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2 *National Greenhouse Gas*

3 *Inventory System in Finland*

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# 1 *Foreword*

2 Statistics Finland has prepared this description of Finland's Greenhouse Gas Inventory System as part of the reporting  
3 to the UNFCCC to facilitate the estimation of Finland's assigned amount for the commitment period pursuant to  
4 Articles 3.7 and 3.8 of the Kyoto Protocol and to demonstrate Finland's capacity to account for its emissions and  
5 assigned amount.

6 In accordance with the Government resolution of 30 January 2003 on the organisation of climate policy activities of  
7 Government authorities Statistics Finland assumed the responsibilities of the National Authority for Finland's  
8 greenhouse gas inventory 1.1.2005.

9 In Finland the National System as intended in the Kyoto Protocol (Article 5.1) is based, besides regulations  
10 concerning Statistics Finland, on co-operation and agreements between Statistics Finland and expert organisations as  
11 well as the responsible ministries.

12 This report describes the legal, institutional and procedural arrangements of the National System in Finland,  
13 including parties to the system and their responsibilities as well as the quality management methods of the inventory.  
14 Reporting protocols describing the division of responsibilities and tasks in preparing the inventory are appended.  
15 Activities of Statistics Finland as the National Authority are also listed.

16 The report has been reviewed by the ministries participating in the contact network on climate policy issues and it  
17 has been approved by the Cabinet Committee on European Union Affairs meeting on 14 December 2005.

18

Statistics Finland  
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# 1 *Summary*

## 2 *Purpose of the National System*

3 The National System supports compliance with the Kyoto Protocol. In addition to the annual estimation, reporting and  
4 archiving of greenhouse gas emissions and removals, the system contributes to the production of estimates on the actual  
5 effects of the climate policy and forecasts for future development.

6 In Finland the National System is established on a permanent footing in place of the previous, workgroup-based  
7 estimation and reporting of greenhouse gas emissions and removals. The National System guides the development of  
8 emission/removal estimation, reporting and archiving in the manner required by the UNFCCC and the EU Monitoring  
9 Mechanism.

10 The National System ensures the transparency, consistency, comparability, completeness, accuracy and timeliness of  
11 greenhouse gas inventories. The quality requirements are fulfilled by implementing consistently the inventory quality  
12 management procedures.  
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## 14 *Parties to the National System and the regulation basis*

15 The Government resolution of 30 January 2003 on the organisation of climate policy activities of Government  
16 authorities means that Statistics Finland is the National Authority responsible for Finland's greenhouse gas inventory.

17 In Finland the National System as intended in the Kyoto Protocol (Article 5.1) is based, besides regulations  
18 concerning Statistics Finland, on agreements arrangements with Statistics Finland and expert organisations on the  
19 production of the emission estimates and documentation for the national inventory report, and on co-operation and  
20 agreements with the responsible ministries.

21 The Ministerial Workgroup on Climate and Energy Policy considered the proposal on Finland's greenhouse gas  
22 inventory system on 19 November 2004. Statistics Finland assumed the responsibilities of the National Authority for  
23 Finland's greenhouse gas inventory from the beginning of the year 2005.  
24

## 25 *Statistics Finland as the National Authority for the inventory*

26 Statistics Finland as the general authority of the official statistics of Finland is independently responsible for the  
27 preparation and submission of Finland's greenhouse gas inventory to the United Nations Framework Convention on  
28 Climate Change (UNFCCC) and to the European Commission. In its activity as the National Authority for the  
29 greenhouse gas inventory the Statistics Finland Act and the Statistics Act are applied.

30 Statistics Finland defines the placement of the inventory functions in its working order. Statistics Finland has set up  
31 an advisory board to which representatives from the expert organisations and the responsible Government ministries  
32 have been invited. The advisory board reviews the achieved quality of the inventory and decides about changes to the  
33 inventory's division of responsibilities and tasks as agreed for the reporting sectors. In addition, the advisory board co-  
34 ordinates and supervises horizontal research and review projects related to the development of the inventory and  
35 reporting. It co-ordinates also international co-operation in this area (UNFCCC, IPCC, EU), incl. inventory reviews.

36 Statistics Finland as the National Authority is in charge of the preparation of the national greenhouse gas inventory  
37 and its quality management in the manner intended in the Kyoto Protocol. As the National Authority Statistics Finland  
38 also bears the responsibility for the general administration of the inventory and communication with the UNFCCC,  
39 reviews of the Finnish inventory, and publishes and archives the inventory results.  
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## 2 *Responsibilities of expert organisations*

3 According to the Government resolution, Finland’s inventory system includes besides Statistics Finland the expert  
4 organisations that have previously taken part in the preparation of the greenhouse gas inventory. With regard to this co-  
5 operation, separate agreements have been made with the Finnish Environment Institute (SYKE), Agrifood Research  
6 Finland (MTT) and the Finnish Forest Research Institute (Metla). Statistics Finland acquires also parts of the inventory  
7 as a purchased service.

8 The agreements confirm the division of responsibilities and tasks as recorded in the reporting protocols. These  
9 specify the procedures for the annual estimation of emissions and removals as well as quality management co-ordinated  
10 by Statistics Finland. The reporting protocols are based on the responsibility areas of the different expert organisations  
11 and on Finland’s established practice for the compilation of the greenhouse gas inventory. The sectors for which  
12 Statistics Finland is responsible are also defined in the reporting protocols.

13 Statistics Finland has set up an inventory working group comprising all expert organisations producing the emission  
14 and removal estimates. The inventory working group plans agrees on annual tasks, quality objectives and time tables to  
15 produce the inventory in accordance with the Reporting Protocols. The group acts also as a forum for exchange of  
16 information on decisions and guidance from the UNFCCC, incl. the review process, and the EU monitoring mechanism.  
17 It evaluates also the need for improvement of the inventory and prepares proposals on these to the advisory board.  
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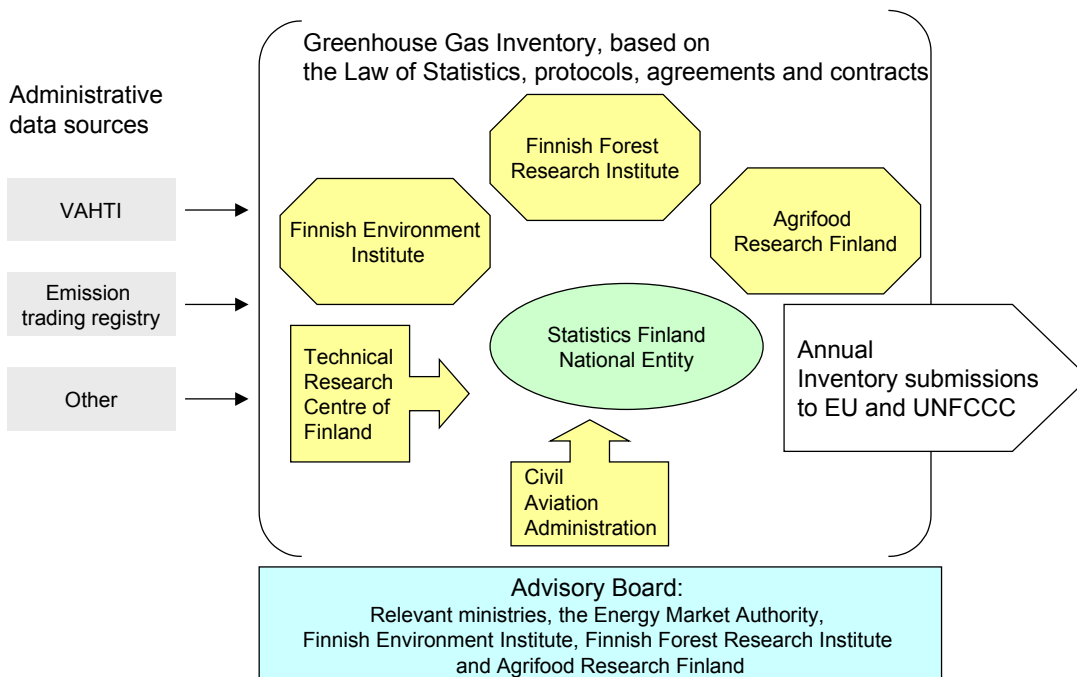
## 19 *The role of the responsible ministries in the inventory system*

20 The resources of the National System for expert organisations are channelled through the relevant ministries’  
21 performance guidance (Ministries of the Environment and of Agriculture and Forestry).

22 In addition, other ministries participating in the preparation of the climate policy advance in their administrative  
23 branch that the data collected in management of public administration duties can be used in the greenhouse gas  
24 inventory.

25 In accordance with the Government resolution, the ministries produce the data needed for international reporting on  
26 the content, enforcement and effects of the climate strategy. Separate agreements have been made on co-operation  
27 between Statistics Finland and the ministries. The structure of the inventory system corresponds to the horizontally  
28 organised preparation of Finland’s climate policy.

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**Figure 1. National Greenhouse Gas Inventory System in Finland.**

## 1 *Quality management and improvement of the inventory*

2 The quality of the inventory is ensured in the course of the calculation and reporting work. The requirements, principles  
3 and elements due to the international agreements and guidelines are integrated directly into the institutional and  
4 functional practical solutions of Finland's National System, i.e. into its organisation and processes. Explicit inventory  
5 documentation produces the required evidence on the compliance and functionality of the inventory system for co-  
6 operation of the Parties to the Framework Convention on Climate Change and the EU Member States.

7 In addition, in attending to the special requirements of the IPCC and UNFCCC guidelines concerning greenhouse gas  
8 inventories, production of a high-quality inventory is supported by the application of the principles and elements  
9 included in the general standard for quality management systems ISO 9001:2000.

10 Preparation, compilation and reporting of the annual inventory consists of four main stages: planning, preparation,  
11 evaluation and improvement.

12 Inventory documentation comprises the basic documents of the inventory system, the sector-specific calculation  
13 documents and the whole inventory level documents of the annual inventory process.

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# 1. Purpose of the National System

## 1.1. Obligations of the UN Framework Convention on Climate Change and the Kyoto Protocol

Finland has made a commitment to follow the United Nations Framework Convention on Climate Change that entered into force on 21 March 1994. In 1997 the legally binding Kyoto Protocol was approved under the UN Framework Convention on Climate Change, and it was ratified by the EU and Finland in May 2002. With these agreements Finland is obliged, as part of the European Community's common emission target, to limit its emissions of greenhouse gases<sup>1</sup> in the first commitment period, i.e. from 2008 to 2012 to the same average level as the emissions for 1990.

The Kyoto Protocol (Article 5.1) requires that the parties have in place a National System by the end of 2006 at the latest for estimating anthropogenic greenhouse gas emissions by sources and removals by sinks and for reporting and archiving the results. In the Decision of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions (280/2004/EC) it is required that Member Countries establish a national greenhouse gas inventory system as fast as possible and by the end of 2005 at the latest and that the Commission adopts the EC's inventory system by 30 June 2006.

In accordance with the Government resolution of 30 January 2003 on the organisation of climate policy activities of authorities Finland's inventory system was already launched by the end of the year 2004.

## 1.2. Functions of the National System

The National System defined in the in the UNFCCC Decision 20/CP.7 and the Draft Decision -/CMP.1 (Article 5.1) supports compliance with the Kyoto Protocol. It produces the annual estimates of the national greenhouse gas emissions and removals in accordance with Article 7.1 and facilitates the review of the information as required by Article 8 of the Protocol, and assists in the continuous improvement of the inventory. The eligibility to use the Kyoto mechanisms is also based on the quality assessment and approval of the reporting produced by the National System.

The EU's greenhouse gas monitoring mechanism (280/2004/EC) combines annual greenhouse gas inventories, the climate strategy and the evaluation of the effect of the policy measures and planning of new measures into a dynamic process. The Commission decision of 10 February 2005 on the implementing provisions of the monitoring mechanism (2005/166/EC) specifies in detail the content of the reports to be submitted to the Commission. By means of the monitoring system, common EU reports can be prepared for the UNFCCC.

The National System guarantees that the data are not only in compliance with the inventory principles and other requirements but that they are also officially approved. In Finland the National System is established on a permanent footing in place of the previous, workgroup-based emission estimation and it guides the development of emission estimation to meet the requirements of the agreements.

In setting up Finland's National System, experiences of other Nordic Countries and the Netherlands were used for the administrative arrangements of emission monitoring.

Finland has implemented the National System as described below, on the basis of **the following general functions of the national system specified in the Annex to the Draft Decision -/CMP.1 (Article 5.1):**

(a) Establish and maintain the institutional, legal and procedural arrangements necessary to perform the functions defined in these guidelines for national systems, as appropriate, between the Government agencies and other entities responsible for the performance of all functions defined in these guidelines;

(b) Ensure sufficient capacity for timely performance of the functions defined in these guidelines for national systems, including data collection for estimating anthropogenic greenhouse gas emissions by sources and removals by sinks and arrangements for technical competence of the staff involved in the inventory development process;

(c) Designate a single national entity; with overall responsibility for the national inventory;

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<sup>1</sup> The greenhouse gases included in the Kyoto Protocol are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), halogenated hydrocarbons (HFC and PFC compounds) and sulphur hexafluoride (SF<sub>6</sub>). HFCs, PFCs and SF<sub>6</sub> are also called F-gases.



1 (d) Prepare national annual inventories and supplementary information in a timely manner in accordance with Article  
2 5 and Article 7, paragraphs 1 and 2, and relevant decisions of the COP and/or COP/MOP;

3 (e) Provide information necessary to meet the reporting requirements defined in the guidelines under Article 7 in  
4 accordance with the relevant decisions of the COP and/or COP/MOP.

5 To meet the objectives of the National System and perform the above-described general functions, each country has  
6 to carry out special functions connected to the planning, preparation and management of the inventory. The designated  
7 National Authority (see c above) has the responsibility of these functions, which will be detailed in Section 4.  
8

### 9 10 *1.3. Quality requirements of the greenhouse gas inventory*

11 The National System must ensure the transparency, consistency, comparability, completeness and accuracy of  
12 greenhouse gas inventories. The EU's decision on the monitoring mechanism also requires timeliness of the inventory.  
13 The quality requirements are fulfilled by implementing consistently the inventory quality management procedures.

14 The transparency of the inventory means that the methodologies, assumptions and references used in the inventory  
15 are documented clearly so that the evaluation and where necessary, replication of the inventory would be possible on  
16 the basis of the documentation.

17 The consistency of the inventory requires that the used methodologies are the same both in the inventory base year  
18 and in the years following it, and that consistent data sets have been used as the basis for emission and sink estimates.  
19 When the methodology changes, recalculation of the inventory must be performed transparently in accordance with the  
20 IPCC Good Practice Guidance.

21 The comparability of the inventory requires that the methodologies (IPCC guidelines) and the mode of presentation  
22 (CRF tables) agreed in the Conference of the Parties to the UNFCCC are used in the inventory calculation and  
23 reporting. The emission source and sink classification must follow the IPCC guidelines on the level of summary and  
24 sectoral tables.

25 The completeness of the inventory means both regional completeness and that the inventory covers all the emission  
26 sources, sinks and gases and all the significant emission source and sink categories mentioned in the IPCC guidelines.

27 The accuracy of the inventory measures the exactness of emission or removals estimates, so that the estimates are  
28 neither systematically over or under estimating the actual emissions or sinks and also, uncertainties that uncertainties  
29 are reduced as much as practicable.

30 The timeliness of the inventory requires preparation and reporting of the inventory in the agreed annual schedule.  
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## 2. *Legal arrangements of the inventory system in Finland*

Finland has reported national greenhouse gas emission data to the UN Framework Convention on Climate Change since 1994 and to the European Commission since 1999. In addition, National Communications have been submitted to the UNFCCC in the years 1995, 1997, 2001 and 2006.

The Ministry of the Environment was responsible for the reports to the UNFCCC in accordance with the Government's division of labour until 1.1.2005, when Statistics Finland took over the responsibility of the national greenhouse gas inventory. The Ministry of the Environment continues to be responsible for the National Communication, although Statistics Finland compiles the report technically.

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### 2.1. *Government resolution*

The Government resolution of 30 January 2003 on the organisation of climate policy activities of Government authorities assigns Statistics Finland as the National Authority responsible for Finland's greenhouse gas inventory. This is confirmed with a written agreement between the Ministry of the Environment and Statistics Finland. A notification of the implementation of the National System assigning Statistics Finland as the National Authority of the National System was sent to the Framework Convention on Climate Change and the European Commission on 14 January 2005.

The Government resolution defines the structure and the principal responsible bodies for Finland's National System. In the resolution, the National System as intended in the Kyoto Protocol is defined to comprise the national inventory unit at Statistics Finland, the contractual arrangements with different expert organisations and the entire production system of greenhouse gas emission and removal statistics and reporting.

Statistics Finland as the National Authority is in charge of the compilation and finalisation of the national inventory report (NIR) and the Common Reporting Tables (CRF) and of their submission to the UNFCCC Secretariat and the EC Commission. The inventory data and the documentation needed for the national inventory report and other reports are prepared by the inventory unit with its contracting parties. The present description of the National System specifies its structure and the division of responsibilities and tasks. The Framework Convention on Climate Change and the EU's monitoring mechanism also require such description as part of reporting. The Cabinet Committee on European Union Affairs has considered and approved this description on the National System for Finland's greenhouse gas inventory on 14 December 2005.

The Government resolution specifies also the responsibilities of different ministries for the preparation and reporting of climate policy. The Ministry of Trade and Industry is in charge of the descriptions and evaluation of the policy actions and of the preparation of the scenario assessments needed in the National Communication, and other reports. The ministries involved in the preparation of the climate policy produce for the National Communication data on the content, enforcement and effects of the climate strategy in their own sectors. Statistics Finland compiles technically the National Communication for consideration by the Ministerial Workgroup on Climate and Energy Policy before submission to the UNFCCC. Statistics Finland is in charge of the printing of the approved report. The National Communication is submitted to the UNFCCC by the Ministry of the Environment.

The Fourth National Communication to be submitted to the UNFCCC 1.1.2006 is being under preparation at the time of preparing this report. The report on Demonstrable Progress under the Kyoto Protocol, also due 1.1.2006, is being prepared by the Ministry of Trade and Industry.

The climate policy organisations mentioned in the Government resolution will be responsible for other reporting, especially evaluation of the compliance with the Kyoto Protocol and the reports required by the EU's monitoring mechanism on the national climate strategy and its effects, as well as the reports on the impacts of different measures, and Statistics Finland assists in the technical preparation of the reports.

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## 1 *2.2. Statistics Finland Act and Statistics Act*

2 The Statistics Finland Act (24 January 1992/48) charges Statistics Finland with the duty to compile statistics and reports  
3 describing the conditions in society and to provide for the general development of official statistics in collaboration with  
4 other Government authorities. Statistics Finland also performs other duties that may be assigned to it by decree or order.

5 In the performance targets agreed with the Ministry of Finance Statistics Finland is committed to function as the  
6 National Authority for the inventory.

7 The Statistics Act (23 April 2004/280) defines the national statistical service authorities and it regulates the  
8 principles of data collection, compilation of statistics, confidentiality and release of data and other issues steering the  
9 national statistical service. Statistics Finland as the general statistical authority compiles those statistics whose  
10 collection has not been specifically assigned to some other authority. Statistics on the environment are not assigned to  
11 any authority.

12 The above-mentioned regulations are applied to the functioning of Statistics Finland as the National Authority for the  
13 greenhouse gas inventory as specified in the Kyoto Protocol.

14 Statistics Finland as the general statistical authority is independently responsible for the greenhouse gas inventory to  
15 the UNFCCC and to the European Commission. This includes the annually supplied national inventory reports under  
16 the Convention (UNFCCC Decision 18/CP.8 and Decision 19/CP.9), as well as the national greenhouse gas inventory  
17 information in accordance with Article 7.1 of the Kyoto Protocol (UNFCCC Decision 22/CP.7). These reports are not  
18 considered yearly in the Ministerial Workgroup. The regulations and operating principles related to the national  
19 statistics service lend support to the preparation of the greenhouse gas inventory in line with the requirements. The  
20 report for the establishment of Finland's assigned amount will be approved by the government.  
21

22

## 23 *2.3. Statistics Finland's working order*

24 Statistics Finland's working order (1 June 2005) specifies the operating organisation, organisation units and their duties,  
25 Statistics Finland's management and settlements of issues, presentation of matters and some other procedures. Statistics  
26 Finland determines the placement of inventory tasks in its working order.

27 Statistics Finland has set up an advisory board to support inventory unit to which representatives from the expert  
28 organisations and the responsible Government ministries were nominated.

29 The advisory board decides about any changes to the inventory's division of responsibilities and tasks agreed in the  
30 reporting protocols attached to this description. In addition, the advisory board deals with longer term research projects  
31 and studies connected to the development of the inventory and reporting and the responsibilities of international co-  
32 operation in this area (UNFCCC, IPCC, EU), incl. inventory reviews.  
33

34

## 35 *2.4. Agreements and other arrangements*

36 According to the Government resolution, Finland's inventory system includes besides Statistics Finland the expert  
37 organisations that have previously taken part in the greenhouse gas inventory. Separate agreements are made on this co-  
38 operation.

39 The agreements with the expert organisations specify the division of responsibilities and tasks recorded in the  
40 reporting protocols and the role of Statistics Finland's in co-ordination of the preparation of the annual greenhouse gas  
41 inventory and in its quality management. The protocols are based on the responsibility areas of different expert  
42 organisations and Finland's established practice for the compilation of the greenhouse gas inventory. The reporting  
43 protocols were prepared in 2004 according to Table (1) and they are presented in the Annex to this description. Quality  
44 management procedures and documentation are discussed in Section 4.

45 Statistics Finland also acquires parts of the calculation and development work from expert organisations as a  
46 purchased service. The estimation of emissions from transportation is based on continuous input from the VTT  
47 Infrastructure and the Civil Aviation Administration (CAA). The continuance of the input is ensured with framework  
48 agreements between Statistics Finland and VTT, and Statistics Finland and CAA. The responsibilities and tasks are

1 specified in the Reporting Protocol B, as well as annual contracts specifying the tasks, taking any improvements needs  
2 into consideration.

3 Statistics Finland has set up an inventory working group comprising all expert organisations producing the emission  
4 and removal estimates. The inventory working group plans agrees on annual tasks, quality objectives and timetables to  
5 produce the inventory in accordance with the Reporting Protocols. The group acts also as a forum for exchange of  
6 information on decisions and guidance from the UNFCCC, incl. the review process, and the EU monitoring mechanism.  
7 It evaluates also the need for improvement of the inventory and prepares proposals on these to the advisory board.

8 Agreements between Statistics Finland and the responsible ministries (Ministry of the Environment, the Ministry of  
9 Trade and Industry and the Ministry of Transport and Communication) have been made to confirm the co-operation and  
10 division of work in accordance with the Government resolution.  
11

12  
13 **Table 1. Reporting protocols and their responsible organisations in 2004**  
14

<b>Reporting protocols</b>	<b>Responsible organisations</b>
<b>A.</b> Point sources, stationary combustion – fuel combustion in point sources, such as power plants, heating boilers, industrial combustion plants and processes	Statistics Finland
<b>B.</b> Mobile sources – transport and off-road machinery	Technical Research Centre of Finland (VTT), Civil Aviation Administration (CAA) (as purchased service)
<b>C.</b> Other fuel combustion (agriculture, households, services, public sector, etc.)	Statistics Finland
<b>D.</b> Fugitive emissions from fuels	Statistics Finland
<b>E.</b> Emissions from industrial processes	Statistics Finland
<b>F.</b> Emissions of F-gases	Finnish Environment Institute
<b>G.</b> Emissions of non-energy NMVOCs (non-methane volatile organic compounds)	Finnish Environment Institute
<b>H.</b> Emissions from agriculture, non-combustion emissions	Agrifood Research Finland (MTT)
<b>I.</b> Emissions from land use and land use change	Finnish Forest Research Institute, Agrifood Research Finland
<b>J.</b> Emissions from waste treatment	Finnish Environment Institute
<b>K.</b> Other emissions	Statistics Finland

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### 3. Parties to the National System and their responsibilities

#### 3.1. Statistics Finland's responsibilities as the National Authority

On the basis of the performance targets agreed with the Ministry of Finance and within the limits allowed by the budget, Statistics Finland has undertaken the responsibility for the functions listed below:

- co-ordination of the annual greenhouse gas inventory, compilation of the results and their reporting according to the guidelines of the UNFCCC and the EU greenhouse gas monitoring mechanism and by following the schedules;
- preparation of Statistics Finland's contribution to the inventory in accordance with the reporting protocols A. (Point Sources, Stationary Combustion), C. (Other fuel combustion), D. (Fugitive emissions from Fuels), E. (Emissions from industrial processes), and K. (Other emissions);
- administration of Finland's greenhouse gas inventory system, including maintenance of the agreements and reporting protocols and preparation for the meetings of the advisory board and the inventory working group;
- co-ordination and compilation of the inventory uncertainty assessments and preparation of the key category analyses;
- co-ordination of the inventory quality management (QA/QC procedures) and preparation of the inventory improvement plan;
- co-ordination of the archiving of inventory-related data;
- co-ordination of communication and feedback to the expert review teams during UNFCCC reviews of the Finnish greenhouse gas inventory including practical arrangements during in-country reviews ;
- production of Finland's contribution to the EC inventory and participation in co-operation according to the decision on a monitoring mechanism (Article 8);
- publishing of the inventory results according to the annual plan and production of summarised inventory data in Finnish;
- participation in the working groups under the Climate Change Committee in matters related to the EC inventory system;
- national co-ordination of the expert work for international development of the inventory related issues (UNFCCC, IPCC; EU) as agreed yearly in the advisory board;
- calculation of the annual indicators in accordance with the implementing provisions of the EU's greenhouse gas monitoring mechanism (Article 7).

Statistics Finland compiles the report to the UNFCCC to facilitate the estimation of Finland's assigned amount pursuant to Articles 3.7 and 3.8 of the Kyoto Protocol, for the commitment period and to demonstrate Finland's capacity to account for its emissions and assigned. The report will be submitted to the UNFCCC by 31 December 2006. Statistics Finland also compiles the corresponding Draft report to the European Commission due 15 January 2006.

To comply with the requirements to report supplementary information under Article 7.1 of the Kyoto Protocol, Statistics Finland ensures the inclusion of following information in the annual inventory reports:

- information on steps taken to improve estimates in areas previously adjusted, if applicable;
- information of emissions and removals from land use, land-use change and forestry activities under Article 3.3;

Statistics Finland supplies the annual inventory information to the register recording Finland's assigned amount units according to the Kyoto Protocol. Information derived from the register authorities on transfers and acquisitions of emission reduction units (ERUs), certified emission reductions (CERs), temporary certified reductions (tCERs), long-term certified emission reductions (lCERs), assigned amount units (AAUs) and removal units (RMUs) will be reported to the UNFCCC in conjunction with the annual inventory submissions after the establishment of Finland's eligibility to participate in the mechanisms.

## 1 3.2. *Responsibilities of expert organisations in the inventory* 2 *system*

3 In addition to Statistics Finland, the authorities participating in the inventory are the Finnish Environment Institute  
4 (SYKE), Agrifood Research Finland (MTT) and the Finnish Forest Research Institute (Metla). The expert organisations  
5 are committed in the agreements they have concluded with Statistics Finland:

- 6 – to produce emission estimations following the division of responsibilities and tasks defined in the reporting protocols  
7 and according to the UNFCCC guidelines in force;
- 8 – to follow the inventory quality management procedures co-ordinated by Statistics Finland and to produce for it the  
9 required documents (incl. descriptions of inventory calculation by CRF category and internal documentation) and to  
10 be responsible for archiving its own original data;
- 11 – to provide responses and feedback, where necessary, to the UNFCCC inventory reviews.

12 In addition, the expert organisations take account of Statistics Finland's publication plan when they publish inventory  
13 results and background data. The organisations have the possibility to name their representatives to the advisory board  
14 set up by Statistics Finland and present annually to the advisory board a plan on their participation in international  
15 collaboration for the development of the inventory and on the resources needed for that.  
16

## 17 18 3.3. *Purchased services*

19 Statistics Finland commissions as a purchased service, within the limits allowed by its budget and with consideration to  
20 the rules on competitive tendering:

- 21 – estimation of emissions in the transportation category
- 22 – projects related to the improvement and development of the inventory
- 23 – work requiring special knowledge such as that of a scientific editor for international reporting.

24 The estimation of emissions from transportation is based on long-term framework agreements and annual contracts  
25 with the VTT Infrastructure and the Civil Aviation Administration (CAA). The responsibilities and tasks of VTT and  
26 CAA are specified in reporting protocol B. These organisations take also part in the work of the inventory working  
27 group.  
28

## 29 30 3.4. *Agreements with the responsible ministries*

31 Statistics Finland and the Ministry of the Environment, Ministry of Transport and Communications and Ministry of  
32 Trade and Industry have concluded agreements on the co-operation.

33 The resources for the expert organisations of the National System come through the relevant ministries (Ministries of  
34 the Environment and of Agriculture and Forestry). In their performance guidance the ministries ensure the resources  
35 needed by the organisations participating in the inventory (Finnish Environment Institute, Finnish Forest Research  
36 Institute and Agrifood Research Finland) for their contribution according to the inventory reporting protocols.

37 The ministries (Ministries of the Environment, of Transport and Communications and of Trade and Industry) can in  
38 their administrative branches advance that Statistics Finland uses the data collected through public administration duties  
39 for the greenhouse gas inventory. Statistics Finland uses in the greenhouse gas inventory the following administrative  
40 data produced under different ministries, aiming to utilise as high-quality emission and activity data as possible:

- 41 – the environmental administration information system (VAHTI), from the sector of the Ministry of the Environment
- 42 – traffic data from the Finnish Maritime Administration, VR-Group and the Finnish Road Administration, from the  
43 sector of the Ministry of Transport and Communications.
- 44 – plant-specific monitored emission data from the emission trading registry established for the EU Emission Trading  
45 Scheme from the Energy Market Authority, from the sector of the Ministry of Trade and Industry (in the 2007  
46 submissions, or later).

47 The quality of the administrative records is primarily the responsibility of the Government agencies and ministries.  
48 The inventory quality criteria are also applied to these (see 1.3).

1        Ministries provide the information on policy measures, scenarios and the Kyoto mechanisms to be included in the  
2 reports to the European Commission (Articles 8 to 11) and the UNFCCC, which according to the Government  
3 resolution ministries produce in their preparation of the climate policy.  
4

## 1 4. Procedural arrangements

### 2 4.1. Quality management

3 The objective is that the inventories produced by the Finland's National Greenhouse Gas Inventory System and the  
4 reporting on them are of high quality. High quality means that the greenhouse gas inventory is in compliance with the  
5 requirements and produces for the Parties to the Framework Convention on Climate Change in usable form the  
6 information needed about Finland on its advancement in fulfilling the obligations of the Convention and the Kyoto  
7 Protocol. The information needs of the EU's monitoring mechanism of greenhouse gases are also met.

8 The starting point for accomplishing high quality for the greenhouse gas inventory is consideration of the  
9 expectations and requirements directed to the inventory. The inventory principles, that is, transparency, consistency,  
10 comparability, completeness, accuracy and timeliness, are dimensions of the quality for the inventory and form the set  
11 of criteria for assessing it.

12 The quality of the inventory is ensured in the course of the compilation and reporting. The requirements, principles  
13 and elements rising from international agreements and guidelines are integrated directly into the institutional and  
14 functional as well as practical solutions of Finland's greenhouse gas inventory system, i.e. into its organisation and  
15 processes. Explicit inventory documentation produces the required proof on the compliance and functionality of the  
16 inventory system for the parties to the Framework Convention on Climate Change and to the EU Member States.

17 In addition, the consideration of the specific requirements of the guidelines concerning greenhouse gas inventories,  
18 production of a high-quality inventory is supported by the application of the principles and elements stated in the  
19 general standard for quality management systems ISO 9001:2000, that facilitates international comparability of the  
20 quality management of Finland's greenhouse gas inventory system.

21 As the National Authority, Statistics Finland bears the responsibility and has the resources for the co-ordination of  
22 the quality management measures for the partners of the National System and for the quality management of the  
23 greenhouse gas inventory at the national level. The inventory working group is established to advance communication  
24 between the inventory unit and the expert organisations in charge of different sectors. An electronic quality manual  
25 including guidelines, annual plans, templates, documentation of methodologies and work processes and checklists of  
26 QA/QC procedures supports the co-ordination of the inventory quality management. An extranet application for  
27 information exchange between the partners of the National System and the inventory unit's Internet pages open to the  
28 public have also been introduced.  
29

30

### 31 *Specific functions of the National System*

32 Sections 12 to 17 of the guidelines for national systems (UNFCCC Decision 20/CP.7) list the specific functions related  
33 to the inventory planning, preparation and management to be performed by the national system, which will assist in the  
34 attainment of the objectives set for the national systems and in the performance of their general functions (see 1.2).

35 Practical quality management solutions made in Finland's Greenhouse Gas Inventory System are based on the  
36 accomplishment of the specific functions of the national systems. The quality management activities aim for a robust  
37 inventory process and for systematic, continuous, fact-based improvement of the inventory.

38 The quality management activities are a management tool for the inventory unit, which directs and steers Finland's  
39 greenhouse gas inventory system to fulfil the specific functions defined for national systems and to produce an  
40 inventory meeting the requirements. Quality management comprises practical solutions with which

- 41 – a systematic inventory process is established, where the inventory planning stage is followed by the inventory  
42 preparation, evaluation and improvement stages
- 43 – the planned inventory evaluations (basic review / extensive review) are made – in accordance with the guidelines,  
44 preferably by an independent party – before the submission of the inventory
- 45 – the inventory is documented and archived according to the requirements
- 46 – the partners of the inventory system and their responsibilities and tasks in the inventory process are itemised
- 47 – the standards for the inventory quality requirements (transparency, consistency, comparability, completeness,  
48 accuracy and timeliness) are set annually in the inventory planning stage and they are recorded as the quality  
49 objectives of the inventory



- 1 – the quality assurance and quality control activities to be made during the inventory processes required for attaining
- 2 the quality objectives are planned and they are recorded as the quality control/quality assurance plan
- 3 – compliance with the IPCC guidelines and good practice is ensured in identification of the key categories, preparation
- 4 of emission estimates, uncertainty assessment, recalculations and in quality control and quality assurance
- 5 implementation
- 6 – the planned general Tier 1 level quality control procedures are performed
- 7 – for key categories and categories, where significant methodological changes have occurred, the Tier 2 level quality
- 8 control procedures are applied, where possible.
- 9 – the review processes of the inventory are enabled
- 10 – the inventory and the inventory process are improved continuously on the basis of reviews and of the experience and
- 11 factual knowledge gained and from e.g. quality control checks and quality assurance evaluations in order to meet the
- 12 set quality objectives.
- 13

14

## 15 4.2. Reporting of the annual inventory

16 The UNFCCC and the EU's greenhouse gas monitoring mechanism require Finland to submit annually a National  
 17 Inventory Report (NIR) and Common Reporting Format (CRF) tables. The reported data indicate consistently the  
 18 emissions during the year before the last (x-2).

19 The organisation of the preparation and reporting of Finland's greenhouse gas inventory and the duties of its  
 20 different parties are detailed in the previous section (3). The expert organisations acting as the parties to the inventory  
 21 system are in charge of the inventory data of the reporting sectors according to the reporting protocols. Statistics  
 22 Finland as the National Authority compiles from the data produced by expert organisations national reports meeting the  
 23 requirements of the UNFCCC and the EU's monitoring mechanism and submits them to the UNFCCC Secretariat and  
 24 to the European Commission.

25 The preparation of the annual inventory follows the schedule of the reporting. In the EU's monitoring mechanism the  
 26 national inventory from the year (x-2) is submitted to the Commission by 15 January. The Member States may  
 27 complement and update their submission by 15 March. The joint EU inventory is compiled from the Member States'  
 28 submissions and it is supplied to the UNFCCC Secretariat by 15 April. The Commission uses the inventory data  
 29 submitted annually by Member States also when evaluating the progress of the Community towards the set greenhouse  
 30 gas emission objectives. Finland's final greenhouse gas inventory for the year (x-2), identical with the data submitted to  
 31 the Commission by 15 March, is submitted to the UNFCCC Secretariat by 15 April.

32

33 **Table 2. Reporting of Finland's annual greenhouse gas inventory to the EU's monitoring mechanism**  
 34 **and to the United Nations Framework Convention on Climate Change**

35

Function	Reporting	Time period
Submission of the CRF tables and the National Inventory Report(NIR)	The EU's greenhouse gas monitoring mechanism / European Commission	15 January
Submission of updated and complementary inventory data and the final NIR	The EU's greenhouse gas monitoring mechanism / European Commission	15 March
Submission of the CRF tables the National Inventory Report (NIR)	UNFCCC / UNFCCC Secretariat	15 April

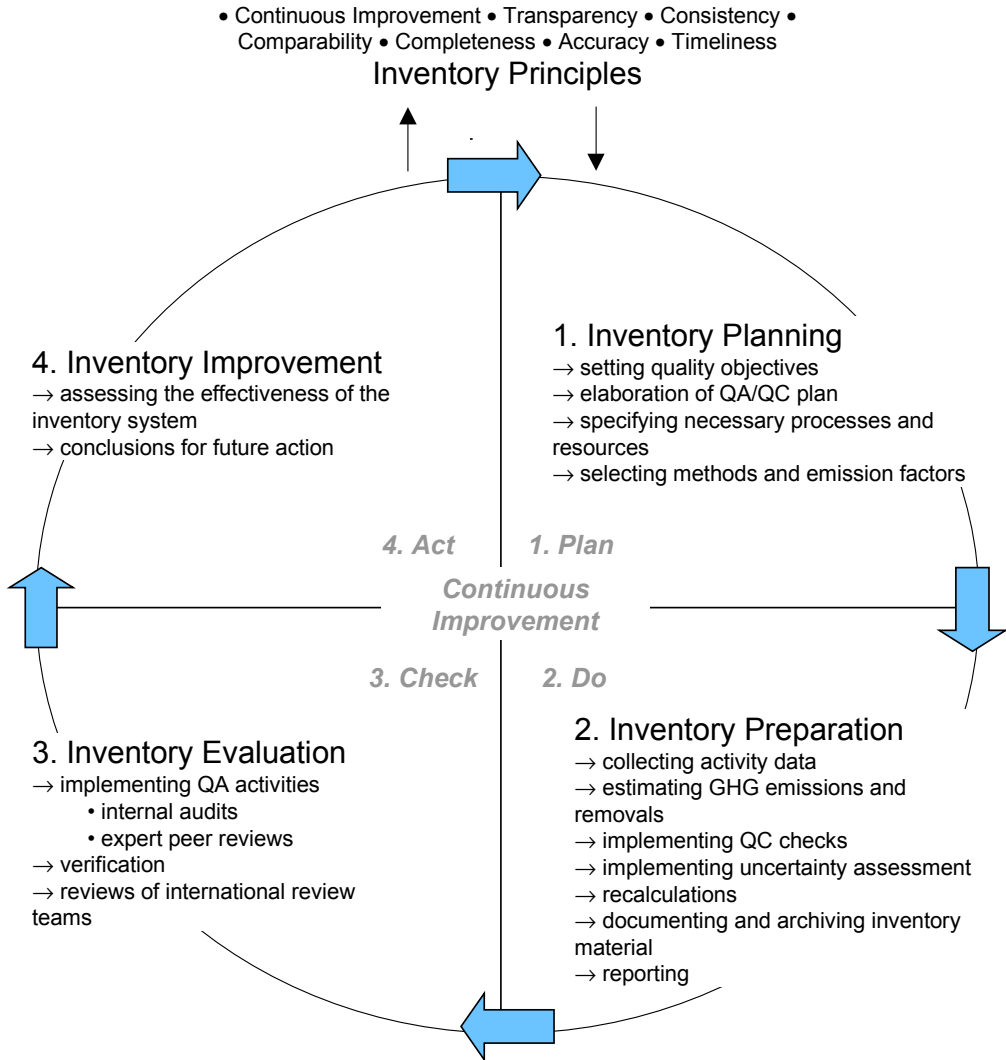
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### 4.3. Quality management process

The compilation and reporting for the annual inventory consist of four main stages: planning, preparation, evaluation and improvement.

The quality management of inventory is a continuous process (Fig. 2) that starts from the consideration of the inventory principles presented in the UNFCCC and in the EU's decision on a mechanism for monitoring community greenhouse gas emissions, that is, transparency, consistency, comparability, completeness, accuracy and timeliness. In addition, the principle of continuous improvement is included. The setting of concrete annual quality objectives is based on this consideration. The next step is elaboration of the QA/QC plan and implementing the appropriate quality control measures (e.g. routine checks, documentation) focused on meeting the quality objectives set and fulfilling the requirements. In addition, the quality assurance procedures are planned and implemented. In the improvement phase of the inventory, conclusions are made on the basis of the realised QA/QC process and its results.



**Figure 2. Quality management process of the Finnish greenhouse gas inventory.**

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## *Inventory planning*

At the inventory planning stage the methodological and organisational solutions for the coming inventory round are made, the resources are reserved for the inventory work and the schedules are decided. In addition, the inventory quality objectives are set and the inventory quality assurance and quality control plans are made.

At the planning stage the inventory unit drafts an annual general plan for compilation of the inventory and supplies it to the expert organisations responsible for the calculation sectors. The annual general plan for inventory compilation specifies the schedules for the coming inventory round and the procedures of the inventory unit in the compilation and reporting of the inventory. In addition, the quality objectives relating to the entire inventory are recorded in the plan, as are the planned quality control checks and quality assurance evaluations.

## *Inventory preparation*

The inventory preparation stage comprises inventory calculation and compilation, the quality control checks and uncertainty assessments performed during it according to the quality control plan. In addition, the stage also includes the production and archiving of internal documentation for the calculation and reporting on the inventory results.

Inventory Quality Control (QC) is a set of routine technical activities to measure and supervise the quality of the inventory as it is being prepared. The purpose of quality control is to provide routine and consistent checks to ensure data integrity, correctness and completeness, to identify and address errors and omissions, and to document and archive the inventory material and record all QC activities.

The quality control activities comprise general (Tier 1) methods, such as accuracy checks on data acquisition and calculation and the use of approved standardised procedures for emission calculations, measurements, estimating uncertainties, archiving information and reporting. The general inventory QC procedures concern all the source categories of Finland's greenhouse gas inventory and also the total inventory.

The general inventory QC checks and the related procedures are in accordance with Table 8.1 of the IPCC Good Practice Guidance.

In addition to general QC checks, category specific QC checks (Tier 2) are applied for the key categories and categories with significant changes in the methodology or source data. These category specific QC activities comprise technical reviews of the source categories, activity data, emission factors and methods.

The CRF tables are produced as a result of the inventory preparation stage. Expert organisations supply the estimates and other data needed in the CRF tables using the CRF Reporter (as sector experts) to the inventory unit in accordance with the reporting protocols. The inventory unit compiles the sectoral data in the CRF Reporter (as the inventory compilers) and produces the full set of the CRF tables. The inventory preparation stage also involves production of the contributions concerning inventory documentation to be compiled into the National Inventory Report (NIR). Once the inventory calculations are completed, the expert organisations update the sections of the National Inventory Report to take into account any changes and recalculations by CRF category and information on planned inventory improvement measures. The inventory unit compiles the contributions and complements it with the updates in the general parts (summaries, description of trends, key category analyses, uncertainties of the whole inventory and other general cross-cutting issues).

## *Inventory evaluation*

The quality assurance activities of the inventory recorded in the QA/QC plan are performed at the inventory evaluation stage.

Quality Assurance (QA) required of the inventory comprises a planned system of review procedures. Where possible, the review should be made by personnel not directly involved in the inventory compilation process. The reviews preferably by an independent third party should be performed after the implementation of QC procedures to the finalised inventory.

1 The goal of the inventory QA procedures is to verify that quality objectives are met, to ensure that the inventory  
2 represents the best possible estimate of emissions and sinks given the current state of scientific knowledge and data  
3 available, and to support the effectiveness of the QC programme.

4 The inventory QA system comprises actions which differ from one another in their viewpoints and timings: internal  
5 self-evaluations, peer reviews, audits, data verifications, system reviews by an independent party and international  
6 reviews.

7 In **internal self-evaluations** experts in their specific calculation sectors and the inventory unit on the level of whole  
8 inventory examine the actual activity and results attained and compare them with the objectives set and the plans made.

9 **Peer reviews** are performed by an external expert or expert group, where the reviewers are experts in other  
10 calculation sectors of the greenhouse gas inventory system or external experts.

11 In the **audits** made by the inventory unit, the representative of the unit reviews the activity and results of a certain  
12 calculation sector. The audit can be directed to topical or otherwise important factors (documentation and archiving of  
13 the calculation, recording of changes, compliance with the QA/QC plan, etc.).

14 Emission and activity data are **verified** by comparing them with other available data compiled independently of the  
15 greenhouse gas inventory system.

16 In **system audits** the conformity of the inventory quality management system is evaluated objectively to the  
17 requirements of the ISO 9001 standard. System audits are conducted by external auditing organisations.

18 The review teams co-ordinated by the UNFCCC Secretariat carry out **international reviews** of the inventory  
19 according to the annual schedule after the submission of the annual inventory report. The reviews may take the form of  
20 written reviews (centralised or desk reviews) produced in September or October, or expert reviewer team visits to  
21 locations (in-country reviews) according to a separately agreed schedule. The National Authority co-ordinates the  
22 participation of the parties to the Finland's greenhouse gas inventory system in the reviews, as well as responses to the  
23 issues raised by the expert review teams. The expert review teams produce yearly an independent review report on  
24 Finland's greenhouse gas inventory.  
25

## 26 27 *Documentation and archiving*

28 Inventory documentation consists of inventory data and metadata (data explaining the calculated estimates). This  
29 information is summarised in the National Inventory Report.

30 Documentation has a key role in inventory quality management. Meeting the requirement on the transparency of the  
31 inventory necessitates systematic documentation and it enables external evaluation of the inventory. The documentation  
32 aims to facilitate replication of the inventory during the review process, should it be necessary. Documentation also  
33 stands as evidence of compliance and functionality of the National System. In addition, continuous, fact-based  
34 improvement of the inventory is steered by an analysis of the materials accumulated during the inventory process.

35 The inventory documentation system consists of the following document types:

- 36 1. The *basic documents of the National System* that are produced, updated and archived by the National Authority  
37 according to Statistics Finland's archiving system:
  - 38 – description of Finland's Greenhouse Gas Inventory System
  - 39 – reporting protocols
  - 40 – agreements and orders related to the calculation
  - 41 – quality manual.
- 42 2. The annual *inventory process documents by reporting sector*, which are produced, updated and archived in the  
43 expert organisations responsible for the sectors according to the reporting protocols:
  - 44 – primary material for the calculation
  - 45 – internal documents for the calculation.
- 46 3. The whole *inventory level documents* of the annual inventory process, which are produced, updated and archived in  
47 the inventory unit according to Statistics Finland's archiving system.
  - 48 – the general plan for compiling the inventory
  - 49 – internal documents for compiling the inventory
  - 50 – the set of CRF tables and the National Inventory Report (NIR)
  - 51 – the inventory improvement plan.

52 The archives are physically located at Statistics Finland. There are two types of archives, "passive" and "active." The  
53 passive archive holds paper and electronic copies (on CD-ROM) of the submissions to EU Commission and to

1 UNFCCC. The active archive (a backed up network server) holds important inventory data; models and other electronic  
2 files that are needed during inventory compilation, improvement and documentation.  
3

## 4 5 *Uncertainty assessments and key category identification*

6 UNFCCC reporting guidelines on annual inventories set the requirement for quantitative uncertainty assessment of all  
7 data used in the inventory. In practice, the IPCC Good Practice Guidance outlines the methods and reporting formats for  
8 this task. Uncertainties of the base year and the most current year emission levels are estimated, as well as the  
9 uncertainty of the emissions trend (defined as percentage change between the two years).

10 Results of the uncertainty assessment are used in identifying so-called key categories. These categories are  
11 important, by definition, in terms of the level or the trend of emissions. Thus, the assessment of uncertainties has an  
12 important role in planning inventory improvements.

13 The national application of the Tier 2 method to estimate uncertainties outlined in the IPCC Good Practice Guidance  
14 were developed by the Technical Research Centre of Finland (VTT). VTT also performed the uncertainty assessment  
15 until in 2005, when this task was transferred to Statistics Finland. Further development of the VTT uncertainty model  
16 (the KASPER model) is done at Statistics Finland. This is necessary since the inventory is continuously improved and  
17 developed.

18 The key category analyses are done according to the requirement in the UNFCCC Guidelines, using the IPCC Tier 2  
19 methodologies. The results of the key categories are reported in the annual inventory submissions. The results of the  
20 key category analyses are used in prioritising improvements of the inventory, choice of methodologies including and in  
21 implementing QA/QC activities.  
22

## 23 24 *Inventory improvement*

25 In the inventory improvement stage conclusions are made on the measures needed to improve the inventory based on  
26 the observations of the inventory evaluation stage of the quality management process, key category analyses obtained  
27 through uncertainty assessments, the review feedback received from the UNFCCC Secretariat on the previous  
28 inventory, and other accumulated data, e.g. issues raised in the QC checks or international or bilateral comparisons.

29 The improvement of the greenhouse gas inventory aims to develop calculation and reporting of the inventory so that  
30 the inventory fulfils the quality objectives set for it and to produce reliable estimates of the emissions of greenhouse  
31 gases in the different emission categories.

32 Statistics Finland co-ordinates the development of the inventory's different sectors. Each expert organisation bears  
33 the primary responsibility for the development of its own sector. The advisory board of the inventory handles horizontal  
34 development projects and the resources needed for development.

35 The expert organisations record the planned inventory improvement measures into the source-specific sections of the  
36 National Inventory Report. Statistics Finland compiles yearly an inventory improvement plan for the whole inventory.  
37 In addition to the improvement measures by CRF category the inventory improvement plan includes horizontal  
38 inventory development projects, and those located at the interfaces of different reporting sectors. The advisory board  
39 considers the inventory improvement plan before starting the next inventory round.

40 The development of the inventory typically contains the following procedures, which can be separate or partly  
41 overlapping:

- 42 – methodological revisions
- 43 – new data sources
- 44 – updating of emission factors
- 45 – reallocation of emissions
- 46 – inclusion of missing emission sources in the calculation
- 47 – improvement of documentation.  
48  
49  
50

1 Implementation of inventory improvements requires resources (funding, expertise and time). Especially the  
2 development of new data collection systems, estimation methodologies or country-specific emission factors are often  
3 very resource consuming in all mentioned aspects.

4 Examples significant investments in inventory improvements undertaken in recent years are the research programme  
5 on “Greenhouse gas emissions from the use of peat and peatlands in Finland (2001 - 2005) and the review and  
6 measurement project to improve the CH<sub>4</sub> and N<sub>2</sub>O emission factors from fuel combustion (2004 - 2005). The results  
7 have improved the accuracy and quality of the inventory significantly.  
8

## 9 10 *4.4 Recalculations*

11 Recalculations are to done to implement methodological improvements in the inventory, including changes in activity  
12 data collection and emission factors, to include new source or sinks categories in the inventory, or to correct for  
13 identified errors, omissions, overlaps, or inconsistencies in the time series.

14 Recalculations based on the annual evaluation of the inventory preparation and improvement needs, including input  
15 from the QA activities and UNFCCC reviews, and which involve methodological changes are discussed and evaluated  
16 in the inventory working group and advisory board before implemented. The implemented changes are documented in  
17 CRF Reporter and the National Inventory Report in accordance with the IPCC good practice reports and the UNFCCC  
18 Guidelines. Reasoning for the recalculations is given and the implications are estimated. The changed estimates are peer  
19 reviewed and validated to the extent possible. Changes in methodologies are implemented for the whole times series.  
20 When data needed in the recalculations is available only for the inventory year, or a number of recent years, the time  
21 series are recalculated using the methods given IPCC good practice reports on recalculation techniques. The changes  
22 will be reflected in the reporting protocols and agreements between Statistics Finland and the participating expert  
23 organisations, as necessary.

24 Recalculations due to correction for errors, omissions, overlaps, or inconsistencies in the time series are always  
25 encouraged. The inventory unit should be informed of any recalculation done and its reasons. The documentation is  
26 done in the CRF Reporter and the National Inventory Report as mentioned above.  
27

## 1 *References and sources*

*Commission Decision of 10 February 2005 laying down rules implementing Decision 280/2004/EC of the European Parliament and of the Council concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol (2005/166/EC).*

*IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories, 2000.*

*IPCC Good Practice Guidance for LULUCF, 2003 (GPG LULUCF).*

*Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories.*

*UNFCCC Decision 20/CP.7. Guidelines for national systems under Article 5, Paragraph 1, of the Kyoto Protocol.*

*UNFCCC Decision 18/CP.8. and Decision 13/CP.9. Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I. UNFCCC Reporting guidelines on annual inventories.*

*VTT 2003: Monni Suvi & Syri Sanna. Uncertainties in the Finnish 2001 Greenhouse Gas Emission Inventory. VTT Research Notes 2209.*

*VTT 2004: Monni, Suvi. Uncertainties in the Finnish 2002 Greenhouse Gas Emission Inventory, VTT Working Papers: 5.*

# 1 ANNEX

## 2 *Reporting protocols for the greenhouse gas inventory in Finland*

### 3 *A. Point Sources, Stationary Combustion*

#### 4 *Scope and definitions*

5 Point sources are defined as combustion of fuels in stationary combustion plants, including e.g.  
6 power plants, district heating plants, industrial boilers and other industrial combustion units and  
7 processes.

8 Point sources belong to the following branches of industry:

9 C 10–14 Mining and quarrying

10 D 15–37: Manufacturing

11 E 40: Electricity, gas and steam and hot water supply.

#### 12 *CRF reporting categories*

13 Emissions from point sources are reported in CRF categories

14  
15 1.A.1. Energy Industries

16 1.A.2. Manufacturing Industries and Construction

#### 17 *Organisation and responsibilities*

18 The responsible unit for the calculation is Statistics Finland.

#### 19 *Estimation methods*

20 Emissions from point sources are calculated using the ILMARI calculation system of Statistics  
21 Finland.

22  
23 Emissions are calculated at as detailed a level as possible using company, site, plant, boiler and  
24 process-specific data obtained from various sources. Emission data are partly reported directly by  
25 companies, partly calculated from fuel consumption. The calculation is consistent with the IPCC  
26 Tier 2 approach. All emission components that are reported to the UNFCCC (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, CO,  
27 NMVOC, NO<sub>2</sub> and SO<sub>2</sub>) are calculated using the same system and same level of detail.  
28

#### 29 *Data sources and responsible organisations*

30 The most important information sources are the Regional Environment Centres' VAHTI database,  
31 Statistic Finland's statistics on energy consumption and energy production, and statistics compiled  
32 by federations in the energy sector.

#### 33 *Annual schedule*

34 Calculation of emissions from point sources begins in August and is completed by the end of  
35 October. The calculation depends on the completion of annual data input in the VAHTI database,  
36 where the target schedule is the beginning of June. In practice, checking of unit-specific data and  
37 acquisition of additional information requires around 2 to 3 months.



## 1 *B. Mobile Sources*

### 2 *Scope and definitions*

3 Mobile sources include road transportation, aviation, navigation, railways and drivable and  
4 moveable working machinery. Vehicles of civil transportation belong to this protocol irrespective  
5 of the branch by which they are used or owned.

### 6 *CRF reporting categories*

7 Emissions from mobile sources are reported in CRF categories

8  
9 1.A.3.a. Civil Aviation

10 1.A.3.b. Road Transportation

11 1.A.3.c. Railways

12 1.A.3.d. Navigation

13 1.A.3.e. Other transportation / Other off-road machinery

14

15 1.A.2.f. Manufacturing Industries and Construction / Construction machinery

16

17 1.A.4.c. Other sectors /Agricultural machinery

18 1.A.4.c. Other sectors / Forest machinery

19 1.A.4.c. Other sectors / Fishing vessels

20

21 International Bunkers / Aviation

22 International Bunkers / Marine

23

### 24 *Organisation and responsibilities*

25 VTT performs the emission calculation of transportation as an outsourced service, and obtains  
26 emission data on aviation from the Civil Aviation Administration (CAA). Statistics Finland is  
27 responsible for integrating the results as part of the reporting to the UNFCCC and total energy  
28 balance, and for co-ordination of the calculation.

29

30 The results from the model of each transport mode are collected into VTT's LIPASTO model. The  
31 summary results needed for the inventory are fed into the ILMARI calculation system at Statistics  
32 Finland.

33

34 Evaporation of fuel from cars is calculated at VTT from data on traffic performance. The emission  
35 data are sent to the Finnish Environment Institute, where they are integrated as part of the  
36 calculation of Protocol G and reporting in the CRF category 1.B.2.a. (Fugitive Emissions from  
37 Fuels / Oil, NMVOC).

38

39 The calculation models by transport mode and the responsible organisations are

40 ILMI, civil aviation / Civil Aviation Administration (CAA)

41 MEERI, navigation / VTT

42 RAILI, railways / VTT

43 LIISA, road transportation / VTT

44 TYKO, off-road machinery / VTT

45 International bunkers / Statistics Finland

## 1 *Estimation methods*

2 Emission calculation of mobile sources is performed using a specific calculation model for each  
3 mode of transportation. The calculation models are based on the measured traffic performance of  
4 each form of transport or, where such data are unavailable, on estimated traffic performances and  
5 data on vehicle stock.

6  
7 The calculation is mainly consistent with the IPCC Tier 2 and Tier 3 approaches.

8  
9 All emission components that are reported to the UNFCCC (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, CO, NMVOC, NO<sub>2</sub>,  
10 and SO<sub>2</sub>) are calculated using the same system.

11  
12 For detailed description of the calculation see: <http://lipasto.vtt.fi/indexe.htm>

## 13 *Data sources and responsible organisations*

14 In addition to calculations performed at VTT and CAA, the following data sources are used in the  
15 inventory:

- 16 – Finnish Road Administration: datafile of traffic performance on public roads from the  
17 national road register (separate query from the register)
- 18 – Finnish Maritime Administration : port traffic service data, fuel consumption of ice-breakers,  
19 fishing vessels (previously recorded by the Ministry of Agriculture and Forestry)
- 20 – State Provincial Office of Western Finland: data on leisure boats from the boat register  
21 (separate query from the register)
- 22 – VR Ltd: datafile of gross tonne kilometres by rail section

23  
24 Responsible organisations for the other data sources used in the calculation:

- 25 – Cities of Helsinki, Espoo and Vantaa: street traffic performance
- 26 – Traffic Information Centre: forecasts on car sales
- 27 – Finnish Oil and Gas Federation: statistics on sales of liquid fuels
- 28 – Statistics Finland: vehicle file from the vehicle register

## 30 *Annual schedule*

31 The calculations using the LIPASTO model are performed by the end of March (in the year  
32 following the calculation year), when the ILMI data also have to be available.

33  
34 The schedule for the LIPASTO calculations demands acquisition of the main data (traffic  
35 performance, stock) during February.

36  
37 Projections done in 2000 are used in the calculation for off-road machinery (TYKO). Because the  
38 data change very little annually the calculation is updated only periodically (at intervals of a few  
39 years) under a separate assignment.

40  
41 The data are sent to Statistics Finland by the end of August.

42

## 1 *C. Other Fuel Combustion*

### 2 *Scope and definitions*

3 Other fuel combustion includes, e.g., fuels used for space heating in different sectors (agricultural,  
4 residential, commercial, institutional, etc), fuels used by the defence forces and coastguard, and  
5 other non-specified use of fuels.

6 Other fuel combustion also includes statistical corrections of total fuel consumption.

### 7 *CRF reporting categories*

8 Emissions from other fuel combustion are reported in CRF categories

9  
10 1.A.4. Fuel Combustion Activities / Other sectors

11 1.A.5. Fuel Combustion Activities / Other

12  
13 All emission components that are reported to the UNFCCC (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, CO, NMVOC,  
14 NO<sub>2</sub>, and SO<sub>2</sub>) are calculated using the same system and the same level of detail.

### 15 *Data sources and responsible organisations*

16 The responsible unit for the calculation is Statistics Finland.

### 17 *Estimation methods*

18 Emissions from other fuel combustion are calculated using the ILMARI calculation system of  
19 Statistics Finland based on fuel consumption figures. The availability of fuel consumption  
20 statistics for the purpose of annual energy statistics determines the level of detail used in the  
21 calculation.

22 The calculation is mainly consistent with the IPCC Tier 1 approach.

### 24 *Data sources and responsible organisations*

25 The main data sources for the calculation are those of energy statistics. The most important ones  
26 are statistics on fuel consumption or fuel sales compiled by federations in the energy sector,  
27 Statistics Finland's model for the calculation of energy for space heating, data on the building  
28 stock and on the fuel use of different types of military vehicles and equipment.

### 29 *Annual schedule*

30 Emission calculation of other fuel combustion is done during autumn and has to be completed by  
31 the end of October. The calculation depends on the completion of other fuel consumption data  
32 (Protocols A and B) and annual energy statistics.

## 1 *D.Fugitive Emissions from Fuels*

### 2 *Scope and definitions*

3 In Finland, fugitive emissions comprise emissions from oil refinery, storage and distribution of oil  
4 products and distribution and transmission of natural gas.

### 5 *CRF reporting categories*

6 Fugitive emissions from energy production and distribution are reported in CRF categories

- 7  
8 1.B.1. Fugitive Emissions from Fuels / Solid fuels (Not occurring at present)  
9 1.B.2. Fugitive Emissions from Fuels / Oil and natural gas

10  
11 The emission compounds to be reported include direct greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O) and  
12 non-methane, volatile organic compounds (NMVOC). Calculation of NMVOCs comes under  
13 Protocol G.

### 14 *Data sources and responsible organisations*

15 The responsible unit for the calculation is Statistics Finland.

### 16 *Estimation methods*

17 The calculation is consistent with the IPCC Tier 1 approach.

### 18 *Data sources and responsible organisations*

19 The calculation is based on the energy statistics of Statistics Finland and on a separate,  
20 plant-specific data collection.

### 21 *Annual schedule*

22 The data is produced by the end of October.

1 *E. Emissions from Industrial Processes*

2 *Scope and definitions*

3 Emissions from industrial processes mean non-combustion emissions from industrial processes.

4 *CRF reporting categories*

5 Emissions from industrial processes are reported in CRF categories

6  
7 2(I).A. Industrial processes / Mineral Products

8 2(I).B. Industrial processes / Chemical Industry

9 2(I).C. Industrial processes / Metal Production

10 2(I).D. Industrial processes / Other Production

11 The emission components that are reported are direct greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O)  
12 and sulphur compounds (SO<sub>2</sub>).

13 *Data sources and responsible organisations*

14 The responsible unit for the calculation is Statistics Finland.

15 *Estimation methods*

16 Emissions are calculated using a simple equation: emission = activity data \* emission factor.  
17 Either production or consumption data are used as activity data. The emission factors are IPCC  
18 defaults or country or plant-specific factors.

19  
20 The calculation is consistent with the IPCC Tier 1 and Tier 2 approaches.

21 *Data sources and responsible organisations*

22 The calculation is based on Statistics Finland's statistics on manufacturing and partly on a separate,  
23 plant-specific data collection. In respect of sulphur compounds, the main data source is the  
24 Regional Environment Centres' VAHTI database.

25 *Annual schedule*

26 The data have to be ready by the end of October.

## 1 *F. Emissions of F-gases*

### 2 *Scope and definitions*

3 Hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF<sub>6</sub>) are F-gases.

### 4 *CRF reporting categories*

5 Emissions of F-gases are reported in the following categories:

6

7 2.C. Industrial processes/ Metal production

8 2.F. Industrial processes/ Consumption of Halocarbons and SF<sub>6</sub>

9

10 Category 2.F is divided into several sub-categories (see Data sources below).

11

12 The complete list of the F-gases in the CRF tables can be found in a report of Teemu Oinonen:

13 Finnish 2002 Inventory of HFC, PFC and SF<sub>6</sub> Emissions. The report is available on the Internet at:

14 <http://www.environment.fi>, keyword FE686.

### 15 *Organisation and responsibilities*

16 The F-gases emission inventories are compiled at the Chemicals division of the Finnish  
17 Environment Institute.

### 18 *Estimation methods*

19 The methods used in the inventory are described in detail in the earlier mentioned report. The  
20 inventory uses the Tier 1a, Tier 1b and Tier 2 methods. The Chemicals division of the Finnish  
21 Environment Institute provides annually a full description of how the emission inventory has been  
22 compiled for the five main sources (refrigeration, foam blowing, aerosols, electrical equipment and  
23 other).

### 24 *Data sources and responsible organisations*

25 The data used in the F-gases emission inventory are obtained directly from corporate entities,  
26 which numbered altogether 800 in the inventory of the year 2003.

27

28 The vast majority of the information is collected from companies in the refrigeration business.  
29 Other data sources are the metal and electric industries (magnesium die casting and semiconductor  
30 manufacturing), electrical engineering (gas insulated switchgear and circuit breakers), plastics  
31 industry (foam products, etc.) and companies importing other products (for instance, refrigerants  
32 and refrigeration equipment, extinguishing agents in fixed fire fighting systems, shoes).

### 33 *Annual schedule*

34 Preparations for the data collection are started in December and the F-gases emission inventory is  
35 finished by the end of June. The information is sent to Statistics Finland in September.

## 1 *G. Emissions of Non-energy NMVOCs (Non-methane volatile* 2 *organic compounds)*

### 3 *Scope and definitions*

4 In this protocol, non- methane volatile organic compounds refer to emissions of NMVOCs  
5 developed in sectors other than energy combustion. The emissions of NMVOCs from fuel  
6 consumption are presented in protocols A to C.

### 7 *CRF reporting categories*

8 Data on NMVOC emissions are reported in the following CRF categories:

9  
10 1.B.2. Fugitive Emissions from Fuels / Oil and Natural Gas

11  
12 2.A. Industrial processes / Mineral Products

13 2.B. Industrial processes / Chemical Industry

14 2.C. Industrial processes / Metal Production

15 2.D. Industrial processes / Other Production

16  
17 3.A. Solvent and Other Product Use / Paint Application

18 3.B. Solvent and Other Product Use / Degreasing and Dry Cleaning

19 3.C. Solvent and Other Product Use / Chemical Products, Manufacture and Processing

20 3.D. Solvent and Other Product Use / Other  
21

### 22 *Organisation and responsibilities*

23 The NMVOC emission inventories are compiled at the Environment Management division of the  
24 Finnish Environment Institute.

25 Evaporation of fuel from cars is calculated at VTT from data on traffic performances. The  
26 emission data are sent to the Finnish Environment Institute, where they are integrated into the  
27 calculation of this protocol and reporting in the CRF category 1.B.2.a. (Fugitive Emissions from  
28 Fuels / Oil, NMVOCs).

### 29 *Estimation methods*

30 Due to the incoherence of the emissions sector, many different methods are used in the inventory.

### 31 *Data sources and responsible organisations*

32 Emissions are calculated at as detailed a level as possible using the following data sources:

- 33 – Regional Environment Centres' VAHTI database (point sources)
- 34 – Questionnaires to companies (non-VAHTI companies are asked for information on their  
35 chemical and product use or emissions)
- 36 – Industry federations (data on products or emissions)
- 37 – Customs statistics
- 38 – Expert institutes

### 39 *Annual schedule*

40 The NMVOC inventory is started with questionnaires in June and is completed by the middle of  
41 November. The inventory is dependent on the completion of annual data input in the Regional  
42 Environment Centres' VAHTI database. Completion of the inventory (acquiring and checking the  
43 data, and the calculation itself) takes about three months.

## 1 *H. Emissions from Agriculture (non-combustion emissions)*

### 2 *Scope and definitions*

3 The Emissions from Agriculture sector includes CH<sub>4</sub> emissions from enteric fermentation of  
4 domestic livestock and from manure management, and N<sub>2</sub>O emissions from manure management  
5 and agricultural soils.

6  
7 Agricultural emissions do not include combustion emissions

### 8 *CRF reporting categories*

9 Agricultural emissions are reported in the following CRF categories:

- 10  
11 *4.A. Enteric Fermentation (reported gas: CH<sub>4</sub>)*  
12 *4.B. Manure Management (reported gases: CH<sub>4</sub> and N<sub>2</sub>O)*  
13 *4.D. Agricultural Soils (reported gas: N<sub>2</sub>O)*  
14 *(4.F. Field Burning of Agricultural Residues, not reported)*

### 15 *Organisation and responsibilities*

16 Agrifood Research Finland (MTT)

### 17 *Estimation methods*

18 Emissions from agriculture are calculated with the model developed by the Technical Research  
19 Centre of Finland (VTT) (Microsoft Excel).

20  
21 Calculation of agricultural emissions follows the IPCC guidelines. Tier level 2 methods are in use  
22 in calculating emissions from Enteric Fermentation and CH<sub>4</sub> emissions from Manure Management  
23 (Cattle). Other emission sources are calculated by using Tier level 1 methods.

24  
25 Emission factors are mainly IPCC default factors.

26  
27 Detailed documentation on annual calculation processes under the MTT's reporting responsibility  
28 will be delivered to Statistics Finland.

### 29 *Data sources and responsible organisations*

30 Activity data used in calculations is received mainly from the following information sources:

- 31  
32 – Publications of the Ministry of Agriculture and Forestry (Yearbook of Farm Statistics,  
33 Maataloustilastotiedote and Tietokappale) and the Matilda database. The information received  
34 annually from these data sources include animal numbers (excluding horses), crop yields,  
35 volume of N fertilisers sold annually and fat content of milk.

36  
37 Other information sources used in calculations:

- 38  
39 – Finnish Trotting and Breeding Association (Suomen Hippos) (number of horses)  
40 – Finnish Environment Institute, VAHTI database of Finland's environmental administration  
41 (amount of N from sewage sludge applied annually to fields)  
42 – Pro Agria (agricultural expert organisation in Finland) (annual milk production of dairy and  
43 mother cows, length of pasture season, weights (cattle), daily weight gain, mature weight)  
44 – MTT Environmental Research (area of cultivated organic soils)



1 - Literature (distribution of different manure management systems, N excretion in manure  
2 during the year)

### 3 *Annual schedule*

4 Collection of data begins in May and data will be delivered to Statistics Finland by the 15  
5 November.

# 1 *I Emissions from Land Use and Land Use Changes*

## 2 *Part Ia. Responsibilities of the Finnish Forest Research Institute (Metla) in* 3 *the Reporting to the United Nations Framework Convention on Climate* 4 *Change*

### 5 *Scope and definitions*

6 In the reporting to the United Nations Convention on Climate Change, the Finnish Forest Research  
7 Institute is responsible for reporting greenhouse gas emissions and removals from Land Use, Land  
8 Use Changes and the Forestry Sector from the following IPCC land use categories and land use  
9 changes as agreed with Agrifood Research Finland (MTT):

- 11 – Forest land
- 12 – Cropland
- 13 – Grassland
- 14 – Wetlands
- 15 – Settlements
- 16 – Other land

17  
18 Starting from the 2006 inventory submission, area data from the different land-use categories and  
19 land-use changes between them will mainly be based on data by the IPCC classification of the  
20 National Forest Inventory (NFI). Additionally, the data registers of the Information Centre of the  
21 Ministry of Agriculture and Forestry and the total land area statistics of the National Land Survey  
22 of Finland will be utilised.

23  
24 Greenhouse gas emissions and removals are reported for all the land use categories and for the  
25 following carbon pools as applicable: aboveground biomass, belowground biomass, litter, dead  
26 wood and soil.

### 27 *CRF reporting categories*

#### 28 Forest Land 5A

29 *5.A.1 Forest land remaining Forest land*

30 *5.A.2 Land (cropland, grassland, wetlands, settlements or other land) converted to Forest land*

#### 31 32 Cropland 5B

33 *5.B.1 Cropland remaining Cropland (MTT is responsible for soil estimates)*

34 *5.B.2 Land converted to Cropland (Metla is responsible for tree biomass estimates)*  
35 *(reported gas: CO<sub>2</sub>)*

#### 36 37 Grassland 5C (MTT is responsible for soil estimates)

38 *5.C.1 Grassland remaining Grassland (reported gas: CO<sub>2</sub>) (MTT is responsible for soil*  
39 *estimates)*

40 *5.C.2 Land (forest land, wetlands, settlements) converted to Grassland (Metla is responsible*  
41 *for tree biomass estimates, if notable)*

#### 42 43 Wetlands 5D

44 *5.D.1 Wetlands remaining Wetlands (optional so far, possible soil estimates)*

45 *5.D.2 Land (forest land, cropland, grassland, settlements, other land) converted to Wetlands*  
46 *(including estimates from peat production)*

1  
2 Settlements 5E

3 *5.E.1 Settlements remaining Settlements (optional so far, possible area estimates)*

4 *5.E.2 Land (forest land, wetlands, cropland, grassland, other land) converted to Settlements*  
5 *(tree biomass estimates, if notable)*

6  
7 Other Land 5F

8 *5.E.1 Other land remaining Other land (area estimates)*

9 *5.E.2 Land (forest land, wetlands, settlements) converted to Other land (tree biomass*  
10 *estimates, if notable) (Rare in Finland)*

11  
12 Aggregate estimates for all conversions of land to a specific land use category may be reported  
13 when data are not available for reporting them separately.

14  
15 In addition, the Finnish Forest Research Institute is responsible for the reporting of the following  
16 data required in the CRF tables 5(I) – 5(V):

17  
18 5(I) Direct N<sub>2</sub>O emissions from N fertilisation on forest land

19 5(II) N<sub>2</sub>O emissions from drainage of soils (optional so far)

20 5(V) Biomass burning (if notable)

21

## 22 *Organisation and responsibilities*

23 The Finnish Forest Research Institute (Metla)

## 24 *Estimation methods*

25 Changes in carbon pools from the above mentioned land use categories will be calculated in  
26 accordance with the IPCC Good Practice Guidance for Land Use, Land Use Change and Forestry  
27 (IPCC GPG LULUCF). The estimation methods used are mainly consistent with the GPG  
28 LULUCF Tier level 2 and 3 methods. Metla produces emission estimates using the data currently  
29 available. The estimates and methods will be revised and improved as new data become available.  
30 Detailed documentation about the annual calculation processes under Metla's reporting  
31 responsibility will be delivered to Statistics Finland.

### 32 Biomass (below- and aboveground)

33 National method, Tier level 3 method (either biomass models or biomass expansion factors). Tree  
34 biomass exists on forest land and to a small extent on the wetlands that do not meet the criteria of  
35 Forest land. Metla is also responsible for the biomass estimates of forested former croplands.

### 36 Litter

37 Forest land: Tier level 2 and 3 methods. (At the moment there are only methods for the humus  
38 layer, while production models for stand canopy litterfall and ground vegetation litterfall are under  
39 preparation).

### 40 Dead wood

41 Forest land: Tier level 3 method

### 42 Soil

43 Tentative plan for Forest land: Tier level 2 and 3 methods. Measured data on the amount of  
44 organic carbon in the mineral soil of the sample plots of the NFI can be used as input data to  
45 derive regression equations relating soil carbon concentration to the NFI variables, or the dynamic  
46 soil model Yasso can be used. Reporting can also be done for Wetlands.  
47  
48  
49  
50

## 1 *Data sources and responsible organisations*

2 Biomass: (below- and aboveground): NFI, information provided by sampled roundwood  
3 purchasers, Metla is responsible for the calculations.

4  
5 Dead wood: NFI, Metla is responsible for the calculations.

6  
7 Litter: NFI, expert estimates, separate measurement data (or IPCC default emission factor if Tier  
8 level 1 method is chosen), Metla is responsible for the calculations.

9  
10 Soil: NFI, Metla is responsible for the calculations.

11  
12 Stock changes in litter, deadwood and soil carbon pools are calculated and reported with the Yasso  
13 model (Liski et al. 2004). Dead wood and plant matter calculated from the forest inventory data  
14 will be used as input data for the Yasso model (Peltoniemi et al. 2004, Integrated 2004).  
15 Application of methods for the reporting is in progress. The methods will be ready to be applied to  
16 the inventory submission of 2006 (data for the year 2004).

17  
18 Stock changes in litter and soil pools on drained peatlands are calculated with the help of litterfall  
19 input derived from forest resource (inventory) data, and emission factors produced in the research  
20 programme “Greenhouse impacts of the use of peat and peatlands in Finland”.

21  
22 Stock change of dead wood pool on peatlands are calculated in a way similar to the one used for  
23 mineral soils.

24

## 25 *Annual schedule*

26 Activity data of harvest removals will be collected during the preceding year and forest resource  
27 (inventory) data between 1 May and 15 October. The data from the preceding year will be  
28 calculated by the end of September. The calculation results will be entered into the CRF tables  
29 during October and delivered to Statistics Finland by 15 November.

30

## 31 *Reporting under the Kyoto Protocol (Article 3.3)*

32 The Finnish Forest Research Institute will prepare for the reporting of emissions and removals  
33 under Article 3.3 of the Kyoto Protocol as well. The details of the reporting methodology have not  
34 been outlined in a reporting protocol yet.

35

# 1 *Part Ib. Responsibilities of Agrifood Research Finland (MTT) in the* 2 *Reporting to the United Nations Framework Convention on Climate Change*

## 3 *Scope and definitions*

4 In the reporting to the United Nations Convention on Climate Change, Agrifood Research Finland  
5 is responsible for reporting greenhouse gas emissions and removals from Land Use, Land Use  
6 Changes and the Forestry Sector from the following IPCC land use categories and land use  
7 changes as agreed with the Finnish Forest Research Institute (Metla):

- 8
- 9 – Forest land
- 10 – Cropland
- 11 – Grassland
- 12 – Wetlands
- 13 – Settlements
- 14 – Other land

15

16 Starting from the 2006 inventory, the submission of area data from the different land use  
17 categories and the land use changes between them will mainly be based on data on the IPCC  
18 classification of the National Forest Inventory (NFI). Additionally, the data registers of the  
19 Information Centre of the Ministry of Agriculture and Forestry and total land area statistics of the  
20 National Land Survey of Finland will be utilised.

21

22 Greenhouse gas emissions and removals are reported for all the land use categories and for the  
23 following carbon pools as applicable: above ground biomass, below ground biomass, litter, dead  
24 wood and soil.

## 25 *CRF reporting categories*

### 26 Cropland 5B

27 *5.B.1 Cropland remaining cropland (soil estimates)*

28 *5.B.2 Land (grassland, wetlands, settlements, forest land) converted to Cropland (soil*  
29 *estimates) (reported gas: CO<sub>2</sub>) (Metla is responsible for tree biomass estimates)*

### 30 Grassland 5C

31 *5.C.1 Grassland remaining Grassland (reported gas: CO<sub>2</sub>)*

32 *5.C.2 Land (cropland, wetlands, settlements, forest land) converted to Grassland (soil*  
33 *estimates) (reported gas: CO<sub>2</sub>) (Metla is responsible for tree biomass estimates)*

### 34 Settlements 5E

35 *5.E.2 Land (cropland, grassland) converted to Settlements (reported gas: CO<sub>2</sub>)*

### 36 Other land 5F

37 *5.F.2 Land (cropland, grassland) converted to Other land (reported gas: CO<sub>2</sub>)*

38

39

40

41

42 Aggregate estimates for all conversions of land to a specific land use category may be reported  
43 when data are not available for reporting them separately.

44

45 In addition, Agrifood Research Finland is responsible for the reporting of the following data  
46 required in the CRF tables 5(III) – 5(V):

47 *5(III) N<sub>2</sub>O emissions from disturbance associated with land use conversion to cropland*

48 *5(IV) Carbon emissions from agricultural lime application*

1 (5(V) Emissions from biomass burning from the area of the MTT's reporting responsibility  
2 (i.e. cropland, grassland) are marginal and are not currently reported in the Finnish  
3 inventory)

## 4 Organisation and responsibilities

5 Agrifood Research Finland, (MTT) (Environmental Research, Soils and Environment)

## 6 Estimation methods

7 Changes in carbon pools from the above mentioned land use categories will be calculated in  
8 accordance with the IPCC Good Practice Guidance for Land Use, Land Use Changes and Forestry  
9 (GPG LULUCF). The estimation methods used mainly correspond with the GPG LULUCF Tier  
10 level 1 and 2 methods. Initially, Tier level 1 methods are used in the calculations, while Tier level  
11 2 methods can be introduced if more national data come available. Detailed documentation about  
12 the annual calculation processes under the MTT's reporting responsibility will be delivered to  
13 Statistics Finland.

14  
15 CO<sub>2</sub> emissions arising from carbon stock changes in soil (mineral soil, organic soil, liming) are  
16 calculated in the Cropland category. In addition, N<sub>2</sub>O emissions from land conversion to cropland  
17 are calculated.

18  
19 The MTT does not produce emissions estimates from tree biomass stock changes. As agreed,  
20 Metla produces CO<sub>2</sub> emissions estimates from tree biomass stock change, if notable. Carbon stock  
21 changes in biomass (annual plants), litter and dead wood will not be reported.

## 22 Data sources and responsible organisations

23 Cropland 5.B

### 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

#### 5.B.1 Cropland remaining Cropland (reported gas: CO<sub>2</sub>)

##### Soil:

##### *Mineral soil:*

- IPCC method, Tier level 1, GPG LULUCF as data source.
- Mineral soils are divided into activity classes, with default reference carbon stock for each activity class, MTT or GPG LULUCF as data sources.

##### *Organic soil:*

- IPCC method, Tier level 1, GPG LULUCF as data source
- The total area of cultivated organic soils is divided into different vegetation zones, MTT as data source
- National emission factors

##### *Liming:*

- Amount of lime applied to fields annually, data source the Finnish Liming Association
- Emission factor, GPG LULUCF as data source

##### Biomass (below- and aboveground):

change in belowground biomass will not be reported, change in aboveground biomass will be reported, Metla will produce stock change estimates of tree biomass, where notable.)

#### 5.B.2 Land converted to Cropland

Soil: See 5.B.1 Cropland remaining Cropland

1 Biomass: Change in aboveground biomass will be reported, if notable, Metla will produce stock  
2 change estimates of tree biomass, if notable.

3  
4 Grassland 5C

5 *5.C.2 Land (cropland, wetlands, settlements, (forest land: soil)) converted to Grassland*  
6 *(reported gas: CO<sub>2</sub>)*

7  
8 Soil: See 5.B.1 Cropland remaining Cropland

9  
10 Biomass: Change in aboveground biomass will be reported, if notable, Metla will produce stock  
11 change estimates of tree biomass, if notable)

12  
13 Settlements 5E

14 *5.E.2 Land (cropland, grassland) converted to Settlements (reported gas: CO<sub>2</sub>)*

15  
16 Soil: See 5.B.1 Cropland remaining Cropland

17  
18 Biomass: Change in above ground biomass will be reported, if notable, Metla will produce stock  
19 change estimates of tree biomass, if notable)

20  
21 IPCC default value: aboveground biomass after conversion is zero

22  
23 Other Land 5F

24  
25 *5.E.2 Land (cropland, grassland) converted to Other land (reported gas: CO<sub>2</sub>)*

26  
27 Soil: Soil carbon stock on land converted to Other land has IPCC default value of zero after  
28 conversion

29  
30 Biomass: Change in aboveground biomass will be reported, if notable, Metla will produce stock  
31 change estimates of tree biomass, if notable.

32  
33 *5(III) N<sub>2</sub>O emissions from disturbance associated with land use conversion to cropland*

- 34  
35 – IPCC method, Tier level 1, IPCC GPG LULUCF as data source  
36 – C/N ratio, IPCC default value or national value  
37 – IPCC default or national emission factor

38  
39 *5(IV) Carbon emissions from agricultural lime application*

- 40 – Amount of lime applied to fields annually, data source the Finnish Liming  
41 Association.  
42 – Emission factor, GPG LULUCF as data source.

## 43 *Annual schedule*

- 44 – Collection of activity data, 1 May-30 September.  
45 – Entering data into the CRF tables and updating of the NIR (to be agreed with Metla),  
46 1 October-31 October. Delivery to Statistics Finland by 15 November.

# 1 *J. Emissions from Waste Treatment*

## 2 *Scope and definitions*

3 Emissions from solid waste disposal on land are calculated in this category. Emissions from the  
4 burning of waste in landfills does not occur in Finland.

5  
6 Emissions from waste incineration with energy recovery are reported in the energy sector and the  
7 reporter is Statistics Finland. Waste incineration without energy does not occur in Finland.

8  
9 The waste sector includes also CH<sub>4</sub> and N<sub>2</sub>O emissions from municipal (domestic) and industrial  
10 wastewater handling plants and uncollected domestic wastewaters. The N<sub>2</sub>O emissions generated  
11 from the nitrogen input of fish farming are also included in the Finnish inventory.

## 12 *CRF reporting categories*

13 Emissions of waste management are reported in the following CRF categories

14 6.A. *Waste / Solid Waste Disposal on Land*

15 6.B. *Waste / Waste Water Handling*

16 6. C *Other /Composting*

17

## 18 *Organisation and responsibilities*

19 The emission inventories from waste treatment are compiled at the Environment Management  
20 division of the Finnish Environment Institute.

## 21 *Estimation methods*

### 22 *Emissions from landfills*

23 The method used to calculate methane emissions is called FOD (First Order Decay, Tier 2) which  
24 considers delay times in the forming of methane emissions. The emission sources include solid  
25 waste disposal sites containing solid municipal, industrial, construction and demolition wastes, and  
26 municipal (domestic) and industrial sludges which contain biologically decomposable carbon.

27  
28 NMVOC emissions are estimated from documented records.

### 29 *Emissions from wastewater treatment*

30 The method corresponds to the IPCC Guidelines with one exception; methane emissions from  
31 wastewater and sludge treatment are calculated using combined activity and emission factor data.  
32 The emissions from sludge disposal on land are estimated and reported in the Solid waste disposal  
33 on land (landfills) subsector.

34

### 35 *Emissions from composting*

36 The method is based on the IPCC 2006 Guidelines<sup>1</sup> (Tier 1).

---

<sup>1</sup> SOD draft - the methodology and default emission factors will be confirmed when the report is finalised.



# 1 *Data sources and responsible organisations*

## 2 *Emissions from landfills:*

3 The activity data used in the calculation are derived from the Regional Environment Centres'  
4 VAHTI database and from the Finnish Biogas Plant Register (Kuittinen & Huttunen 2004).

5  
6 For the beginning of the 1990s, the disposal data (amount and composition) on industrial,  
7 construction and demolition waste are based on the surveys and research by Statistics Finland  
8 (Vahvelainen & Isaksson 1992; Isaksson 1993; Puolamaa et al. 1995) and the Technical Research  
9 Centre of Finland VTT (Perälä & Nippala 1998; Pipatti et al. 1996).

10  
11 Before the year 1990, waste amounts are estimated based on the method given in the report of  
12 VTT (Tuhkanen 2002).

## 13 *Emissions from wastewater treatment:*

14 The activity data used in the calculation are derived from the Regional Environment Centres'  
15 VAHTI database directly or as revised by the Environment Management division.

16

## 17 *Emissions from composting:*

18 The activity data used in the calculation are derived from the Regional Environment Centres'  
19 VAHTI database directly or as revised by the Environment Management division.

## 20 *Annual schedule*

21 The waste inventory with checkings are carried out during autumn and are finalised by the  
22 beginning of November. The inventory is dependent on the completion of annual data input in the  
23 Regional Environment Centres' VAHTI database. Completion of the inventory (acquiring and  
24 checking of the data, and the calculation itself) takes about two months.

25

## 1 *K. Other Emissions*

### 2 *Scope and definitions*

3 This protocol comprises all emission sources not mentioned earlier. The contents and definitions  
4 will be reviewed as improvements are made to the inventory.

### 5 *CRF reporting categories*

6 Emissions from the use of nitrous oxide in different sectors are reported in the CRF category 3  
7 Solvent and other product use

8 Emissions from use of fuels in the non-energy sector are currently reported in the CRF category 7,  
9 Other. The objective is to revise the estimates in the near future so that they can be reported in the  
10 CRF categories 2(I) A–D.

### 11 *Organisation and responsibilities*

12 The responsible unit for the calculation is Statistics Finland.

### 13 *Estimation methods*

14 There are no specific Tier methods for this category. Emissions are calculated by combining  
15 available plant level data and statistics on total amounts. The method is comparable to the Tier 1  
16 and Tier 2 methods of other emission sources.

### 17 *Data sources and responsible organisations*

18 The calculation is based on the energy and manufacturing industry statistics of Statistics Finland  
19 and on a separate, plant-specific data collection. In future, other data sources will be included if  
20 necessary.

### 21 *Annual schedule*

22 The data is produced by the end of October.  
23

