

# **Lithuania's Initial Report under the Kyoto Protocol**

**Calculation of Assigned Amount under Article 7,  
paragraph 4, of the Kyoto Protocol**



**Ministry of Environment of the Republic of Lithuania  
Vilnius, November 2006**

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## Introduction

Lithuania signed the United Nations Convention on Climate Change (UNFCCC) as an Annex I Party in 1992 and ratified it in 1995. The Kyoto Protocol was signed in 1998 and ratified in 2002. Lithuania undertook to reduce its greenhouse gas emissions by 8% below 1990 levels during the first commitment period 2008-2012.

This Report has been prepared to the UNFCCC, pursuant to Articles 3.7 and 3.8 of the Kyoto Protocol to facilitate the estimation of Lithuania's assigned amount for the commitment period. Each Party included in Annex I with a commitment inscribed in Annex B shall submit this report to the UNFCCC secretariat, prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for the Party, whichever is later (decision 13/CMP.1).

In accordance with decision 13/CMP.1 the Initial report contains the following information or references to such information where it has been previously submitted to UNFCCC secretariat:

1. Complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for the years 1990-2004 prepared in accordance with Article 5, paragraph 2, and relevant decisions of the COP/MOP.
2. Identification of selected base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride in accordance with Article 3, paragraph 8
3. Calculation of assigned amount pursuant to Article 3, paragraphs 7 and 8, on the basis of the inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol.
4. Calculation of commitment period reserve in accordance with decision 11/CMP.1 (*Article 17*)
5. Identification of selection of single minimum values for tree crown cover, land area and tree height for use in accounting for its activities under Article 3, paragraphs 3 and 4, together with a justification of the consistency of those values with the information that has been historically reported to the Food and Agriculture Organization of the United Nations or other international bodies, and in the case of difference, an explanation of why and how such values were chosen, in accordance with decision 16/CMP.1
6. Identification of election of activities under Article 3, paragraph 4, for inclusion in its accounting for the first commitment period, together with information on how its national system under Article 5, paragraph 1, will identify land areas associated with the activities, in accordance with decision 16/CMP.1
7. Identification of whether, for each activity under Article 3, paragraphs 3 and 4, Lithuania intends to account annually or for the entire commitment period

8. A description of national system in accordance with Article 5, paragraph 1, reported in accordance with the guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol
9. A description of national registry, reported in accordance with the guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol

## 1 Lithuania's complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases for the years 1990-2004

In accordance with Article 5, paragraph 2 of the Kyoto protocol and relevant decisions of the COP/MOP Annex I Parties shall develop national greenhouse gas inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol.

Lithuania's greenhouse gas inventory covers the years 1990-2004 (recalculated greenhouse gas emission estimates, submitted to UNFCCC Secretariat in December 2006 together with this report). This is the first time when full set of CRF tables have been prepared and it contains most of the improvements recommended by the UNFCCC experts during in-country review of the 2005 greenhouse gas inventory submission of Lithuania, coordinated by UNFCCC secretariat (*Report of the individual review of the greenhouse gas inventory of Lithuania submitted in 2005, UNFCCC 2005*). For the preparation of the inventory CRF Reporter v.3.0 software has been used.

The greenhouse gas inventory contains information on anthropogenic emissions by sources and removals by sinks 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)"(FCCC/SBSTA/2004/8). Greenhouse gas inventory is compiled in accordance with the methodology recommended by the Intergovernmental Panel on Climate Change (IPCC) in its Revised 1996 Guidelines for National Greenhouse gas Inventories (IPCC, 1997), Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC, 2000) and Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC, 2003).

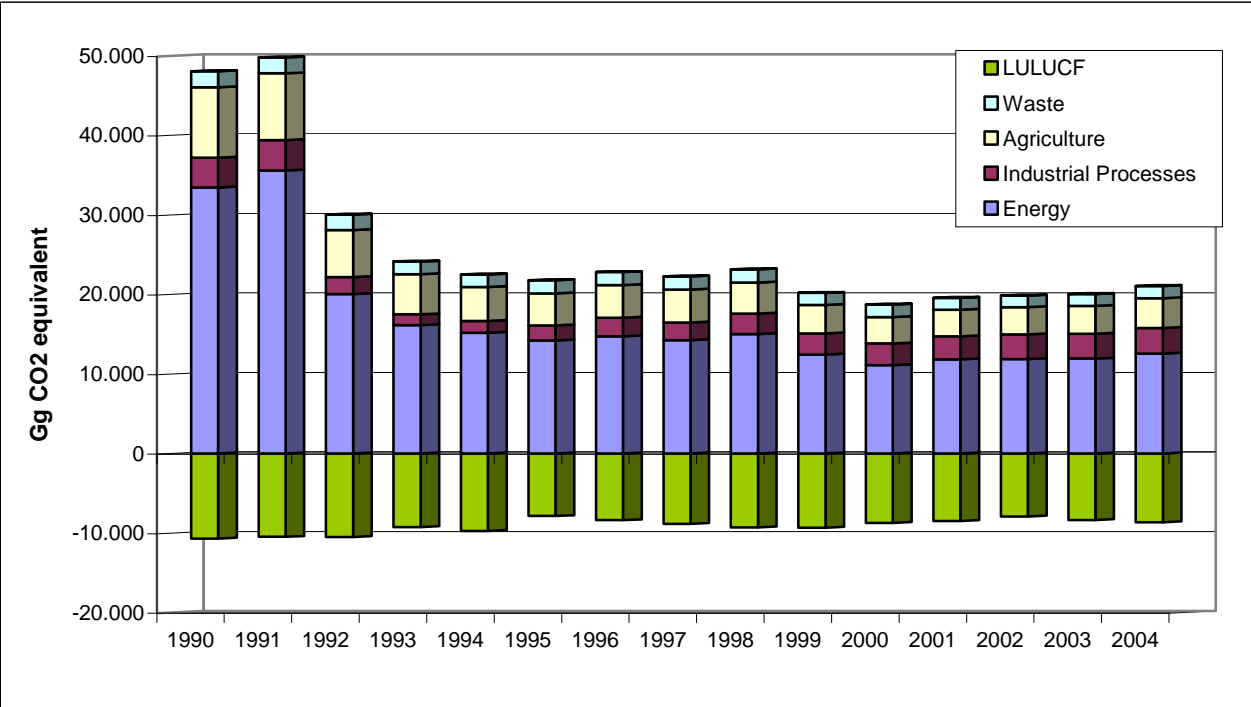
Summary of the greenhouse gas inventory 1990-2004 is provided in the Table below.

**Table 1. Greenhouse gas emissions and removals 1990 to 2004, Gg CO<sub>2</sub> equivalent**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	F-gases	Total (without LULUCF)	LULUCF
<b>1990</b>	35 670	6 146	6 242	-	48 059	-10 700
<b>1991</b>	37 779	5 948	6 050	-	49 777	-10 475
<b>1992</b>	21 074	4 981	3 992	-	30 047	-10 489
<b>1993</b>	16 328	4 236	3 572	-	24 136	-9 234
<b>1994</b>	15 640	3 894	2 984	-	22 518	-9 716
<b>1995</b>	14 961	3 847	2 916	45	21 769	-7 859
<b>1996</b>	15 661	3 816	3 239	91	22 808	-8 381
<b>1997</b>	15 046	3 838	3 378	19	22 281	-8 862
<b>1998</b>	15 890	3 709	3 519	42	23 160	-9 274
<b>1999</b>	13 224	3 451	3 359	158	20 192	-9 309
<b>2000</b>	11 919	3 292	3 471	30	18 712	-8 709
<b>2001</b>	12 690	3 243	3 632	14	19 579	-8 482
<b>2002</b>	12 784	3 211	3 807	35	19 837	-7 931
<b>2003</b>	12 828	3 333	3 868	24	20 053	-8 346
<b>2004</b>	13 431	3 332	4 250	38	21 050	-8 650

In the base year the most important source of emissions was the energy sector, which contributed over 69% of the total emissions without LULUCF. Other contributing sectors include agriculture (18%), industrial processes (8%) and waste (4%) (see Figure 1). More detailed data on Lithuania's GHG inventory is provided in the latest National inventory report.

**Figure 1. Greenhouse gas emissions and removals (Gg CO2 equivalent) in 1990-2004 by reporting sectors**



## **2 Identification of Lithuania's selected base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride**

In accordance with Art. 3.8 of the Kyoto Protocol Lithuania has chosen 1995 as its base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride, for the purposes of calculating its assigned amount in accordance with Article 3.7.

### **3 Calculation of Lithuania's assigned amount on the basis of inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases**

Lithuania's proposal for assigned amount is calculated as the total greenhouse gas emissions (in CO<sub>2</sub> equivalents) in base year multiplied by Lithuania's quantified emission limitation commitment and multiplied by 5. The calculation of the assigned amount is based on the recalculated greenhouse gas emission inventory, submitted together with this report.

Greenhouse gas (except HFCs, PFCs and SF <sub>6</sub> ) emission in base year (1990)	48 058 810 tonne
HFCs, PFCs and SF <sub>6</sub> emissions in base year (1995)	44 654 tonne
Total greenhouse gas emissions in base year	48 103 464 tonne
Lithuania's quantified emission limitation commitment	92 %

**Lithuania's assigned amount = 48 103 464 tonne \* 92% \* 5 = 221 275 934 tonne CO<sub>2</sub> equivalent.**



#### 4 Calculation of Lithuania's commitment period reserve

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.

Proposed assigned amount (Section 3)	221 275 934 tonne
Most recently reviewed inventory emission (2004, Section 1)	21 050 311 tonne
90% of the proposed assigned amount	199 148 340 tonne
5 times most recent inventory	105 251 557 tonne

**Lithuania's commitment period reserve is 105 251 557 tonne CO<sub>2</sub> equivalent.**

## **5 Identification of selection of single minimum values for tree crown cover, land area and tree height for use in accounting for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol**

Threshold values in forest definition selected in Lithuania are the following:

Minimum tree crown cover	10 %
Minimum area of forest land	0.1 ha
Minimum height reached at maturity <i>in situ</i>	5 m
Minimum width of linear formations	10 m

Temporarily unstocked areas (forest regeneration areas) are included.

Forest definition threshold values are consistent with the information that has been historically reported to the Food and Agriculture Organization of the United Nations.

## **6 Identification of Lithuania's election of activities under Article 3, paragraph 4, for inclusion in its accounting for the first commitment period**

Lithuania has chosen to elect Forest Management as an activity under Article 3, paragraph 4. Lithuanian institutions, especially the State Forest Survey Service, have developed necessary information collection and processing systems and have technical ability to estimate changes in carbon stocks in forests.

Forest areas will be identified within their geographic boundaries encompassing units larger than 0.1 ha. Forest management areas are also determined statistically within squares of 4 km grid.

**7 Identification of whether, for each activity under Article 3, paragraphs 3 and 4, of the Kyoto Protocol Lithuania intends to account annually or for the entire commitment period**

Lithuania has chosen to account for the activities under Article 3, paragraph 3 (afforestation, reforestation and deforestation) and Article 3, paragraph 4 (forest management) for the whole commitment period.

## **8 Description of Lithuania's national system**

### **8.1. Background**

According to Article 5, paragraph 1, of the Kyoto Protocol to the UNFCCC, each Party included in Annex I shall have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases (GHG) not controlled by the Montreal Protocol.

A national system includes all institutional, legal and procedural arrangements made for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases, and for reporting and archiving inventory information.

National system should be designed and operated to ensure the transparency, consistency, comparability, completeness and accuracy of inventories as defined in the guidelines for the preparation of inventories by Parties included in Annex I, in accordance with relevant decisions of the COP and/or COP/MOP.

National system should ensure the quality of the inventory through planning, preparation and management of inventory activities. Inventory activities include collecting activity data, selecting methods and emission factors appropriately, estimating anthropogenic GHG emissions by sources and removals by sinks, implementing uncertainty assessment and quality assurance/quality control (QA/QC) activities, and carrying out procedures for the verification of the inventory data at the national level, as described in these guidelines for national systems.

In this chapter an overview of the Lithuania's national GHG inventory system is given in accordance with national system guidelines under Article 5, paragraph 1 of the Kyoto Protocol (*Decision 19/CMP.1*). More detailed data on Lithuania's GHG inventory is provided in the latest National inventory report.

### **8.2. Institutional arrangements for GHG inventory**

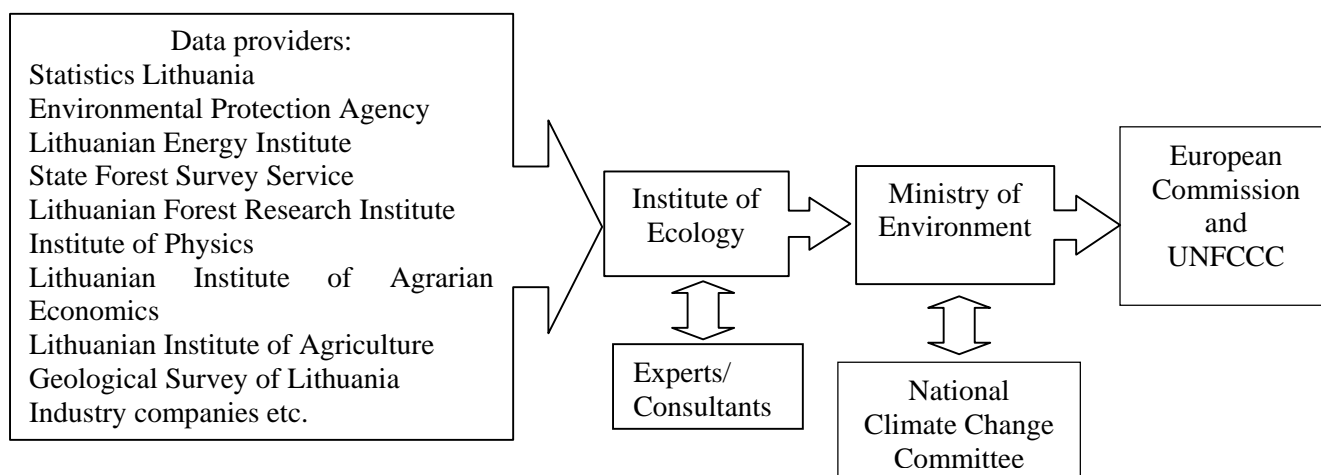
The single entity responsible for the establishment of the yearly GHG inventory and its submission to European Commission and UNFCCC is the Ministry of Environment, Environmental Quality Department, Air Division. The Head of that Division is the Focal Point for all matters related to the UNFCCC and for the climate change activities under the EC.

The national system for the estimation of greenhouse gas emissions is established setting up of inventory preparation group (Inventory Group), which consists of experts from various branches of economy as well as institutions of science and studies. The Group's work is coordinated by the Institute of Ecology. Institute of Ecology is responsible for coordination of the process of annual greenhouse gas inventory, compilation of results, data management and archiving. For estimation of GHG emissions and removals in the LULUCF sector extensive use is made of annual statistics with the aim to obtain the most exact and newest data available in Lithuania.

Ministry of Environment annually submits GHG inventory reports to European Commission and UNFCCC secretariat. Before submission, reports are forwarded to the National Climate Change Committee for final approval. A National Committee on Climate Change has been set up in 2001. It consists of experts from academia, government and non-governmental organizations (NGOs) and has an advisory role. The main objective of the Committee is to ensure attaining the goals related to the restriction of GHG emissions as set in the National Sustainable Development Strategy and implementing the measures for attaining such goals. The Committee also has to organize the implementation of the provisions of the UNFCCC and coordinate compliance with the requirements of the Kyoto Protocol and EU legal acts related to the UNFCCC.

Figure 1 illustrates the structure of the emission inventory system in Lithuania.

### National GHG Inventory System in Lithuania



### 8.3. Data sources

Activity data necessary for the calculation of GHG emissions is collected from published materials, if it is possible. Not published data is gathered from relevant authorities (institutes, industry companies etc.) on the request of the Ministry of the Environment.

The main data providers for GHG inventory estimation are the Department of Statistics under the Government of Lithuania (Statistics Lithuania), State Forest Survey Service and Environmental Protection Agency:

- Statistics Lithuania (Statistical Yearbooks of Lithuania, Sectoral Yearbooks on energy balance, agriculture, commodities, natural resources and environmental protection);
- State Forest Survey under the Service Ministry of Environment (Lithuanian Statistical Yearbooks of Forestry);
- Environmental Protection Agency (waste water and waste data).

Statistics Lithuania has to announce annually under the established procedure the main sustainable development indices in the main annual yearbooks of statistics of Lithuania, with specific indices to be issued in other publications.

State Forest Survey Service is responsible for establishment of national forest inventory and forestry information system, implementation of Lithuania's forests state monitoring, collection and management of statistical data etc. State Forest Survey Service is established under the Ministry of Environment.

The Environment Protection Agency (EPA) is a subsidiary institution of the Ministry of Environment. It is responsible, among others, for environmental quality monitoring, gathering and storing of environmental data and information as well as for assessment and prognosis of environmental quality. One of the main tasks of the EPA is managing, processing and reporting of information.

#### **8.4. GHG inventory development process**

In order to meet the objectives and perform the general functions of the national system, specific functions related to inventory planning, preparation and management should be undertaken. The process of inventory compilation consists of few stages.

##### **8.4.1. Inventory planning**

At the inventory planning stage, organizational and methodological issues are decided and time frame of inventory preparation and reporting is planned.

At the planning stage areas for data improvement are identified, quality objectives are set and new international/national requirements for GHG inventory reporting are taken into account. The work is planned and coordinated in order to ensure timely submission of inventory reports.

##### **8.4.2. Inventory preparation**

The inventory preparation process consists of activity data, emission factors and all relevant information needed for emission estimation collection, inventory calculation, key sources identification, uncertainty evaluation, QA/QC procedures and recalculations of the previously submitted estimates.

#### **Methodologies used for GHG inventory**

Lithuania provided GHG inventory data for the first time in its first National Communication under UNFCCC (1996). Since 2004, inventory is prepared in common reporting format (CRF). In 2006 inventory was prepared using *CRF Reporter* software. The GHG inventory also includes National inventory report (NIR) containing detailed and complete information on inventory. In 2006 for the first time complete time series 1990-2004 has been developed.

The GHG inventories are compiled in accordance with the methodology recommended by the Intergovernmental Panel on Climate Change (IPCC) in its *Revised 1996 Guidelines for*

*National Greenhouse Gas Inventories (IPCC, 1997), Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC, 2000) and Good Practice Guidance for Land Use, Land-Use Change and Forestry (IPCC, 2003).* Emission factors used are either country specific (used for Energy sector, except fugitive emissions) or internationally recommended default factors, mainly those provided in *IPCC Good Practice Guidance* and in *EMEP/CORINAIR Emission Inventory Guidebook*.

Lithuania's GHG emission inventory includes all major emission sources identified by the *IPCC Good Practice Guidance* with some exceptions, which supposed to have minor effect on the total GHG emissions. All Lithuania's territory is covered by GHG inventory.

### Key source categories

Key sources for the GHG inventory are analyzed according to *IPCC Good Practice Guidance*, at the level of IPCC source categories. Level assessment of the key source analysis is conducted every year following the Tier 1 approach. The contribution of each source category to the national total is calculated. Any source category that met the 95% threshold is identified as a key source category.

### Uncertainty evaluation

Uncertainty estimation is implemented using Tier 1 approach of *IPCC Good Practice Guidance*. Quantitative uncertainties assessment was carried out for the emission level 2004 and for 1990-2004 (1995-2004 for F-gases) trend in emissions for all IPCC source categories (except LULUCF & Solvents use) comprising emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFC and SF<sub>6</sub> gases (in CO<sub>2</sub> equivalents). The GHG uncertainty estimates do not take into account the uncertainty of the GWP factors. The sources included in the uncertainty estimate cover 99.9% of the total greenhouse gas emission.

Uncertainties are estimated using combination of available default factors proposed in *IPCC Good Practice Guidance* with uncertainties based on expert judgment, consultation with statistical office. The total GHG emission in the year 2004 is estimated with an uncertainty of  $\pm 9.3\%$  and the trend of GHG emission 1990-2004 has been estimated to be  $\pm 1.9\%$ .

### Quality assurance and quality control

The QA/QC process is intended to ensure transparency and quality of GHG inventory. Elaboration of QA/QC programme which complies with the Tier 1 general inventory level QC procedures outlined in the *IPCC Good Practice Guidance* and formal QA/QC plan is planned to finalize during 2006. Particular attention will be paid to priority areas, such as key source categories.

Several QC activities are carried out each year at the various stages of the inventory compilation process - processing, handling, documenting and performed by cross-checks, recalculations and visual inspections. Those activities are implemented by sectoral experts and inventory compiler. Inventory quality checks procedures became more effective now when complete time series 1990-2004 of GHG inventory were compiled. GHG inventory review and checks are also performed by Air Division of the Ministry of Environment as a part of inventory approval process.



## Recalculations and improvements

All emissions estimates in a time series should be estimated consistently, which means that previously submitted estimates should be evaluated for consistency and recalculated if necessary whenever methods are changed or refined.

In 2006 Lithuania's previous GHG estimates were recalculated using the same methods and consistent data sets over entire time series and full set of CRF tables have been prepared containing most of the improvements recommended by the UNFCCC experts during the last in-country review of the greenhouse gas inventory submission of Lithuania, coordinated by UNFCCC secretariat (*Report of the individual review of the greenhouse gas inventory of Lithuania submitted in 2005, UNFCCC 2005*).

### **8.4.3. Inventory management**

According to Decision 20/CP.7, as a part of its inventory management each Party shall archive inventory information, provide review teams under Article 8 with access to all archived information used to prepare the inventory and respond to requests for clarifying inventory information resulting from the different stages of the review process of the inventory information

All data and information used to develop GHG inventory such as emission factors, activity data etc. for each year is documented and archived in a printed or electronic form by the Inventory group. All this data will be accessible to the expert review teams under Article 8.

## 9 Description of Lithuania's national registry

1. Name and contact information of the registry administrator designated by the Party to maintain the national registry;

Lithuanian Environmental Investment Fund  
Laisves av. 3  
LT-04132 Vilnius  
Lithuania  
Tel. +370 5 216 95 99  
Fax: +370 5 216 93 99  
E-mail: [sdregistras@laaif.lt](mailto:sdregistras@laaif.lt)

2. Any other Party with which the Party cooperates by maintaining their respective registries in a consolidated system

Lithuania's national registry is linked to the operational EU member states' National Registries by way of the European Commission CITL (Community Independent Transaction Log).

3. The description of the database structure used in the national registry.

The registry is implemented using a Microsoft SQL Sever relational database management system with a dedicated data model for supporting registry operations.

The maximum size of a SQL Server 2000 database is 27 gigabytes.

SQL Server database model is also scalable up to 2 processors with max 8 gigabytes of memory.

At the time of writing, Lithuania's registry contains:

- a. 67 organizations (60 operators, 4 legal, 3 verifiers).
- b. with 310 users
- c. with 100 holding accounts (3 Party holding accounts, 93 operator holding accounts, 4 person holding accounts)
- d. with 301 transactions having been performed; and
- e. has a total size of database more than 65 megabytes

Applying a growth of 8 % in organizations (7 new operator holding accounts is foreseen to be opened already), users and accounts we predict that this will result in annual growth in database storage max 10 megabytes per year.

4. A description of the national registry conforms to the technical standards for the purpose of ensuring the accurate, transparent and efficient exchange of data

between national registries, the clean development registry and the independent transaction log.

To ensure the technical standards for purpose of ensuring the accurate, transparent and efficient exchange of data between national registries, daily automated checks and the data reconciliation process is being initiated by the CITL. The process is set in European Commission Regulation No. 2216/2004 for a standardized and secured system of registries pursuant to Directive 2003/87/EC of the European Parliament and of the Council and Decision 280/2004/EC of the European Parliament and the Council.

Lithuania is using GRETA software of EU ETR (European Union Emissions Trading Registry) which is supplied by DEFRA (Department for Environment Food and Rural Affairs of the United Kingdom). DEFRA has been providing Lithuania's national registry Installation Services from the Commencement Date until the Services Commencement Date.

The GRETA registry system has been developed for the EU Emissions Trading Scheme (EU ETS). Under EU ETS requirements its Member States registries have to be compliant with the Data Exchange Standards specified for the Kyoto Protocol. Currently the development of the software adhere to the legal requirements for ITL implementation.