the Inventory Project Management. The project management itself may consider the recalculation of data on the basis of review results. It will assess the rationale for any recalculation and propose its performance to the NIS Supervisory Board if deemed justified and in line with the criteria set out in IPCC Good Practice Guidance. Implementation of recalculations will also depend on their implications for consistency of time series with base year (1990) data. Thus, recalculations will be restricted to the inevitable minimum.

2.2.6 **QC procedures (paras 14g + 15a)**

A standardized and formalized way of carrying out Tier 1 QC activities was introduced in 2005 (effective for the 2006 inventory compilation process). All contributors to the inventory had to complete checklists that had been designed following the requirements of Table 8.1 of the Good Practice Guidance (IPCC 2000). The QC procedures in place and the related roles and responsibilities are described in detail in section 2.4 of the Description of the Swiss QA/QC System, annexed to this report.

At present, Standard Operating Procedures are being implemented to ensure agreed standards and transparency. Priority is given to key source categories. The quality system is designed according to a Plan-Do-Check-Act-Cycle (PDCA-cycle). This approach is in accordance with procedures described in the guidelines for National Systems under Article 5, paragraph 1 of the Kyoto Protocol and in the IPCC Good Practice Guidance (IPCC 2000, chapter 8).

2.2.7 **Domestic and internal reviews (paras 15 b – 15d)**

In 2006, the Energy and Industrial Processes sectors as well as methane emissions from the Agriculture sector were subjected to a thorough domestic review. Both review papers are available in English and will be provided on demand. An abstract is given in the Description of the Swiss QA/QC System annexed to this report. Recommendations have been integrated in the inventory improvement process and implemented as part of the Inventory Development Plan. The LULUCF sector will undergo a peer review in spring/summer 2007.

In 2006, an internal study was conducted to explain the small discrepancies that exist between the Swiss CO_2 emissions from the Energy sector as reported in FOEN (2006b) and those published by the IEA (OECD/IEA 2005). The results of this study are included in the Description of the Swiss QA/QC System annexed to this report.

The internal review of the NIR was introduced within the GHG Inventory Core Group prior to the 2006 submission. Every member of the review team checks a chapter, the preparation of which he or she was not directly involved in. Subsequent acceptance or rejection of proposed amendments were communicated from the NIR authors to the reviewers and documented in detail. The insights gained from this experience fed back into general QA/QC procedures: from now on, the performance of an internal review will be an integral part of the annual cycle of inventory preparation (see Table H.2).

2.3 Inventory management (paras 16–17)

2.3.1 **Archiving and location of inventory information (paras 16a + 17)**

Inventory data as well as background information on activity data and emission factors are archived by the National Inventory Compiler in the EMIS data base. Information on procedures, activities and results of key category analysis, reviews, QA/QC as well as inventory development is documented and archived in the IDM central documentation and archiving tool of the FOEN. All inventory information, as far as needed to reconstruct and interpret inventory data and to describe the inventory system and its functions is accessible at a single location at the FOEN in Ittigen near Bern. Information flows, documentation and archiving are managed by the QA/QC system.

2.3.2 **Accessibility of inventory information; support of the review process (paras 16b + 16c)**

Information documented in the EMIS data base and the IDM central documentation and archiving tool is held available at the FOEN for consultation by reviewers. The Inventory Project Management is prepared to respond to any request from the review process in line with the relevant decisions of the COP/MOP for the review of information under Article 8 of the Kyoto Protocol. While all information officially submitted under Article 7 of the Kyoto Protocol is translated into English, this may not be possible for background information made available during the review process. The official inventory documentation language is German. Switzerland would appreciate if this could be taken into consideration by the UNFCCC Secretariat when planning in-depth reviews of the Swiss GHG Inventory.

I) Description of the national registry

1 Name and contact information of the registry administrator

Federal Office for the Environment
Swiss National Registry
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CH-3003 Bern
Switzerland
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fax +41 31 323 03 67
e-mail: swissflex@bafu.admin.ch
Website: https://www.national-registry.ch

2 Cooperation with other Parties

Switzerland uses the Seringas™ registry software, which was developed by the French Caisse des Dépôts et Consignations, CDC. Further developments, updates and releases of the software are undertaken in cooperation with all Seringas™ licensees. As of today the same software is used by Belgium, the Czech Republic, France, Germany, Liechtenstein, Luxembourg, Monaco, Poland, Portugal, Slovakia and Spain.

In addition, Switzerland cooperates with Liechtenstein and Monaco and hosts the registry of these Parties on Swiss servers. All three national registries are however maintained as independent systems with independent registry administrators.

3 Description of the data base structure and capacity of the national registry

Switzerland has implemented the Seringas™ system using a Microsoft SQL Server relational data base management system with a dedicated data model. The total capacity of the registry is only limited by the maximum size of the Microsoft SQL Server.

The data model for the national registry was developed by CDC (see Figure I.1).

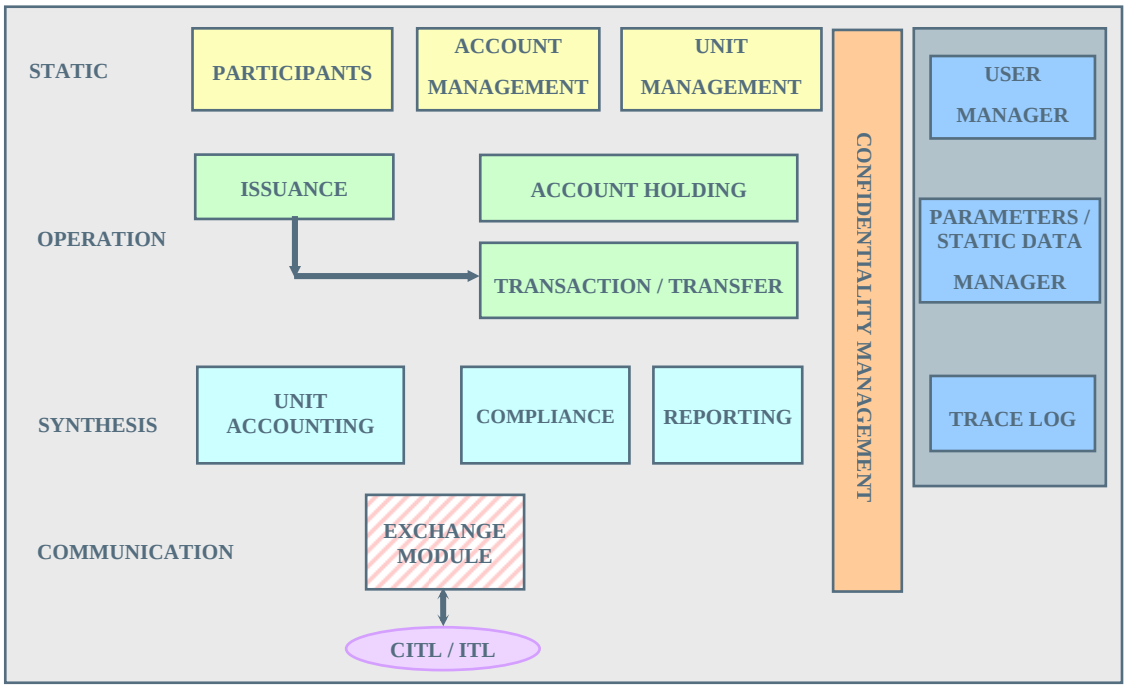

Figure I.1 Data model for the national registry

As a specific characteristic of the data base structure, the registries of Liechtenstein and Monaco are run in parallel on Swiss servers. The Information and Communication Technology (ICT) architecture is illustrated by the following diagram (Figure I.2).

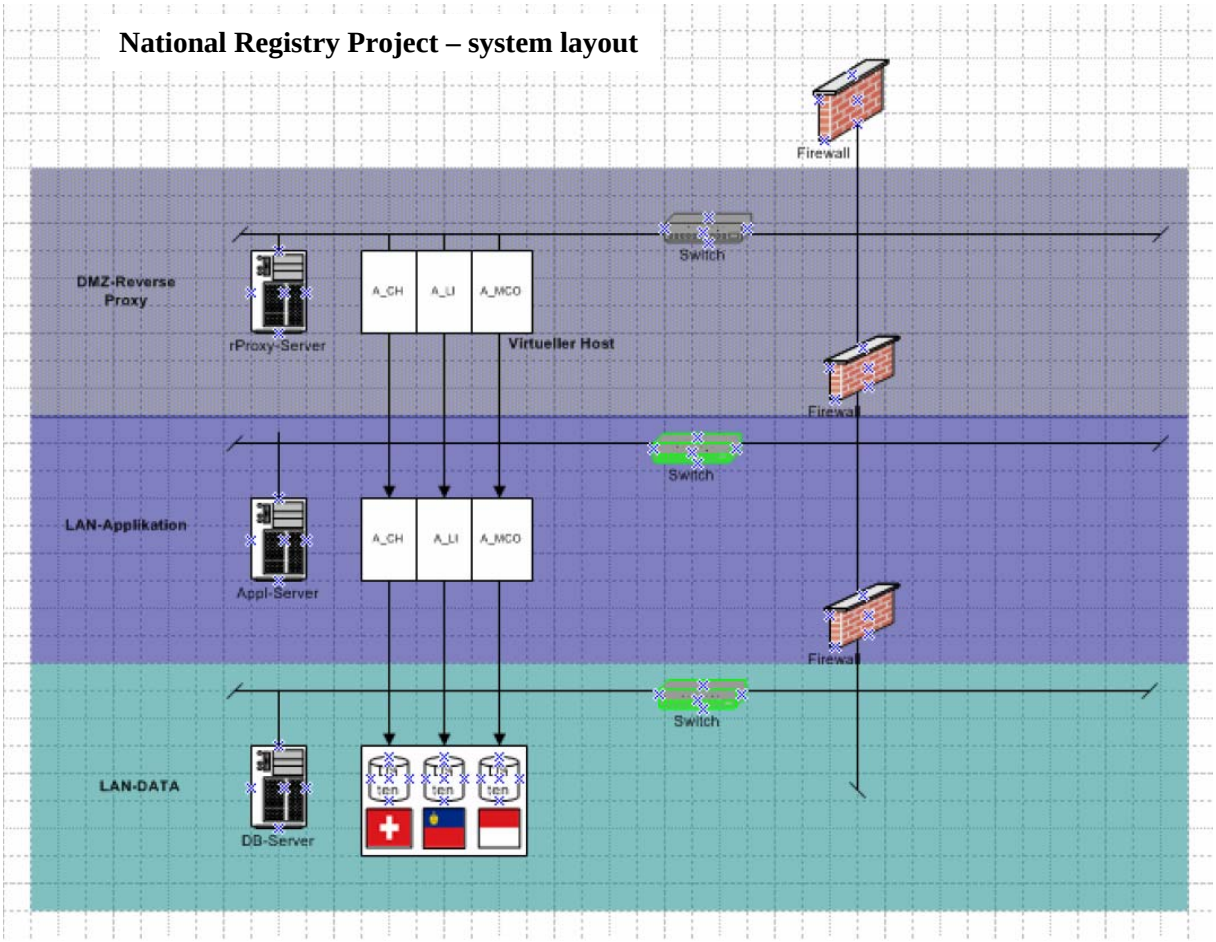

Figure I.2 ICT architecture

4 Conformity to the technical standards for data exchange

The Swiss national registry conforms to the technical standards for data exchange as specified in the UNFCCC Data Exchange Standards for registry systems under the Kyoto Protocol, technical design specification, version 1.0, DES # 7 of December 18, 2004.

In particular, the Swiss registry

- uses the Seringas™ registry software, which was developed by the CDC for the EU Emissions Trading Scheme; this scheme requires its Member States' registries to be compliant with the UN Data Exchange Standards specified for the Kyoto Protocol; currently, the development adheres to the standards specified in DES # 7 of the UN DES document;
- conforms to the data exchange standards defined in DES #7 and notably its annex F in respect of account numbers, serial numbers of units including project identifier and transaction numbers;
- conforms to the data exchange standards defined in DES #7 and notably its annexes I, K, L, concerning the list and electronic format of information transmitted electronically when transferring, acquiring, issuing, cancelling or retiring AAUs, CERs, ERUs or RMUs to other national registries or to the CDM registry and/or the ITL.

The above-mentioned processes and the reconciliation process use XML messages and web services.

A 24 hour clean-up, transaction status enquiry, time synchronization, data logging requirements (including Transaction Log, Reconciliation Log, Internal Audit Log and Message Archive) has been implemented as defined in DES #7.

The following functionalities still have to be developed:

- management of tCERs or lCERs (replacement, changing of expiry date);
- Commitment Period Reserve;
- Management of ITL notifications.

These functionalities are under development and should be added to the Swiss registry by the first quarter of 2007, depending on the implementation of the ITL.

5 Procedures employed to minimize and manage discrepancies and to correct problems

The conformity of the Swiss registry to DES #7 ensures the correct treatment and reception of information by the ITL. In case of discrepancies, the 24 hour "clean-up" procedure allows identification of errors and cleaning of the data base. This procedure will also terminate all pending transactions. Through the reconciliation procedure, the national registry compares its data with those held by the ITL every 24 hours. These procedures ensure the integrity of the data base.

6 Security measures

The solution is based on a two-tier architecture. The front-end and the data base tier are separated from each other by means of a firewall. The front-end tier is protected from the Internet by means of a firewall and a reverse proxy. Access to the front-end is restricted to port 443 (https).

At present, users of the system are authenticated by means of username and password. The final system is planned to be hardened with a security template.

In order to keep the system software up to date, the servers are subject to a continuous patch process.

All servers are physically installed in a data centre and therefore the appropriate physical controls are in place.

System operations are in compliance with the IT security instructions of the federal administration ("Directives du Conseil de l'informatique concernant la sécurité informatique dans l'administration fédérale", cf http://www.isb.admin.ch/intranet/sicherheit/00595/00596/index.html?lang=fr&sub).

7 Information publicly accessible by means of the user interface

The user interface is located on the Swiss National Registry Website (https://www.national-registry.ch). The information that is publicly accessible will be defined in an annex to the user terms and conditions. These are expected to be available by the end of the year for download from the website.

Information made available to the public will conform to the criteria defined in the annex to decision 13/CMP.1 (using the format defined in decision 14/CMP.1) [8] as well as to paragraphs 1 to 10 of annex XVI of the EU Regulation on Registries (2216/2004).

8 Internet address of the interface to the national registry

https://www.national-registry.ch

[8] Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol; Standard electronic format for reporting Kyoto Protocol units (FCCC/KP/CMP/2005/8/Add.2)

9 Measures taken to safeguard, maintain and recover data in the event of a disaster

The planned backup strategy is illustrated in Table I.1.

Table I.1 Backup strategy

	Description	Frequency	Retention Period	Storage
System data	Full backup	Weekly	3 months	Tape, offsite
	Incremental backup	Daily	1 week	Tape, offsite
Application DB	Online backup of the data base on a daily basis.	Daily	3 months	Tape, offsite
	Creating transaction logfiles	Hourly	1 week	Local system disk on the data base server. This device is separate from the device holding the DB.
Transaction logfiles	Transaction logfiles will be subject to the system data backup			

The system itself is not redundant. In case of loss of a system, it has to be rebuilt from the backup files. An alternate site could be implemented at a later stage.

Annexes

- Common Reporting Format Tables (November 2006)
- Switzerland's Greenhouse Gas Inventory 1990–2004, National Inventory Report 2006 (November 2006)
- Description of the Swiss QA/QC System (November 2006)

Referenced Documents

FOEN 1985-2005: Statistical Yearbook of Forestry. Federal Office for the Environment, Bern.

FOEN 2006b: Switzerland's Greenhouse Gas Inventory 1990–2004, National Inventory Report and CRF tables 2006. Submission of 31 May 2006 to the United Nations Framework Convention on Climate Change. Federal Office for the Environment, Bern.
http://www.environment-switzerland.ch/climatereporting/00545/00546/index.html?lang=en

IPCC 1997a: Greenhouse Gas Inventory Reference Manual, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reporting Instructions (Volume 1). Intergovernmental Panel on Climate Change.
http://www.ipcc-nggip.iges.or.jp/public/gl/invs4.htm [30.08.2006]

IPCC 1997b: Greenhouse Gas Inventory Reference Manual, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Workbook (Volume 2). Intergovernmental Panel on Climate Change.
http://www.ipcc-nggip.iges.or.jp/public/gl/invs5.htm [30.08.2006]

IPCC 1997c: Greenhouse Gas Inventory Reference Manual, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. Reference Manual (Volume 3). Intergovernmental Panel on Climate Change.
http://www.ipcc-nggip.iges.or.jp/public/gl/invs6.htm [30.08.2006]

IPCC 2000: Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC GPG). Intergovernmental Panel on Climate Change.
http://www.ipcc-nggip.iges.or.jp/public/gp/english/ [30.08.2006]

IPCC 2003: Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC GPG LULUCF).
http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm [30.08.2006]

OECD/IEA 2005: CO_2 emissions from fuel combustion 1971-2003. IEA Statistics, Paris.

SFOE 2005: Schweizerische Gesamtenergiestatistik 2004. Statistique globale suisse de l'énergie 2004. Swiss Federal Office of Energy, Bern.
http://www.bfe.admin.ch/php/modules/publikationen/stream.php?extlang=de&name=de_183763736.pdf. [in German and French] [30.08.2006]

Swiss Confederation 1983: Loi fédérale du 7 octobre 1983 sur la protection de l'environnement (Loi sur la protection de l'environnement, LPE). As at 23 August 2005.
http://www.admin.ch/ch/f/rs/c814_01.html [official text in German, French and Italian] [30.08.2006]

Swiss Confederation 1991: Loi fédérale du 4 octobre 1991 sur les forêts (Loi sur les forêts, LFo). As at 6 April 2004.
http://www.admin.ch/ch/f/rs/c921_0.html [official text in German, French and Italian] [30.08.2006]

UNFCCC 2004: United Nations Framework Convention on Climate Change, Secretariat, Switzerland – Report of the Individual Review of the Greenhouse Gas Inventory Submitted in the Year 2004. FCCCC/WEB/IRI/2004/CHE, 15 December 2004.
http://unfccc.int/files/national_reports/annex_i_ghg_inventories/inventory_review_reports/application/pdf/2004_irr_in-country_review_switzerland.pdf [30.08.2006]