



REGIERUNG
DES FÜRSTENTUMS LIECHTENSTEIN

Liechtenstein`s Initial Report

under Article 7, paragraph 4 of the Kyoto Protocol

Vaduz, December 2006



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Glossary

AVW	Amt für Volkswirtschaft (Office of Economic Affairs)
AWNL	Amt für Wald, Natur und Landschaft (Office of Forest, Nature and Landscape)
CH ₄	Methane
CO ₂ , CO ₂ eq	Carbon dioxide (equivalent)
CRF	Common reporting format
FCCC	Framework Convention on Climate Change
FOEN	Swiss Federal Office for the Environment (former name SAEFL)
Gg	Giga gramme (10 ⁹ g = 1'000 tons)
GHFL	Genossenschaft für Heizöllagerung im Fürstentum Liechtenstein
GHG	Greenhouse gas
HFC	Hydrofluorocarbons (e.g. HFC-32 difluoromethane)
IPCC	Intergovernmental Panel on Climate Change
LGV	Liechtensteinische Gasversorgung
LIHK	Liechtensteinische Industrie- und Handelskammer (The Liechtenstein Chamber of Commerce and Industry LCCI)
LKW	Liechtensteinische Kraftwerke
LULUCF	Land Use, Land-Use Change and Forestry
LWA	Landwirtschaftsamt (Office of Agriculture)
NIR	National Inventory Report
NIS	National Inventory System
N ₂ O	Nitrous oxide (laughing gas)
OEa	Office of Economic Affairs
OEP	Office of Environmental Protection
PFC	Perfluorinated carbon compounds (e.g. Tetrafluoromethane)
QA/QC	Quality assurance and quality control
SAEFL	Swiss Agency for the Environment, Forests and Landscape (former name of Federal Office for the Environment FOEN)
SF ₆	Sulphur hexafluoride
SLP	Stabstelle für Landesplanung, Office of Land Use Planning
UNFCCC	United Nations Framework Convention on Climate Change

Summary

The Initial Report demonstrates that Liechtenstein has implemented the requirements for accounting under the Kyoto Protocol and its capacity to account for emissions trading of Kyoto Protocol units via the national registry. The report adheres to the requirements as specified in Decision 13 of the first Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP.1).

The report contains a number of technical definitions, calculations and definitions required to participate in the Kyoto Protocol. These are summarised as:

- a complete inventory of anthropogenic emissions by source and removals by sinks of greenhouse gases (not controlled by the Montreal Protocol) for 1990–2004
- the identification of 1990 as Liechtenstein's selected base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride
- calculation of Liechtenstein's assigned amount as:
 $230.42 \text{ Gg} \times 0.92 \times 5 = 1059.94 \text{ Gg CO}_2 \text{ equivalent}^3$
 where 230.42 Gg corresponds to 1990 emissions excl. LULUCF and
 0.92 is Annex B percentage for Liechtenstein
- calculation of Liechtenstein's commitment period reserve as:
 $0.9 \times 1059.94 \text{ Gg} = 953.94 \text{ Gg CO}_2 \text{ equivalent}^3$
- Liechtenstein's decision to not account for LULUCF activities under Article 3.4 during the first commitment period
- the identification of Liechtenstein's selected single minimum values for use in accounting for its activities under Article 3.3. 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.
- Liechtenstein's intention to use annually accounting for all activities under Article 3.3 during the first commitment period.
- a description of Liechtenstein's national system in accordance with Article 5.1 and Decision 19/CMP.1 detailing the legal, institutional and procedural arrangements established for the continued compilation of Liechtenstein's greenhouse gas inventory
- a technical description of Liechtenstein's national registry in accordance with Article 7 and Decision 15/CMP.1.

Total emission without LULUCF are 230.42 Gg in the base year 1990 und 271.33 Gg in 2004. The Energy sector is the most important source of greenhouse gas emissions in Liechtenstein. In 2004, 242.01 Gg CO₂ equivalent were emitted in this sector, which corresponds to 89.2% of total emissions. Within the energy sector, category 1A4 (Other sectors: Commercial/Institutional, Residential) is the largest source with 46.2% of the Energy related greenhouse gas emissions, followed by category 1A3 (Transport) with 35.5% and category 1A2 (Manufacturing Industries and Construction) with 15.4% of the emissions. CO₂ accounts for 99.1% of greenhouse gas emissions in the energy sector in 1990 and for 98.9% in 2004. An increase of 19% of Energy related emissions is observed between 1990 and 2004. This fact will become important for Liechtenstein's emission reduction policy to comply with the obligations of the Kyoto Protocol.

Foreword

In 1995, the Principality of Liechtenstein ratified the United Nations Framework Convention on Climate Change (UNFCCC). In 1995, 2001 and 2006, Liechtenstein submitted its National Communication Reports to the secretariat of the UNFCCC. Also, a first greenhouse gas inventory (without National Inventory Report) was submitted in the Common Reporting Format (CRF) in 2005. In May 2006, the second greenhouse gas inventory and the first National Inventory Report were submitted.

In 2004, Liechtenstein ratified the Kyoto Protocol to the UNFCCC. Meanwhile, a National Inventory System (NIS) according to Article 5.1 of the Kyoto Protocol has been built-up.

The Office of Environmental Protection (OEP) is in charge of compiling the emission data and bears overall responsibility for Liechtenstein's national greenhouse gas inventory. In addition to the OEP, the Office of Economic Affairs, the Office of Agriculture, the Office of Forests, Nature and Landscape participate directly in the compilation of the inventory. Several other administrative and private institutions are involved in inventory preparation.

Liechtenstein is a small central European State in the Alpine region with a population of 34'600 inhabitants (as of 31 December 2004) and with an area of 160 km². Its neighbours are therefore important partners: Liechtenstein and Switzerland form a customs and monetary union governed by a customs treaty. On the basis of this union, Liechtenstein is linked to Swiss foreign trade strategies, with few exceptions, such as trade with the European Economic Community: Liechtenstein – contrary to Switzerland – is a member of the Agreement of the European Economic Area. The Customs Union Treaty with Switzerland impacts greatly on environmental and fiscal strategies. Many Swiss taxes and regulations for special goods (for example, environmental standards) are also adapted and applied in Liechtenstein.

For the determination of the GHG emissions and the climate reporting, it is important to take note of the specific circumstances of the Principality of Liechtenstein:

- Due to the smallness of the State it may not develop its greenhouse gas inventory to a highly sophisticated level with country-specific methods and emission factors in every source category. Nevertheless, the close relation to Switzerland implicates a vivid cooperation in climate reporting activities between the two states from which Liechtenstein benefits in adopting a number of methods and emission factors from Switzerland.
- In Liechtenstein, not every process, data flow and arrangement does need to be established by a formal agreement due to short "distances" within the administration and due to a high degree of acquaintance between the persons involved. Therefore, the National System manages with relatively few written documents

Acknowledgement

Liechtenstein's Office of Environmental Protection (OEP) highly appreciates the generous support by the members of the Swiss FOEN Inventory Group. The free use of methods and tools developed by the Swiss Federal Office for the Environment (FOEN) has been essential not only during the development of the Liechtenstein GHG inventory and the NIR but also for the preparation of the Initial Report.

Part 1

1. Greenhouse gas inventories 1990–2004

Note: The Principality of Liechtenstein is a very small country of 34'600 inhabitants (2004).

1.1. *Inventory submission*

The present inventory submissions follow the updated 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 14/CP.9)"¹ Consistency with the following methodologies is ensured:

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

A complete inventory of greenhouse gas (GHG) emissions and removals for the years 1990 – 2004 is contained in an annex to this report. Liechtenstein's assigned amount is calculated on the basis of this inventory. The inventory comprises of the Common Reporting Format tables for the years 1990 – 2004 and of Liechtenstein's National Inventory Report 2004.

1.2. *Development and current state of the inventory*

1.2.1. Past development

Liechtenstein ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995 and the Kyoto Protocol in 2004. Liechtenstein submitted National Communications to the secretariat of the UNFCCC in 1995, 2001 and 2006. A National Inventory System (NIS) according to Article 5.1 of the Kyoto Protocol has now been implemented.

A first preliminary greenhouse gas inventory (without National Inventory Report) was submitted in the Common Reporting Format (CRF) in 2005. On 31 May 2006 Liechtenstein submitted two inventories for 1990 and 2004 in the CRF accompanied by Liechtenstein's first National Inventory Report (OEP 2006).

The current report is the second submission in 2006, which includes, beside a number of improvements and corrections, a complete time series 1990–2004 of all the sectors for the first time. The LULUCF sector has for the first time been calculated by means of the IPCC Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC 2003), which has not been available yet for the submission in May 2006.

¹ FCCC/SBSTA/2004/8

1.2.2. Completeness

Liechtenstein's current GHG inventory is now for the first time completed for all Kyoto gases and includes for the first time LULUCF CRF tables. The emissions of precursors (NO_x, CO, NMVOC, SO₂) are in general not estimated and not reported (not mandatory). However, the CO and NMVOC emissions from source category 3 Solvent and Other Product Use have been estimated in a preliminary way based on Swiss data.

1.2.3. Time series consistency

Time series for all sources are consistent.

1.2.4. Reporting and record keeping

The inventory is implemented using the UNFCCC CRF Reporter software Version 3.0.

No formal QA/QC system exists for Liechtenstein's GHG inventory. It is important to take note of the specific circumstances of the Principality of Liechtenstein: Due to the small size of the country, not every process, data flow and arrangement is established by a formal agreement, because of short "distances" between persons within the administration and due to a high degree of acquaintance between the limited number of persons involved. Therefore, the national system is managed with a small number of written documents.

Nevertheless, the following QC activities are carried out:

- Several meetings of the Inventory Group and several meetings of governmental and other data suppliers with the Office of Environmental Protection are carried out during the annual cycle of the preparation of the inventory. During these meetings the activities, responsibilities and schedule for the inventory preparation process are being organised and determined.
- The group "Umwelt und Raum" (environment and spatial planning) holds regular meetings. The group is formed by the heads of the Office of Environmental Protection, the Office of Land Use Planning, the Office of Forest, Nature and Landscape, and the minister for the environment. It prepares policy matters for the attention of the Government including climate affairs.
- The project manager, the sectoral experts and the NIR authors accomplish a number of QC activities:
 - The NIR authors check the emission results produced by the sectoral experts, for consistency of cross-cutting parameters, correctness of emissions aggregation and completeness of the GHG inventory. They compare the methods used with IPCC Good Practice Guidance, check the correct compiling of the methods in the NIR, the correct transcription of CRF data into NIR data tables and figures, the consistency between data tables and text in the NIR, the completeness of references in the NIR, and are responsible for the correctness of the key source and the uncertainty analysis.
 - The sectoral experts check the description of methods, numbers and figures in the NIR.
 - Further staff members of the Office of Environmental Protection carry out a proof reading of single sectors.
 - The project manager executes an overall checking function for the GHG inventory and the NIR: He monitors the GHG emission modelling and the key category analysis. He checks the NIR for correctness, completeness, transparency and

quality, checks for the complete archiving of documents, and the completeness of the CRF submission document.

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

Emissions and Removals 1990	CO ₂	CH ₄	N ₂ O	HFCs	PFCs	SF ₆	Total
	CO ₂ equivalent (Gg = 1000 tonnes)						
1 All Energy	201.53	1.05	0.83				203.41
2 Industrial Processes	NA,NO	NA,NO	NA,NO	0.00	NA,NO	NA,NO	0.00
3 Solvent and Other Product Use	1.53		0.46				1.99
4 Agriculture		11.70	12.00				23.70
6 Waste	NA,NO	0.43	0.89				1.32
Total (without LULUCF)	203.05	13.18	14.19	0.00	NA,NO	NA,NO	230.42
5 Land Use, Land-Use Change and Forestry (LULUCF)	-7.35	NO	NO				-7.35
International Bunkers	0.43	0.00	0.00				0.43

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

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)	203.05	210.77	211.66	219.97	206.05	209.38	211.55	223.84	235.13	234.28
CH ₄	13.18	13.04	12.95	12.24	12.43	12.49	12.62	12.44	12.52	12.41
N ₂ O	14.19	14.34	14.33	13.89	13.77	13.86	13.59	13.53	13.24	13.11
HFCs	0.00	0.00	0.01	0.05	0.15	0.39	0.66	1.04	1.38	1.81
PFCs	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
SF ₆	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	0.00	0.00	0.00	0.00
Total (without LULUCF)	230.42	238.15	238.95	246.15	232.39	236.12	238.42	250.84	262.27	261.61

Greenhouse Gas Emissions	2000	2001	2002	2003	2004
	CO ₂ equivalent (Gg = 1000 tonnes)				
Gross CO ₂ emissions (without LULUCF)	227.52	225.61	230.54	240.01	240.18
CH ₄	12.22	12.94	13.52	13.91	14.31
N ₂ O	12.83	12.87	12.82	12.85	12.85
HFCs	2.31	2.92	3.16	3.44	3.95
PFCs	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
SF ₆	0.02	0.04	0.05	0.05	0.06
Total (without LULUCF)	254.90	254.37	260.09	270.26	271.33

Table 2 GHG emissions in CO₂ equivalent (Gg) by gas, 1990-2004.

The **Energy** sector is the most important source of greenhouse gas emissions in Liechtenstein. In 2004, 242.01 Gg CO₂ equivalent were emitted in this sector, which corresponds to 89.2% of total emissions (271.33 Gg CO₂ equivalent, without LULUCF). An increase of 19% of Energy related emissions is observed between 1990 and 2004. This fact will become important for Liechtenstein's emission reduction policy to comply with the obligations of the Kyoto Protocol. Within the energy sector, category 1A4 (Other sectors: Commercial/Institutional, Residential) is the largest source with 46.2% of the Energy related greenhouse gas emissions, followed by category 1A3 (Transport) with 35.5% and category 1A2 (Manufacturing Industries and Construction) with 15.4% of the emissions. CO₂ accounts for 99.1% of greenhouse gas emissions in the energy sector in 1990 and for 98.9% in 2004. Energy data in Liechtenstein are robust, but the fact that Liechtenstein forms a customs union with Switzerland and the resulting lack of customs statistics impacts data quality. A significant effort has been undertaken to improve the data basis. The country's energy statistics were revised to correct some inconsistencies. In some cases it was necessary to rely on interpolations. However, no interpolations were used for determining the 1990 base year emissions from Energy.

Please note that for the Swiss greenhouse gas inventory, the data for source category 1A Fuel Combustion from the Swiss Overall Energy Statistics (in TJ) is corrected for the fuel

consumption in Liechtenstein (FOEN 2006). In the Swiss GHG Inventory, the fuel consumption in Liechtenstein is subtracted from the fuel consumption from the Swiss Overall Energy Statistics (that includes Liechtenstein's consumption). Therefore, a potential overestimation (underestimation) of fuel consumption in Liechtenstein is fully compensated by a related underestimation (overestimation) of fuel consumption in Switzerland.

The **Industrial Processes** sector emitted 4.00 Gg CO₂ equivalent in 2004, which corresponds to 1.5% of total emissions (271.33 Gg CO₂ equivalent, without LULUCF). Emissions in this sector were almost non-existent in 1990. The source of these emissions are HFC emissions from refrigeration and air conditioning equipment as well as some SF₆ emissions from electrical equipment (Category 2F, Consumption of Halocarbons and SF₆).

The **Solvent and Other Product Use** sector is the smallest source of greenhouse gas emissions in Liechtenstein. It accounted for 1.10 Gg CO₂ equivalent in 2004, which corresponds to 0.4% of total greenhouse gas emissions (271.33 Gg CO₂ equivalent, without LULUCF). Emissions decreased by 45% from 1990 to 2004. Two reduction efforts are responsible for the decrease of the emissions: The limitation of the application of NMVOC brought by the legal restrictions (Government 1986 and 2003) and the introduction of the VOC-levy in 2000 in Liechtenstein and Switzerland (based on the Customs Union Treaty the Swiss VOC-levy is also applicable in Liechtenstein). The emissions of NMVOC, CO₂ and N₂O are all calculated from the corresponding Swiss emissions by using the specific emission per inhabitant as conversion factors.

The **Agriculture** sector is the second largest sector in terms of greenhouse gas emissions. It emitted 22.51 Gg CO₂ equivalent in 2004, which corresponds to 8.3% of total emissions (271.33 Gg CO₂ equivalent, without LULUCF). There was a decrease in emissions by 5.0% from 1990 to 2004. Main agricultural sources of greenhouse gases in 2004 were enteric fermentation emitting CH₄ equivalent to a share of 46.2% of CO₂ equivalent emissions within the Agriculture sector, and N₂O emissions from agricultural soils with a share of 39.1%. CH₄ emissions were higher in 2004 than 1990 due to higher emission factors for dairy cattle and an increase of the number of some animal populations. N₂O emissions decreased mainly due to a reduced input of mineral fertilizers and due to a reduction of organic soils. Activity data stems from Liechtenstein's Office of Agriculture agricultural statistics, methods and emission factors are in many cases adapted from the Swiss NIR, or from IPCC.

The **Waste** sector accounted for 1.7 Gg CO₂ equivalent in 2004, which corresponds to a relatively small part, 0.6%, of total emissions (271.33 Gg CO₂ equivalent, without LULUCF). Emissions from this sector increased by 29% between 1990 and 2004. This is mostly due to the increase in composting activities in the country, reducing the amount of municipal solid waste exported for incineration to Switzerland. In 2004, 58.0% of the greenhouse gas emissions within the Waste sector stemmed from the category 6B "Waste-water Handling" (mostly N₂O emissions), 41.7% from the sub-category 6D "Others" (mostly CH₄ emissions), and 0.3% from 6C "Waste Incineration" (mostly CH₄ emissions). Liechtenstein exports its municipal solid waste for incineration to Switzerland. Activity data stems from Liechtenstein's waste statistics, methods and emission factors are adapted from the Swiss NIR, or from IPCC.

Land Use, Land-Use Change and Forestry (LULUCF): In all the years 1990–2004, growth of biomass exceeds the harvesting and mortality rate. The growth of biomass in forests results in mean removals of -69 Gg CO₂, whereas harvesting and mortality sum up to mean emissions of 50 Gg CO₂. Compared to these biomass changes in forests, the net CO₂ equivalent emissions arising from all land-use changes and from the soils are relatively small. They are dominated by "Cropland remaining cropland". The mean emission of these aggregated categories form a net source of average 12 Gg CO₂. In total, the LULUCF sector of Liechtenstein is a net sink, varying between -9.4 and -3.9 Gg CO₂ over the time period 1990–2004.

2. Base year for HFCs, PFCs and SF₆

The time series for emissions of hydrofluorocarbons (HFCs), and sulphur hexafluoride (SF₆) in Liechtenstein are illustrated in Table 3. Perfluorocarbons (PFCs) are not occurring in Liechtenstein.

2F Consump. of Halocarbons and SF ₆	Gas	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		Gg CO ₂ eq														
2F1 Refrigeration and Air Cond. Eq.	HFC	8.E-06	2.E-03	0.01	0.05	0.15	0.39	0.66	0.98	1.27	1.70	2.20	2.79	3.05	3.38	3.88
2F4 Metered Dose Inhalers	HFC	NO	NO	NO	NO	NO	NO	NO	0.06	0.11	0.10	0.10	0.13	0.10	0.05	0.06
2F8 Electrical Eq.	SF ₆	NO	NO	NO	NO	NO	NO	NO	NO	NO	0.00	0.02	0.04	0.05	0.05	0.06
2F Total	all	8.E-06	2.E-03	0.01	0.05	0.15	0.39	0.66	1.04	1.38	1.81	2.32	2.96	3.21	3.49	4.00

Table 3 Time series of emissions of synthetic gases (F-gases).

Article 3.8 of the Kyoto Protocol gives Parties the option of selecting 1995 instead of 1990 as the base year for synthetic gases. For source 2F7 Electrical Equipment, data from Liechtenstein's utility is used to determine the emission of SF₆. For the rest of sources of synthetic gases, Liechtenstein has no country-specific data for the calculation of the emissions. For the most relevant source category 2F1 Refrigeration and Air Conditioning Equipment, Liechtenstein follows the Swiss data with an elementary transformation scheme. Since Switzerland chooses 1990 as base year, Liechtenstein adopts the same base year:

Liechtenstein has chosen 1990 as the base year for emissions of HFCs, PFCs and SF₆.

3. Calculation of assigned amount

The rules to calculate the assigned amount are defined by Article 3, paragraphs 7 and 8 of the Kyoto Protocol, taking into account Decision 13/CMP.1². This decision was based on Article 7 paragraph 4 of the Kyoto Protocol, which provides that the "Conference of the Parties serving as the meeting of the Parties to this Protocol shall also, prior to the first commitment period, decide upon modalities for the accounting of assigned amounts".

According to 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, or the base year or period determined in accordance with paragraph 5 above, multiplied by five. Those Parties included in Annex I for whom land-use change and forestry constituted a net source of greenhouse gas emissions in 1990 shall include in their 1990 emissions base year or period the aggregate anthropogenic carbon dioxide equivalent emissions by sources minus removals by sinks in 1990 from land-use change for the purposes of calculating their assigned amount".

Article 3 paragraph 8 allows to choose the year 1995 as the base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride.

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

Pursuant to Decision 13/CMP.1, Annex, paragraph 5, emissions from "land-use change and forestry" mentioned in Article 3 paragraph 7 are to be understood as all emissions by sources and removals by sinks under category 5 (LULUCF) of the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. The "aggregate anthropogenic carbon dioxide equivalent emissions by sources minus removals by sinks" to be included in the base year refer to the emissions in relation to the conversion of forests (deforestation).

As the percentage inscribed for Liechtenstein in Annex B is 92%, the assigned amount is equal to 92% of its aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A in the base year.

The base year for all of the anthropogenic greenhouse gas emissions listed in Annex A of the Kyoto Protocol is 1990.

LULUCF did not constitute a net source of greenhouse gas emissions in Liechtenstein in 1990 (see Table 1). Liechtenstein has therefore no obligation to include the net emissions or removals due to the conversion of forests in the emissions in the base year. Consequently, the assigned amount is calculated without taking into account these base year removals in the LULUCF sector.

Article 4 of the Kyoto Protocol contains provisions for Parties to fulfil their commitments under Article 3 jointly. Liechtenstein did not conclude an agreement to fulfil its commitment jointly with other Parties. Therefore, Liechtenstein's assigned amount, calculated according to Article 3, is not modified by any Article 4 agreement.

Liechtenstein's assigned amount is calculated as shown in Table 4.

Base year emissions [Gg CO ₂ equivalent]	Base year emissions times 5 [Gg CO ₂ equivalent]	Percentage according to Annex B [%]	Calculated assigned amount [Gg CO ₂ equivalent]
230.42	1152.11	92%	1059.94

Table 4 Calculation of Liechtenstein's assigned amount³.

The calculated assigned amount of Liechtenstein is 1059.94 Gg CO₂ equivalent (1.05994 million tonnes CO₂ equivalent).

³ Note that the calculations are carried out with the original values reported in the CRF tables, which contain more decimal places than presented here. Therefore a small rounding difference appears when a re-calculation is made only on the basis of the values presented here with two decimal places.

Part 2

4. Calculation of the commitment period reserve

The calculation of the commitment period reserve is carried out according to the rules provided by Decision 11/CMP.1,⁴ annex, paragraph 6, which states: „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 lowest.“

Liechtenstein considers that the „most recently reviewed inventory“ refers to the inventory which is submitted with the present Initial Report. This inventory will be subject to a review process before the beginning of the commitment period. The inventory is understood to be calculated without LULUCF emissions/removals.

In order to determine which of the two methods to calculate the commitment period reserve results in the lower value, the results of both methods are indicated in Table 5.

Method 1		Method 2	
Assigned amount calculated pursuant to Art. 3, para. 7 and 8 of the Kyoto protocol (five times 92% of 1990 emissions, see Table 4) [Gg CO ₂ equivalent]	1'059.94	2004 emissions without LULUCF (see Table 2) [Gg CO ₂ equivalent]	271.33
90% of the assigned amount [Gg CO ₂ equivalent]	953.94	100% of five times the 2004 emissions without LULUCF [Gg CO ₂ equivalent]	1356.66

Table 5 Calculation of Liechtenstein's commitment period reserve³.

Method 1 results in the lower value and is therefore used to calculate the minimum amount of the commitment period reserve.

The commitment period reserve of Liechtenstein should not drop below 953.94 Gg CO₂ equivalent (0.95394 million tonnes CO₂ equivalent).

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

5. Selected definitions for reporting under Article 3, paragraphs 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) list the definitions to be specified by Parties. For forest, Liechtenstein chooses the following definition (see Figure 1):

The following definitions are identical to Switzerland's definition (see Part II, Section E of Swiss Initial Report, FOEN 2006)

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.

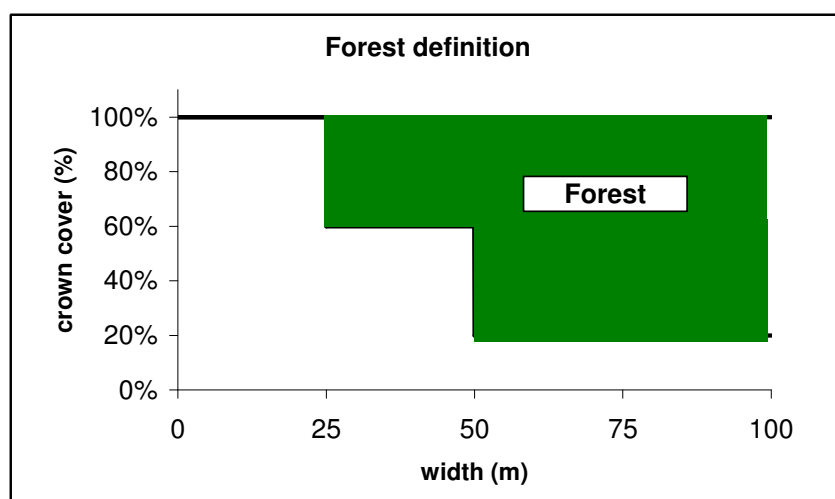


Figure 1 Forest definition applied in Liechtenstein's Land Use Statistics (AREA), which is used for Kyoto reporting.

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 both criteria:

- a) afforested area on land not under forest cover for 50 years (afforestations);
- b) regenerated forest, as well as burned, cut or damaged areas situated on land classified as forest.

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.

For reporting under the Convention and the Kyoto Protocol, Liechtenstein 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. For Liechtenstein, the Land Use Statistics has been built up identically to Switzerland (same method and data structures, same realisation). 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 are derived from Liechtenstein-specific area data and Swiss carbon factors (FOEN 2006).

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 m²) is fulfilled, and
- (b) the conversion is a direct human-induced activity.

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

Deforestation is prohibited by the National Law on Forests with article 6 (Government 1991). Exceptions need governmental authorisation. To ensure that the total area of forest does not decrease, areas affected by direct human-induced deforestation have to be compensated (article 7, Law on Forests), mainly by afforestation of the same spatial extent. 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.

Reforestation

Reforestation does not occur in Liechtenstein. Therefore no definition is expressed.

Definition of deforestation

Deforestation is the permanent conversion of land area fulfilling the definition of forest in terms of minimum forest area (625 m²) to an area not fulfilling the definition of forest as a consequence of direct human influence.

In Liechtenstein, human-induced deforestation is subject to authorisation as mentioned above. Authorisations include the obligation to regenerate the forest area within a few years. Nevertheless such land-use change is classified as permanent deforestation and accordingly accounted for under Article 3, paragraph 3 of the Kyoto Protocol.

6. Elected activities under Article 3, paragraph 4

Liechtenstein has elected to not account for LULUCF activities under Article 3.4 during the first commitment period⁵.

7. Choice of accounting periodicity for activities under Article 3, paragraph 3 and 4

According to paragraph 25 of the annex to decision 13/CMP.1, 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.

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

8. Description of the National Inventory System

It is important to take note of the specific circumstances of the Principality of Liechtenstein as mentioned in the Foreword: Due to the smallness of the state and the close links with Switzerland, Liechtenstein adopted many system elements from Switzerland as far as applicable. In Liechtenstein fewer people are involved in the inventory and reporting processes than in Switzerland (let alone larger states). Therefore, the National System is managed with a small number of written documents.

The description of Liechtenstein's National Inventory System (NIS) follows the structure of the "Guidelines for National Systems under Article 5, paragraph 1, of the Kyoto Protocol"⁶. The relevant (sub)paragraphs are mentioned in the title of each section or subsection.

8.1. General functions

8.1.1. Institutional, legal and procedural arrangements (paragraph 10a)

Liechtenstein's National Inventory System (NIS) is developed and managed under the auspices of the Office of Environmental Protection (OEP). As stipulated in the Decision of the Government of 13 June 2006⁷, this agency has the lead within the national administration regarding climate reporting (greenhouse gas inventory, CRF tables, National Inventory Report, Initial Report).

⁵ Regierung des Fürstentums Liechtenstein: Kyoto-Protokoll – Initial Report – Anrechnung von Senken, RA 2006/2168-8642, Vaduz, 05.09.2006

⁶ Decision 19/CMP.1, annex, paragraphs 10–17 (FCCC/KP/CMP/2005/8/Add.3)

⁷ Regierung des Fürstentums Liechtenstein: Klimainventar und Inventory Report 2006 – Vorbereitung Initial Report, RA 2006/1528-8642, Vaduz, 13.06.2006

In 2005, the Office of Environmental Protection started its activities for the establishment of the National System 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 preparation process is based on the following elements:

- Government Decisions affecting roles and responsibilities of inventory and reporting activities⁸, preparation of National Registry⁹, election of activities under Article 3, paragraph 4 of the Kyoto Protocol¹⁰.
- Several contracts with external experts to support the administration in the setup of the greenhouse gas inventory, in the compilation of the National Communications, National Inventory Report, Initial Report and in the establishment of the National System^{11,12}
- Updating of the national greenhouse gas inventory¹³
- Setting-up of a simple QC system¹⁴
- Official consideration and approval of data
- Data documentation and storage : The OEP is directly linked to the central IT department of the state administration, which follows the rules for saving and archiving of files as requested by the Office of Human and Administrative Resources (Amt für Personal und Organisation).

⁸ Regierung des Fürstentums Liechtenstein: Klimainventar und Inventory Report 2006 – Vorbereitung Initial Report, RA 2006/1528-8642, Vaduz, 13.06.2006

⁹ Regierung des Fürstentums Liechtenstein: Kyoto-Protokoll – Nationales Register - Vertragsverhandlungen, RA 2006/909-8643, Vaduz, 12.04.2006

¹⁰ Regierung des Fürstentums Liechtenstein: Kyoto-Protokoll – Initial Report – Anrechnung von Senken, RA 2006/2168-8642, Vaduz, 05.09.2006

¹¹ Regierung des Fürstentums Liechtenstein: National Inventory Report 2006 - Vorstudie, RA 2005/3068-8642, Vaduz, 14.12.2005

¹² Regierung des Fürstentums Liechtenstein: Klimakonvention – Resubmission 2006 – National Inventory Report und Initial Report, RA 2006/2075-8642, Vaduz, 16.08.2006

¹³ Regierung des Fürstentums Liechtenstein: Klimakonvention - Resubmission 2006 - Vervollständigung der Treibhausgasinventare, RA 2006/2076-8642, Vaduz, 16.08.2006

¹⁴ INFRAS: Minutes to the meeting of 24 Oct 2006 at OEP (Submission-Dec-06-Protokoll-061024.pdf)

Institutional setting

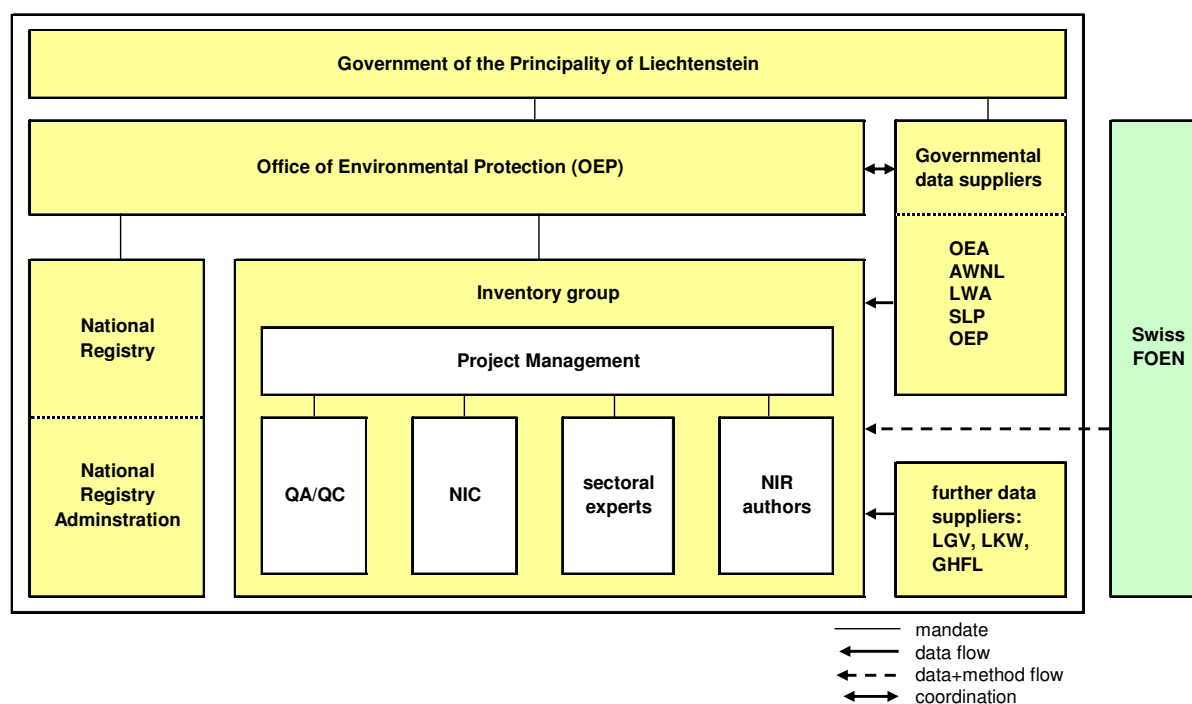


Figure 2 National Inventory System: Institutional setting

The **Government of the Principality of Liechtenstein** bears the overall responsibility for the NIS. The Government is responsible for the official consideration and approval of the submission documents.

The **Office of Environmental Protection (OEP)** plays a major role in the National Inventory System. Liechtenstein's Government mandated the realisation of the NIS to its Office of Environmental Protection. According to the Air Pollution Control Act, the Office of Environmental Protection is in charge of establishing emission inventories and is therefore also responsible for all aspects concerning the establishing of the National Inventory System (NIS) under the Kyoto Protocol. The responsibility of the OEP for establishing the NIS is also described in the report of the Government to the parliament for ratifying the Kyoto Protocol¹⁵. The head of the OEP is the project manager of the inventory group and the National Registry Administrator. He also coordinates the data flow from the governmental data suppliers to the Inventory Group.

The **Inventory group** consists of the project manager, the responsible person for the QC activities, the National Inventory Compiler (NIC), all represented by the head of the OEP. Furthermore several external experts belong to the Inventory Group: Sectoral specialists for modelling the greenhouse gas emissions and removals and the NIR authors.

Among the **governmental data suppliers** there are:

- Office of Economic Affairs (AVW)
- Office of Forest, Nature and Landscape (AWNL)
- Office of Agriculture (LWA)
- Office of Land Use Planning (SLP)

¹⁵ Bericht und Antrag Nr. 76/2004 der Regierung an den Landtag

- Office of Environmental Protection (OEP)

Further data suppliers are

- Co-operation for the storage of gas oil in the Principality of Liechtenstein [Genossenschaft für Heizöl-Lagerhaltung im Fürstentum Liechtenstein (GHFL)]
- Liechtenstein's Gas Utility Liechtensteinische Gasversorgung (LGV)
- Electric power company Liechtensteinische Kraftwerke (LKW)
- Abwasserzweckverband (AZV)
- Heliport Balzers (Rhein Helikopter AG)

National Registry

Liechtenstein cooperates with Switzerland and Monaco for the setting-up and operation of the IT-Platform (hardware and software) for the National Registry. Switzerland is responsible for the hosting of the registries of these Parties on servers physically located in Switzerland. The three National Registries are maintained as independent systems with independent registry administrators.

Swiss FOEN

The Swiss Federal Office for the Environment (FOEN) is the agency that has the lead within the Swiss federal administration regarding climate policy and its implementation. FOEN and OEP cooperate in the inventory preparation. Due to the customs treaty of the two states, the import statistics in the Swiss overall energy statistics also include the fossil fuel consumption of the Principality of Liechtenstein (SFOE 2005). FOEN therefore corrects its fuel consumption data by subtracting Liechtenstein's fuel consumption from the data provided in the Swiss overall energy statistics¹⁶. To that aim, OEP calculates its energy consumption and provides FOEN with the data. FOEN, on the other hand, makes a number of methods and emission factors available to OEP (mainly transportation, agriculture, LULUCF). Liechtenstein has benefited to a large extent from the methodological support by the inventory core group within the Swiss Federal Office of the Environment (FOEN) and its readiness to share very openly data, documents and spreadsheet-tools. Its kind support is herewith highly appreciated (see also Chapter Acknowledgement).

8.1.2. Capacity for performance of general functions (paragraph 10b)

A description of the organisational structure of the NIS 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. The Government has committed the governmental offices directly involved in inventory preparation to make available the necessary resources to perform their tasks (see footnote 7). For this purpose, the Government has created an additional position in the OEP, starting end of 2006. The new collaborator will be concerned with the implementation of the Kyoto Protocol, especially with the implementation of the NIS.

¹⁶ with one exception: kerosene consumption of a helicopter base in Liechtenstein is doubly counted in Liechtenstein and Switzerland, and the – small – amount of resulting CO₂ is doubly reported in the CRF of both countries.

8.1.3. Entity with overall responsibility (paragraph 10c)

The Government delegated its responsibility for coordinating the implementation of any related reporting commitments including the GHG inventory and the National Inventory Report to the Office of Environmental Protection (OEP). Primarily, the OEP is responsible for recording and maintaining an emission inventory (paragraph 32 of the national law on air pollution control, see Government 2003). As well, a national law on climate protection is in preparation, which will define tasks and responsibilities to fulfil the obligations derived from the United Nations Convention on Climate Change (UNFCCC) and the Kyoto Protocol.

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8.1.4. Provision of information (paragraphs 10d, 10e)

Until today, Liechtenstein provided all information that has to be submitted according to the obligations of the United Nations Framework Convention on Climate Change (UNFCCC) to the secretariat. It is the priority objective of Liechtenstein's government to do this also in the future years and also for the supplementary information to be submitted under obligations arising from the Kyoto Protocol.

To complete the additional tasks in the future years, the government created a supplementary position in the OEP for climate reporting and implementing the NIS as mentioned above.

8.2. *Specific functions*

8.2.1. Inventory planning (paragraphs 12-13)

Entity with overall responsibility; contact information (paragraphs 12a-b): See section 8.1.3 above.

Roles, responsibilities and arrangement for cooperation (paragraph 12c): See section 8.1.1 above.

QA/QC plan (paragraph 12d):

- The annual cycle for inventory preparation contains several meetings of the Inventory Group and several meetings of governmental and other data suppliers with the OEP. On these meetings the activities, responsibilities and schedule for the inventory preparation process are being organised and determined.

- Regular meetings of the group “Umwelt und Raum” (environment and spatial planning). The group is formed by the heads of the OEP, SLP, AWNL and the minister for the environment and staff members of the ministry of transport and the Office of Civil Engineering. It prepares policy matters for the attention of the Government including climate affairs like the choice of LULUCF activities under Article 3.4 of the Kyoto Protocol.
- There is no formal QA/QC system for Liechtenstein's GHG inventory. Nevertheless, the project manager, the sectoral experts and the NIR authors have implemented a simplified QC system: The NIR authors check the emission results produced by the sectoral experts, the sectoral experts check the description of methods, numbers and figures in the NIR, and further staff members of the OEP carry out a proof reading of single sectors. Finally, the project manager executes an overall checking function for the GHG inventory and the NIR¹⁷.

Official consideration and approval; response to the Art. 8 review (paragraph 12e): The process for the official consideration and approval of the inventory as well as any recalculations are defined in the Inventory Group. The group will also suggest arrangements to further experts, as necessary. The formal consideration and approval is carried out by the Government.

Inventory improvement (paragraph 13): Liechtenstein has made big efforts in the last year to achieve conformity of its inventory with defined quality standards, and to comply with the principles of transparency, consistency, completeness, comparability and accuracy. So far, only selected emission data for single years was available. For the current submission, this data was analysed, updated and completed by estimating the missing emissions resulting in the generation of full time series 1990-2004. Several methods and emission factors were adopted from Switzerland. In cases where activity data and emission factors were not available, estimates based on Switzerland's emission with adequate indicators (population, areas etc.) were carried out.

8.2.2. Inventory preparation (paragraphs 14-15)

Paragraph 14a: The key category analysis is performed on the basis of the IPCC Good Practice Guidance (chapter 7 in IPCC 2000). The approach to the Tier 1 key category analysis is documented in detail in the NIR annexed to this report.

Paragraph 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-c) and IPCC Good Practice Guidances of (IPCC 2000, IPCC 2003), as adopted by the UNFCCC. An overview of methods used is given in chapter 1.4 of the NIR annexed to this report.

Paragraph 14c,f: Data collection and inventory compilation. The OEP has mandated the emission modelling to an external sectoral expert that maintains the 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 files and/or in the NIR.

Figure 3 illustrates in a simplified manner the data flow leading to the CRF tables required for reporting under the UNFCCC. For roles and responsibilities of the actors see Figure 2.

¹⁷ INFRAS: Minutes to the meeting of 24 Oct 2006 at OEP (Submission-Dec-06-Protokoll-061024.pdf)

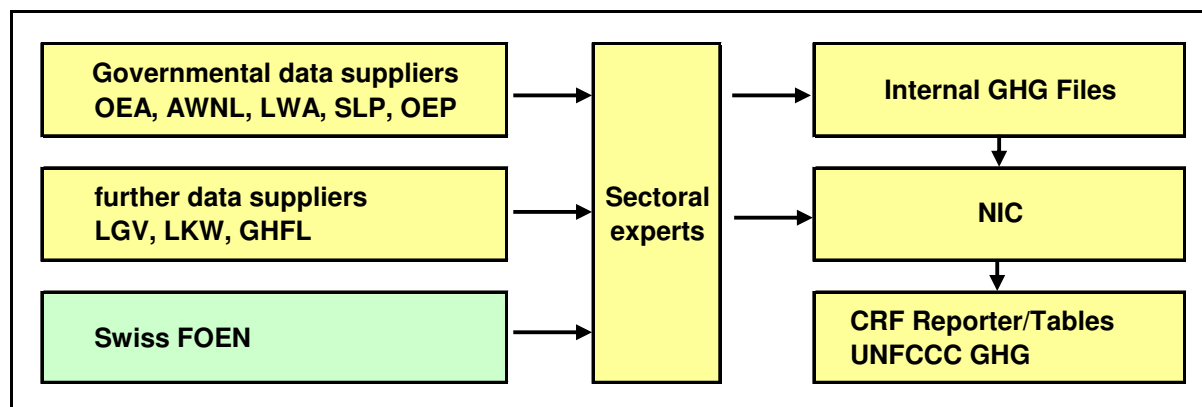


Figure 3 Data suppliers and data collection for setting up the UNFCCC GHG Inventory (see Glossary for abbreviations).

Paragraph 14d: In preparing the GHG inventory, a Tier 1 methodology, as suggested in the IPCC Good Practice Guidance (chapter 6) is used for estimating uncertainties. Detailed information is given in chapter 1.7 of the NIR annexed to this report.

Paragraph 14e: Recalculations for 2003 were performed, driven by the completion and improvement of the inventory. In the future, recalculations may occur due to improvements of emission factors and of activity data. The project management decides whether recalculations will be carried out. All data suppliers will have to apply for recalculations to the inventory project manager who may consider the recalculation of data on the basis of review results. In general, recalculations will be restricted to the inevitable minimum.

Paragraphs 14g, 15a: No formal QC procedures are implemented, see however section 8.2.1, paragraph 12d. The individual data suppliers bear the main responsibility for the quality of data provided. The relevant guidelines, including IPCC Good Practice Guidance, are to be taken into account.

Paragraphs 15b-d: So far, no review of Liechtenstein's GHG Inventory has taken place. For future reviews, the necessary personnel will be provided: Project manager, OEP staff, sectoral experts, NIR authors.

8.2.3. Inventory management (paragraphs 16-17)

Inventory data as well as background information on activity data and emission factors are archived by the sectoral expert that feed the Internal GHG files and the NIC. The CRF tables and the NIR are archived by the project manager of OEP. Electronic documents are archived by the central IT department of the state administration (see Section 8.1.1).

All the background data relevant for the GHG will archived at the sectoral expert. A copy of its data will be transferred to the OEP (responsibility: project manager).

8.3. Description of National Registry

8.3.1. Name and contact information of the registry administrator

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8.3.2. Cooperation with other Parties

Liechtenstein cooperates with Switzerland and Monaco for the setting-up and operation of the IT-Platform (hardware and software) for the National Registry. Switzerland is responsible for the hosting of the registries of these Parties on servers physically located in Switzerland. The three National Registries are maintained as independent systems with independent registry administrators.

The National Registry is based on 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.

8.3.3. Description of the data base structure and capacity of the national registry

For the National Registries of Liechtenstein, Switzerland and Monaco, the Seringas™ system has been implemented using a Microsoft SQL Server relational data base management system with a dedicated data model.

As part of the joint hosting of the three countries registries, the registry systems of Liechtenstein, Switzerland and Monaco are run in parallel on servers physically located in Switzerland. The Information and Communication Technology (ICT) architecture is illustrated by the following diagram (Figure I.2).

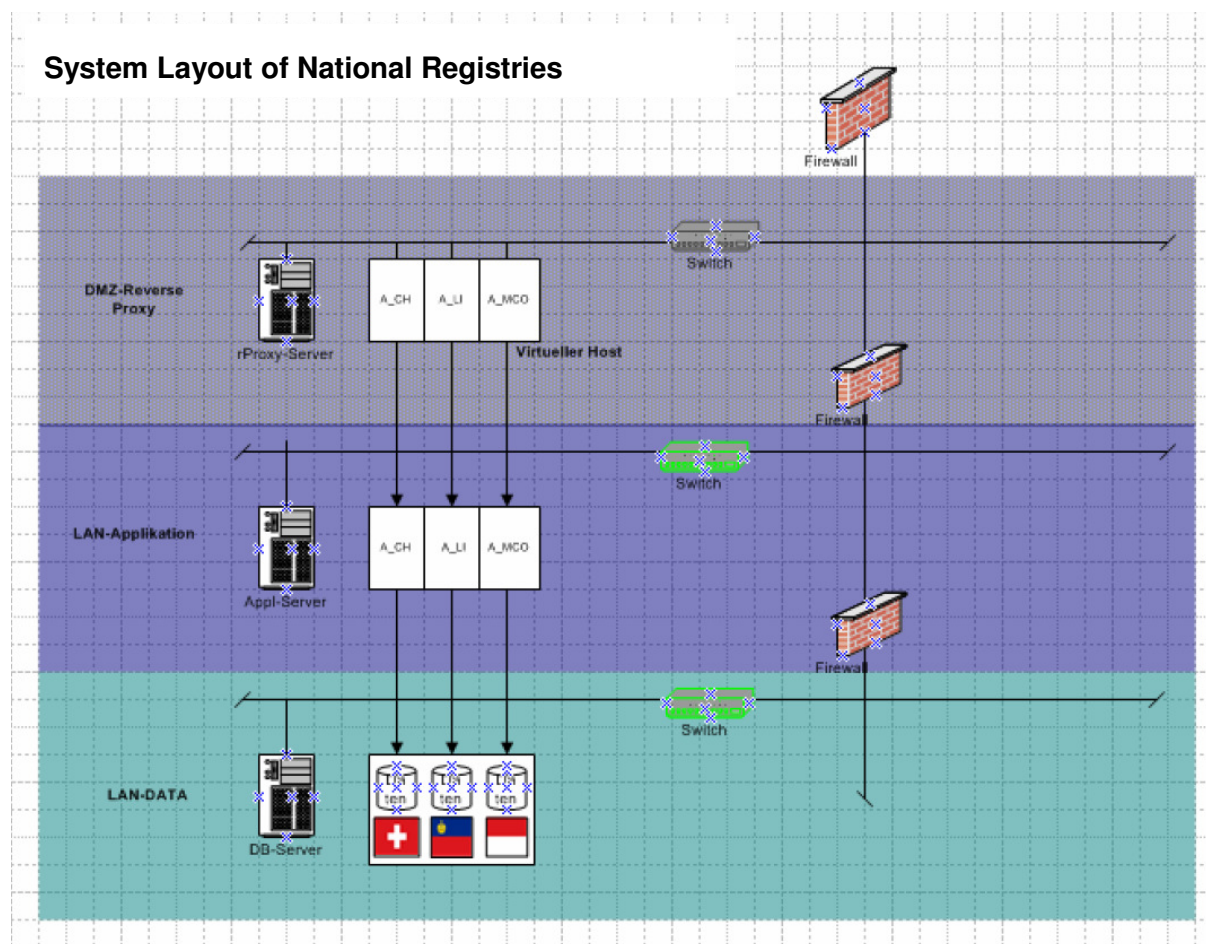


Figure 4 Information and Communication Technology architecture (Source: Initial Report of Switzerland, FOEN 2006).

8.3.4. Conformity to the technical standards for data exchange

Liechtenstein's 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 National Registry of Liechtenstein:

- 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) have been implemented as defined in DES #7.

The following functionalities still have to be implemented:

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

These functionalities are under development.

8.3.5. Procedures employed to minimize and manage discrepancies and to correct problems

The conformity of Liechtenstein's National 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.

8.3.6. 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 in Switzerland; the appropriate physical controls are in place.

The authorities of Liechtenstein are bound to follow the relevant Swiss IT-Security regulations for governmental bodies. System operations are in compliance with the IT security instructions of the Swiss federal administration¹⁸.

8.3.7. Information publicly accessible by means of the user interface

The information that is publicly accessible will be defined in an annex to the user terms and conditions.

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)¹⁹ as well as to paragraphs 1 to 10 of annex XVI of the EU Regulation on Registries (2216/2004).

¹⁸ "Directives du Conseil de l'informatique concernant la sécurité informatique dans l'administration fédérale".

8.3.8. Internet address of the interface to the national registry

The interface to the national registry will be accessible in due course through the website of the Office of Environmental Protection (OEP): <http://www.afu.llv.li>.

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

The planned backup strategy is illustrated in Table 5.

	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			

Table 6 Backup strategy of National Registry (Source: Initial Report of Switzerland).

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.

¹⁹ 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)

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