

Description of the Quality Management System

Supplement to Switzerland's Greenhouse Gas Inventory 1990-2012

Submission of 15 April 2014
under the United Nations Framework Convention on Climate Change
and under the Kyoto Protocol



Schweizerische Eidgenossenschaft
Confédération suisse
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Swiss Confederation

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Published and distributed by:

Federal Office for the Environment FOEN
Climate division
3003 Bern, Switzerland

Bern, 15 April 2014

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1 Introduction

This supplement to the greenhouse gas inventory documents the current status (April 2014) of the NIS quality management system (QMS) and provides additional information to chapter 1 of the national inventory report (NIR) (FOEN 2014). Based on input from the UNFCCC expert review team and from other QA/QC activities, the QMS will be further developed.

The following terms are crucial for this document (for definitions see UNFCCC (2006a)). Additional explanations and specifications for QA/QC are given in chapter 8 of IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC 2000).

A **national system** (referred to as national inventory system (NIS) in this paper) includes all institutional, legal and procedural arrangements made within a Party included in Annex I for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and for reporting and archiving inventory information.

Good practice is a set of procedures intended to ensure that greenhouse gas inventories are accurate in the sense that they are systematically neither over- nor underestimated as far as can be judged, and that uncertainties are reduced as far as possible. Good practice covers choice of estimation methods appropriate to national circumstances, quality assurance and quality control at the national level, quantification of uncertainties, and data archiving and reporting to promote transparency.

Quality control (QC) is a system of routine technical activities to measure and control the quality of the inventory as it is being developed. The QC system is designed to:

- provide routine checks to ensure data integrity, correctness and completeness;
- identify and address errors and omissions;
- document and archive inventory material and record all QC activities.

Quality control activities include general methods such as accuracy checks on data acquisition and calculations and the use of approved standardized procedures for emission calculations, measurements, estimating uncertainties, archiving information and reporting. Higher tier QC activities also include technical reviews of source categories, activity and emission factor data and methods.

Quality assurance (QA) activities include a planned system of review procedures conducted by personnel not directly involved in the inventory compilation development process, to verify that data quality objectives were met, ensure that the inventory represents the best possible estimate of emissions and sinks given the current state of scientific knowledge and data available, and support the effectiveness of the QC programme.

Key category is one that is prioritized within the national inventory because its estimate has a significant influence on a country's total inventory of direct greenhouse gases in terms of the absolute level of emissions, the trend in emissions, or both.

Recalculation is a procedure for re-estimating anthropogenic greenhouse gas (GHG) emissions by sources and removals by sinks of previously submitted inventories as a consequence of changes in methodologies, changes in the manner in which emission factors and activity data are obtained and used, or the inclusion of new source and sink categories.

2 The Quality Management System

In accordance with IPCC (2000) the main elements of the QMS are an inventory agency responsible for coordinating QA/QC activities, a QA/QC plan, QC procedures, QA review procedures, as well as reporting, documentation, and archiving procedures. This chapter provides additional information with respect to these main elements.

2.1 Responsibilities and coordination of QA/QC activities

The institutional arrangements for inventory preparation are described in section 1.2 of the NIR (FOEN 2014). While various agencies and institutions are involved in the preparation of the inventory, the process management as well as the coordination of QA/QC activities are centralized at FOEN. QA/QC activities are assigned to all tasks required in the course of inventory preparation and the documentation thereof is compiled and evaluated by the QA/QC officer.

The QA/QC officer has the overall responsibility for enforcement of the defined quality objectives for the greenhouse gas inventory. The QA/QC officer oversees design, development, and operation of the quality management system. She provides and updates a quality manual, serving as a working tool for all contributors to the inventory (chapter 2.2), and coordinates and subsequently evaluates the QA/QC activities performed within the annual cycle of inventory preparation (chapters 2.3, 0, and 3). Furthermore, she makes sure that documentation and archiving procedures are adhered to (IPCC 2000, chapter 8.10; chapter 2.5). The QA/QC officer attends the meetings of the GHG inventory core group and the GHG inventory working group, where she is responsible for quality issues being given due consideration. She also advises the national supervisory board on matters relating to the conformity of the inventory with reporting requirements.

The main responsibilities in relation to inventory preparation and documentation as outlined briefly in section 1.2 of the NIR are listed below:

The **inventory process manager** has the overall responsibility for the integrity of the inventory. The main tasks of the project manager are:

- inventory planning: definition and allocation of specific responsibilities in the inventory development process; definition of schedules and deadlines; elaboration of an updated inventory development plan (together with the QA/QC officer) considering internal and external reviews as well as tier 1/2 QC procedures performed on the basis of previous inventory submissions; assessment of need for recalculations;
- inventory preparation: supervision of compilation, revision and editing of NIR, CRF tables, KP LULUCF tables, and supplementary information under the Kyoto Protocol; implementation and updating of the inventory development plan (together with the QA/QC officer); arrangement of independent evaluations of the inventory planning and preparation process as well as periodic internal evaluations of the operational procedures;
- inventory management: managing and optimizing the cooperation of all members of the GHG inventory working group and particularly the GHG inventory core group; supervision of the inventory change management; communication with the UNFCCC secretariat; providing the NIS supervisory board with all information required to assume its responsibilities; supervision of review procedures; providing review teams with access to (confidential) information; facilitating and encouraging the participation of project collaborators in advanced training courses.
- quality control of own inventory activities, documentation in checklist;
- participation in internal reviews;
- preparation of the official submission of the GHG inventory to the UNFCCC.

The **national inventory compiler** is responsible for the GHG inventory database (EMIS) and for the CRF tables. The main tasks are:

- compilation and quality control of emission data in EMIS;
- implementation of tasks recorded in the inventory development plan;
- ensuring completeness and consistency of the inventory;
- calculation and recalculations of emission estimates;
- key category analysis;
- production of CRF tables using the CRF reporter (including KP-LULUCF);
- export of time series of emission factors, activity and emission data from EMIS into spreadsheets from which tables and figures for the NIR are generated;
- documentation of inventory information and recalculations;
- archiving of the dataset;
- quality control of own activities, documentation in checklist;
- participation in internal reviews;
- upload of the complete inventory to the UNFCCC once officially approved.

The **NIR lead authors** are responsible for the technical documentation in the national inventory report (NIR). Their main tasks are:

- editing of the NIR, checking for consistency between CRF tables, EMIS-NIR tables, and NIR;
- scientific management of the individual NIR authors;
- technical revision of assigned NIR chapters;
- implementation of tasks recorded in the inventory development plan;

- documentation of inventory information;
- uncertainty analysis;
- quality control of own activities, documentation in checklist;
- participation in internal reviews.

Sectoral experts provide additional input and expertise in specific areas of the inventory. Several experts are invited on a regular basis to review sections of the NIR in the course of the internal review prior to submission.

Various **data suppliers** deliver input data for the Swiss inventory (see Table 1-1 in the NIR; FOEN 2014). The GHG inventory core group coordinates the activities of suppliers of raw and processed data. Data suppliers are responsible for:

- the selection of appropriate methods for calculation of emissions, in compliance with IPCC Guidelines (IPCC 1997a, 1997b, 1997c) and IPCC Good Practice Guidance (IPCC 2000, 2003);
- the collection of activity data, determination of appropriate emission factors, and/or calculation of emissions;
- the implementation of tasks as recorded in the inventory development plan (see section 3 and Annex E: Inventory development plan);
- tier 1 QC procedures, documentation in checklists.

2.2 QA/QC plan

2.2.1 Quality manual

In the NIS quality management system, the QA/QC plan (Annex B: Quality manual and section 1.6.1.2 in the NIR) represents a quality manual as required by the ISO 9001:2008 standard, where all documents relevant to quality issues are compiled. The quality manual is reviewed annually and modified by the QA/QC officer where necessary.

The quality manual provides information regarding:

- the management structure;
- requirements, process flow charts, and results of the GHG inventory project;
- current QA/QC activities (QA, tier 1/2 QC, internal audit plan, IDP);
- links to supporting documents and official inventory submission data.

2.2.2 GHG inventory web platform and the NIR sharepoint environment

All members of the GHG inventory core group, NIR authors, some data suppliers, and internal reviewers have access to inventory related documents by means of a SSL connection to a web-based interface of the inventory data held at the FOEN (GHG inventory web platform, Figure 1). In the inventory data system, sector-specific information, documents of the QMS, UNFCCC and IPCC guidelines and other reference material, minutes of meetings, and previous submissions are archived. The emission database EMIS is operated independently, with access limited to the inventory compiler and her alternates in order to avoid inadvertent manipulations.

Furthermore, editing and reviewing of the NIR is made in a sharepoint environment, where all authors and reviewers can access and edit the masterfile of the NIR. In both environments, older versions are stored so that the history of the documents can be traced.

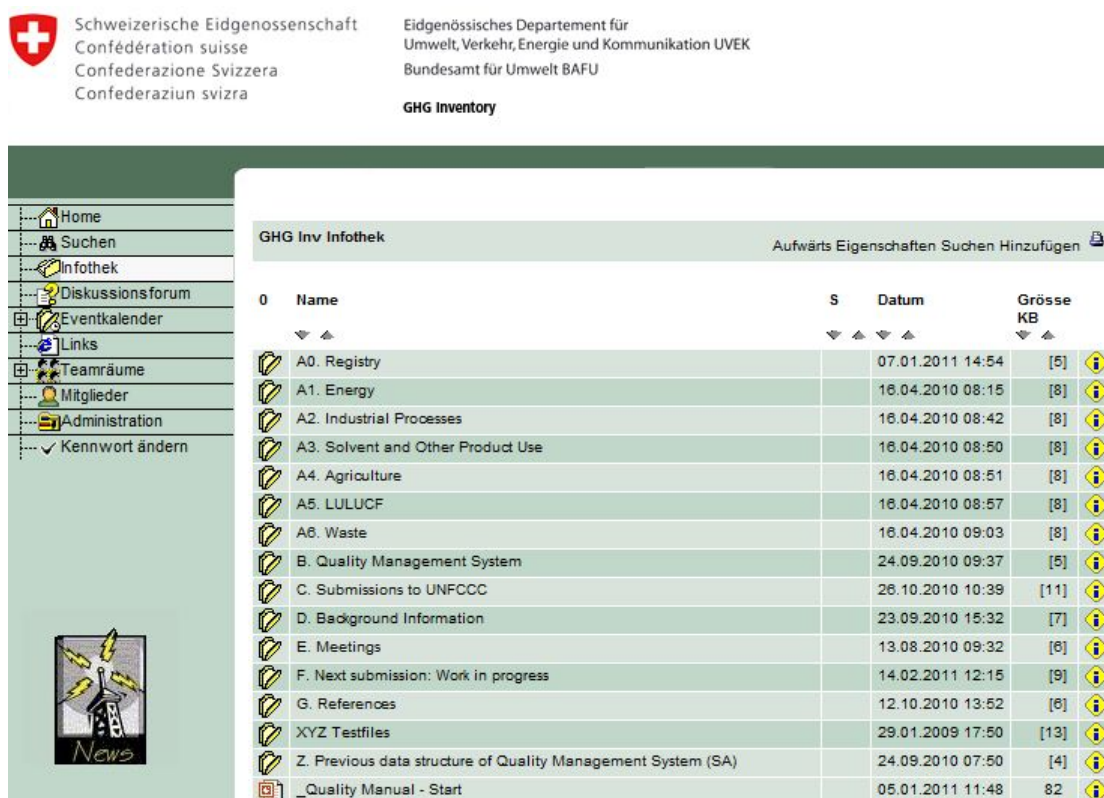


Figure 1: Screenshot "Infothek" showing the directory structure on the GHG inventory web platform.

2.2.3 Annual cycle of inventory planning, preparation, and management

The process of inventory preparation follows an annual cycle, running from May to April. It covers inventory planning, preparation, and management and forms an important part of the QMS. Table 1 shows the annual inventory cycle with a particular focus on the timing of QA/QC activities.

Table 1: Annual cycle of inventory planning, preparation, and management.

	Year n												Year n+1	
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
Meeting of NIS supervisory board														
Meeting of GHG inventory core group														
Meeting of GHG working group														
Evaluation of UNFCCC synthesis & assessment report														
Data collection			Energy Data		Non-Energy Data									
Quality check of energy data														
Quality check of non-energy data														
Calculation of emissions/removals														
Compilation/editing of NIR														
Generation of NIR tables (EMIS)														
Generation of CRF tables (EMIS)														
Completion of checklists and other QC activities														
Expert peer review														
Evaluation of UNFCCC individual review														
Uncertainty analysis														
Key category analysis														
Internal review														
Official consideration and approval														
Submission														
(Online) Publication and archiving														
Check internal audit plan														
Management review														

QA/QC activities carried out over the course of an inventory cycle include:

- regular meetings of the NIS supervisory board and GHG inventory groups, involving all relevant individuals participating in inventory preparation. The GHG inventory working group meeting is used as an opportunity for information exchange about new developments related to the GHG inventory process;
- completion of tier 1 QC checklists by data suppliers and the members of the GHG inventory

core group (section 2.3.1); supervision and/or realization of tier 2 QC projects by members of the GHG inventory core group;

- QA procedures, including an internal review of the inventory prior to every submission (section 2.4.3). External experts are mandated to review selected key categories (section 2.4.1). Furthermore, the consideration and implementation of UNFCCC Expert Review Teams' recommendations are an integral part of the annual cycle of inventory preparation (section 2.4.2 and 3);
- tier 1 and tier 2 key category analyses (both with and without LULUCF categories);
- tier 1 uncertainty analysis (a Monte Carlo tier 2 uncertainty analysis every second year);
- official consideration of the inventory by the national supervisory board and official approval by the FOEN directorate;
- archiving of inventory data and CRF tables by the national inventory compiler (in the EMIS database); archiving of NIR text, tables and figures as well as outcomes of QA/QC activities and other relevant documents by the QA/QC officer (chapter 2.5);
- continuous documentation of findings resulting from QA/QC activities in the course of the inventory cycle by the QA/QC officer for discussion in the GHG inventory core group and for subsequent incorporation in the inventory development plan.

2.3 QC procedures

2.3.1 QC checklists

A standardized way of carrying out tier 1 QC activities has been introduced for the 2006 inventory preparation process. All contributors to the inventory complete checklists that have been designed according to table 8.1 of the Good Practice Guidance (IPCC 2000).

Five types of checklists have been introduced:

- checklist for suppliers of activity data (e.g. fuel statistics, waste fluxes, land use statistics);
- checklist for suppliers of activity data, emission factors, and emissions (e.g. energy, synthetic gases, agricultural data, LULUCF);
- checklist for the national inventory compiler;
- checklist for the NIR lead authors;
- checklist for the project manager.

During the period of data collection, the data suppliers fill in the checklists. Once completed, the checklists are returned to FOEN. Simultaneously to GHG inventory preparation, the suppliers of emission data, the national inventory compiler, the NIR lead authors, and the project manager complete the respective checklists as well. The QA/QC officer reviews and archives the checklists and contacts the suppliers if concerns about data integrity and/or the performance of quality control procedures arise. Follow-up activities for the next GHG inventory cycle will be defined by the QA/QC officer and listed in the inventory development plan as appropriate.

2.3.2 Further general QC procedures

Below, the QC activities of all people involved in the inventory planning and preparation are summarised. Their correct documentation is systematically checked by the QA/QC officer.

Data suppliers carry the responsibility for the quality of their sectoral data. They

- check the appropriate choice of methods, activity data, and emission factors in compliance with IPCC Good Practice Guidance;
- check for correct calculation and/or modelling of data and consistency of time series (comparison with previous estimates);
- document the results;
- document quality control activities in a checklist.

The **FOEN inventory core group** review the NIR, check for transparency, accuracy, completeness, consistency, comparability, and quality of the documentation.

The **national inventory compiler** checks for

- correct import and transcription of data delivered by suppliers into the EMIS database;

- consistent use of emission factors;
- correctness of emissions aggregation;
- integrity of data structures in the inventory;
- completeness of the inventory;
- consistency of the time series;
- correct and complete transcription of data from EMIS into CRF tables;
- correct transcription from EMIS into EMIS-NIR tables;
- correctness of recalculations;
- complete and correct archiving of GHG data;
- and documents his quality control activities in a checklist.

The **NIR lead authors**

- compare the methods used with IPCC Good Practice Guidance requirements;
- check the correct description of methods applied in the NIR;
- check the correct transcription of data from the EMIS database into EMIS-NIR tables;
- check for consistency between tables and text in the NIR;
- check for consistency between CRF tables and NIR;
- check for completeness of references in the NIR;
- document their quality control activities in a checklist.

The **process manager**

- supervises the GHG emission estimates;
- monitors the key category analyses and the uncertainty analyses;
- checks the implementation of the inventory development plan;
- checks the performance of the quality management system;
- checks the completeness of the inventory submission files;
- documents its own quality control activities in a checklist .

Besides planning and supervision of standardized QA/QC activities, the **QA/QC officer** executes further general QC procedures in the framework of QMS operation, including

- maintaining of ISO 9001:2008 certification;
- provision of an internal audit plan, realization of internal audits;
- citation guidelines, compilation of references;
- upload of GHG inventories on www.climatereporting.ch, including background information such as references or expert estimates (personal communications);
- guidelines for and overview over the internal review;
- documenting professional experience and inventory specific training (workshops, meetings, UNFCCC activities etc.) for selected NIS members;
- provision of a list of abbreviations and acronyms used in the Swiss inventory.

Some data suppliers and data processors (ART 2013a; INFRAS with respect to the tier 2 uncertainty analysis, INFRAS 2008a; Meteotest 2014; Sigmaplan 2014) produce an internal documentation that describes their operational procedures and internal QA/QC activities within the GHG inventory project beyond the degree documented in the NIR. The national inventory compiler is currently reviewing the QC procedures implemented and developing a new process description.

2.3.3 Category-specific QC procedures

In addition to general QC, the inventory process manager and members of the GHG inventory core group ensure the performance of tier 2 QC activities both by initiating internal studies, where appropriate, and by providing FOEN (co)-funding of selected research projects. Significant outcomes of tier 2 QC procedures will be discussed in the GHG inventory core group with respect to implementation in inventory preparation and / or incorporation into the inventory development plan. A complete list of past and current projects is provided in Annex D: List of QC tier 2 projects.

2.4 QA review procedures

2.4.1 Expert peer reviews, domestic reviews

QA procedures in the form of in-depth reviews carried out by independent experts are conducted sector by sector with the aim to successively cover the complete inventory. In general, key categories are given priority. Thereafter, a periodic recurrence of peer reviews is planned.

In 2006, the energy and industrial processes sectors as well as methane emissions from the agriculture sector were subjected to a thorough domestic review (eicher+pauli 2006; Soliva 2006, 2006a). In 2009, the waste sector was subject to an expert peer review (Ryttec 2010). Several recommended improvements have been realized in the 2010 submission (see chapter 10. Recalculations in FOEN 2010). Further suggestions for improvements are listed in the IDP and have led to the launch of QC tier 2 projects that will help improving future submissions (see Annex D: List of QC tier 2 projects). The LULUCF sector was reviewed thoroughly at the end of 2010 (vTI 2011). The discussions with the sectoral experts from the Johann Heinrich von Thünen-Institut, Germany, were most valuable and recommendations of the review report contributed to the preparation of the sectoral estimates in subsequent submissions. Inter alia, an aerial photo interpretation error has been assessed for the Swiss Land Use Statistics (AREA) in coordination with the Federal Statistical Office.

In 2012, the review of the industrial processes sector was commissioned (CSD 2013). The decision to choose this sector was triggered by the recommendations of the in-country review in 2010. The review led to recalculations in several areas, e.g. in the steel industry, the acetic acid production or the mineral products sector.

2.4.2 UNFCCC reviews

National inventory submissions to the UNFCCC secretariat are subject to the review procedures defined in the relevant COP/MOP decisions. The secretariat publishes three types of inventory review reports for Annex I parties:

- Status reports for each individual party (providing information on the completeness and timing of the inventory submission);
- Synthesis and assessment reports (part I synthesizing and comparing inventory data across all Annex I parties; part II, not publicly available, for each Annex I party subject to an individual review);
- Annual inventory review reports (being prepared by expert review teams and providing an assessment of the conformity of the inventory with the reporting guidelines under the UNFCCC (UNFCCC 2006b) and under the Kyoto Protocol (UNFCCC 2008) and with IPCC Guidelines (IPCC 1997a, 1997b, 1997c) and IPCC Good Practice Guidance (IPCC 2000, 2003)).

As indicated in Table 1 the outcomes of UNFCCC inventory review reports are systematically evaluated by the GHG inventory core group and used to update the IDP. For the inventory submitted in April 2013, the GHG inventory core group was informed of the result of the initial check in June (Annual status report of the annual inventory of Switzerland; FCCC/ASR/2013/ CHE). The synthesis and assessment report (FCCC/WEB/SAI/2013) has been published by the UNFCCC secretariat by end of June 2013. On 13 August 2013, Switzerland responded to the questions and comments raised in part II of the synthesis and assessment report.

Most of the UNFCCC expert recommendations of previous years have been implemented. Several findings resulting from questions and comments of the expert review in September 2013 were taken up straight away. The draft of the review report (FCCC/ARR/2013/CHE; UNFCCC 2014), was received at the end of December 2013, and the final report at the end of February 2014. Recommendations have been taken into consideration as far as possible (see section 1.6.1.5 in the NIR; FOEN 2014). Outstanding issues are listed in the IDP and considered in future submissions.

2.4.3 Internal review

The internal review prior to official approval and inventory submission is an integral part of the annual cycle of inventory preparation (Table 1). The review team consists of members of the GHG inventory core group and staff of the companies involved in inventory compilation (see Annex C: Internal review). Every reviewer checks a NIR chapter (including spot checks of associated CRF tables), in

which he or she was not directly involved during report drafting. Also the QA/QC supplement is subject to that review process. The sequence of the different review steps (Figure 6) is defined by the QA/QC officer and is communicated to all persons involved. Any findings and discrepancies identified in the course of the review procedure are directly noted in the NIR master file (using track change mode) or, in the case of substantial objections, recorded on a review form. Subsequent acceptance or rejection of proposed amendments are communicated by the NIR authors to the reviewers and documented in detail. Finally, the reviewers check how the issues they raised have been handled and scrutinize the justification for any rejection. Follow-up activities will be discussed in the GHG inventory core group. If necessary, the inventory development plan will be updated.

Reviewers and authors have access to the NIR, the CRF tables and to the associated review forms through a sharepoint environment. By doing so, each step of the review procedure is automatically recorded in a new version of the file. For official reviews, revised text files and review forms are available on demand.

2.4.4 Comparison of CRF and IEA CO₂ emission data

In 2006, an internal study (FOEN 2006g) was conducted to explain the small discrepancies that exist between the 1990-2003 Swiss CO₂ emissions from the energy sector as reported in FOEN (2006) and those published by the IEA (OECD/IEA 2005). Although the relative deviation is smaller than the range admitted by IEA to be 'normal' (due to the fact of different methods of data collection, emission factors etc.; OECD/IEA 2005: I.5-I.6), the inventory project manager was interested in learning about the reasons behind it. A compilation of the most relevant results was provided in FOEN (2006e: 39 et seqq.). In 2011, the issue has been reassessed (FOEN 2011d). This time, the comparison was made based on fuel and energy use, rather than CO₂ emissions. Differences in fuel use arose primarily due to allocation of fuels to fuel categories, fuel use in Liechtenstein which is included in the IEA statistic, and different definitions of relevant stock changes. Differences in energy use were larger due to additional differences in net calorific values used to calculate the energy content.

A follow-up in 2012 has clarified further issues, and the remaining small differences can all be explained in detail. The findings are summarized in Annex 4 of the NIR (FOEN 2014).

2.4.5 Public information

FOEN operates a homepage (www.climate reporting.ch) from which the Swiss GHG inventories (NIR, CRF and SEF tables, QA/QC supplement), the Swiss national communications and other reports submitted to the UNFCCC can be downloaded. Furthermore, all UNFCCC review reports are listed there. Thus, except for confidential data, all relevant information about the Swiss GHG emissions and climate policy is easily accessible for stakeholders and interested individuals. Over the past years, a growing amount of relevant background documents ('grey literature'¹) quoted in the GHG inventory have been made available on this site.

The national registry operates an independent public website (www.national-registry.ch), where e.g. information on account holders or the commitment period reserve is provided.

2.5 Reporting, documentation, and archiving procedures

Inventory data as well as background information on activity data and emission factors are archived by the national inventory compiler in the EMIS database. The Swiss national air pollution database (EMIS) underwent a full redesign in 2005/2006 in order to serve as a central database for all atmospheric emissions. EMIS allows to document background information (e.g. interim worksheets, references, rationale for choice of methods) for any subset of inventory-related data (EMIS 2014/(NFR-Code); FOEN 2006c).

Information on the QMS, all QA/QC activities performed, decisions reached by the experts (minutes), reviews, results of key category analyses and uncertainty analyses, inventory development (IDP) as

¹ 'Grey literature' (Non-conventional literature) comprises scientific and technical reports, patent documents, conference papers, internal reports, government documents, newsletters, factsheets and theses, which are not readily available through commercial channels. (Wikipedia, [01.03.2008]).

well as all important inventory data is documented and archived in the FOEN IDM system and accessible to authorized collaborators via the GHG inventory web platform. All inventory information, as far as needed to reconstruct and interpret inventory data and to describe the inventory system and its functions, is accessible at a single location at the FOEN in Ittigen near Bern. Information flows, documentation and archiving are specified by the QMS monitoring protocols (see Annex B: Quality manual).

Information documented in the EMIS database and in the IDM system (GHG inventory web platform) is available at the FOEN for consultation by reviewers. The inventory project manager is prepared to respond to any requests from the review process in line with the relevant decisions of the COP/MOP for the review of information under article 8 of the Kyoto Protocol. While all information officially submitted under article 7 of the Kyoto Protocol is translated into English, this is not possible for background information made available during the review process as the official inventory documentation language is German.

Data backup is managed by the Federal Office of Information Technology, Systems and Telecommunication (FOITT) using a storage area network. FOITT runs backup facilities at two distinct locations on a daily as well as on a weekly basis.

3 Inventory improvements

The various QA/QC activities provide valuable input for continuous improvement of the inventory and its documentation. Minor errors and deficiencies which can be remedied easily (e.g. typos) are listed in a document, the "Error list", which is checked for implementation by the National Inventory Report Compiler and the QA/QC officer prior to submission.

Suggestions for more thorough changes, such as for example recommendations by the expert review team (ERT) or the domestic peer reviews are listed in the inventory development plan (IDP). The inventory development plan is updated periodically, usually after the internal review and after the review of the inventory by the UN expert review team. It is discussed regularly in the inventory core group and necessary steps are taken to implement the suggested changes. The complete inventory development plan listing pending actions and those completed in the course of the last inventory cycle is given in Annex E: Inventory development plan.

In response to a recommendation of the ERT during the individual review in 2010 and in order to facilitate the overall view over the status of implementation of the suggestions made by the ERT, recommendations and encouragements as well as actions taken in response to them are listed in table 1-12 and table 1-13, section 1.6.1.5 in the NIR (FOEN 2014).

4 References

Unless stated otherwise or considered confidential, references are made available at:

www.bafu.admin.ch/ghginv-ref

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EMIS 2013/(NFR-Code): Comments to EMIS database. Internal documents. Federal Office for the Environment, Bern. See also Table A-1 in FOEN 2013 [mostly available in German only].

EMPA 2007: FOCAWIN Fossil carbon dioxide emissions from waste incineration facilities. Dübendorf, Bern. [German]

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5 Annex A: National system

5.1 NIS Groups

Various people from different institutions contribute to the preparation of the Swiss GHG inventory. A database with contact details and responsibilities is held at FOEN and is updated regularly. The lists below correspond to the status as of April 2014. See Figure 1-1 in the NIR for a schematic of the Swiss NIS.

National inventory system supervisory board (NISSB)

Andrea Burkhardt (Head of climate division)
 Paul Filliger (Climate division; head of climate reporting and adaptation section, process manager)
 Christine Hofmann (FOEN vice director)
 Marcel Kamber (Climate division; national registry developer)
 Yvan Keckeis (Climate division; QA/QC officer national registry)
 Christine Kieffer (Climate division; national registry administrator)
 Rolf Manser (Head of forest division)
 Alexandre Peiry (Head of IT and services section)
 Franz Perrez (Head of international affairs division)
 Susanne Riedener (Climate division, head of section for CO₂ act implementation)
 Regine Röthlisberger (Climate division; QA/QC officer GHG inventory, NISSB secretary)
 Martin Schiess (Head of air pollution control and chemicals division)
 Karine Siegwart (FOEN vice director, chair of NISSB)

National registry administrator

Christine Kieffer, Stefan Meier (alternate)

QA/QC officer of the national registry

Yvan Keckeis, Matthias Kohler (alternate)

GHG inventory process manager

Paul Filliger, Regine Röthlisberger (alternate)

QA/QC officer for the national inventory

Regine Röthlisberger, Paul Filliger (alternate)

GHG inventory core group

Anouk Bass (FOEN; NIC)
 Daniel Bretscher (ART; agriculture)
 Paul Filliger (FOEN; process manager)
 Denise Fussen (EBP; NIR lead author)
 Jürg Heldstab (INFRAS; NIR lead author and NIR compiler NIRC)
 Martin Herren (INFRAS; NIRC alternate)
 Beat Müller (FOEN; NIC alternate, overall responsibility over EMIS)
 Beat Rihm (Meteotest; NIR lead author)
 Nele Rogiers (FOEN; NIR lead author)
 Regine Röthlisberger (FOEN; QA/QC officer)
 Andreas Schellenberger (FOEN; LULUCF)

National inventory compiler NIC

Anouk Bass, Beat Müller (alternate)

NIR lead authors

Jürg Heldstab (INFRAS; energy (transport), industrial processes (synthetic gases), agriculture)
 Beat Rihm (Meteotest; LULUCF)
 Nele Rogiers (FOEN; KP-LULUCF)
 Denise Fussen (EBP; energy (stationary), industrial proc., solvent & other product use, waste)

Agriculture group

Daniel Felder, Christine Zundel (FOAG)
Paul Filliger, Andreas Schellenberger (FOEN)
Daniel Bretscher, Jens Leifeld (ART)

Swiss GHG inventory working group

All members of the GHG inventory core group

FOEN

Blaise Horisberger, Rainer Kegel, Simon Liechti, Sabine Schenker (Air pollution control and chemicals division)
Keith Anderson, Michael Reinhard, Paolo Camin (alternate) (Forest division)
Elena Havlicek, Fabio Wegmann (Soil division)
Michael Hügi (Waste and resources division)

Federal administration

Amilcare Foglia (Swiss Air Forces)
Pia Baumann (SFOE)
Daniel Felder, Christine Zundel (FOAG)
Armin Keller, Jens Leifeld (ART)
Markus Didion, Esther Thürig (WSL)
Theo Rindlisbacher (FOCA)
Felix Weibel (SFSO)

External experts

Fredy Dinkel, Cornelia Stettler (Carbotech)
Christoph Könitzer, Lukas Mathys (Sigmaplan)
Richard Volz (Meteotest)
Selected experts from EBP and Infras (depending on topics discussed)

National focal point climate

Norbert Bäerlocher, FOEN
International affairs division, head of Rio conventions section
norbert.baerlocher@bafu.admin.ch
+41 31 325 47 57

5.2 Meetings of NIS Groups

Information, agendas, and minutes regarding meetings of the various NIS groups is held on the GHG inventory platform, where it is available to members of the inventory core group and to collaborators at the FOEN.

5.2.1 Meetings of the national inventory system supervisory board (NISSB)

The national inventory system supervisory board (reporting) meets bi-annually, once in autumn to coordinate the preparation of the upcoming national inventory, and once in spring to consider and approve the latest inventory before submission. In view of ongoing developments of the national registry, meetings regarding registry issues are held separately by the NISSB registry.

5.2.2 Meetings of the GHG inventory core group

The GHG inventory core group meets bi-monthly during the half year preceding the submission of the GHG inventory. Additional meetings can be arranged by the project leader as required.

5.2.3 Meetings of the GHG inventory working group

The GHG inventory working groups meets once a year, usually before the annual submission. A general overview of the latest inventory is given, accompanied by detailed information from particular sectors, where major changes were made over the past year. The presentations are made available to all members of the working group via email and are also held on the GHG inventory web platform.

5.2.4 Meetings of the LULUCF group

The LULUCF group consists of members of institutions involved in data preparation and compilation in the LULUCF sector. It sets its meeting schedule and agenda according to the requirements of the collaborators involved. Normally, at least two meetings are held per year: A meeting in spring coordinates the data processing and transfer between the institutions involved. At a second meeting in autumn, the status of the processed data is discussed and necessary further steps are considered. At these meetings, improvements as listed in the inventory development plan or suggested by reviewers are taken up and suggestions for further improvements are made. Further ad hoc meetings of sub-groups address specific methodological topics.

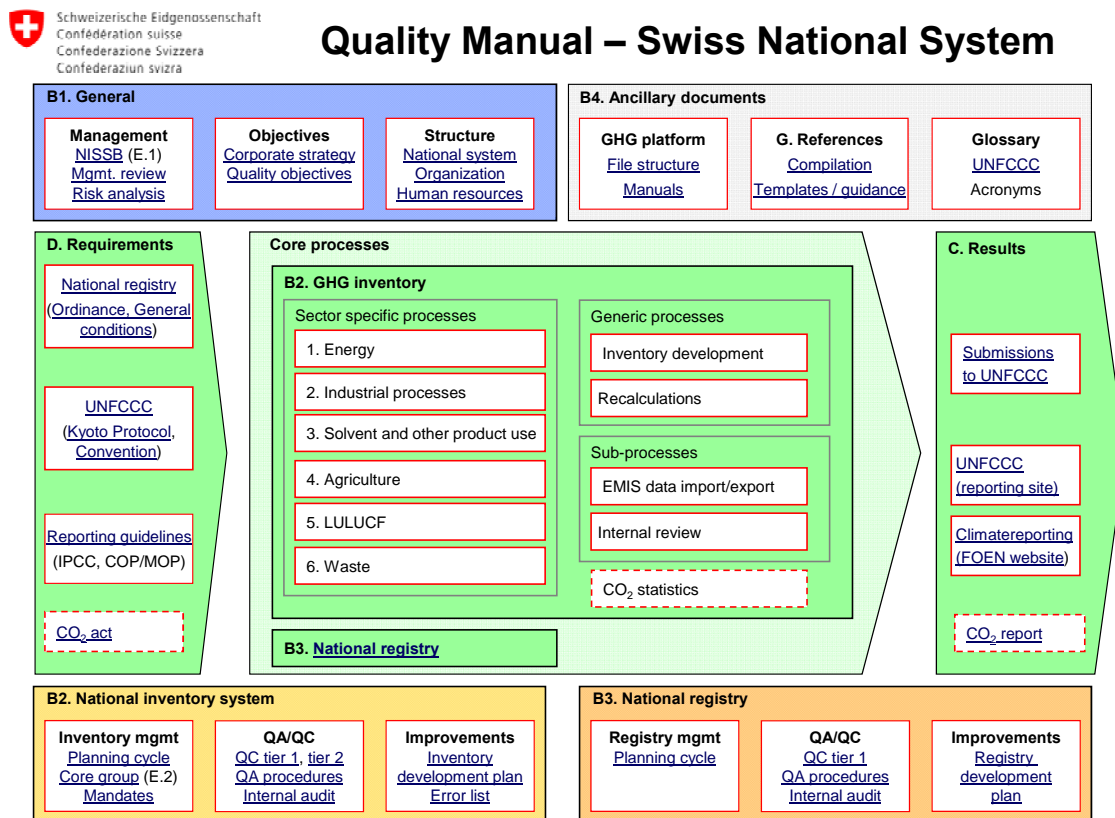
5.2.5 Meetings of the agriculture group

The agriculture group meets on regular basis. Relevant experts for a particular topic are invited to discuss issues regarding agricultural emissions. Currently, research regarding carbon sequestration in agricultural soils and issues related to cropland and grassland management and the option for accounting for those activities during the second commitment period of the Kyoto Protocol are the two main topics.

6 Annex B: Quality manual

The quality manual constitutes the core of the quality management system. The quality manual contains information regarding requirements, core processes and results of the inventory process, as well as QA/QC activities, management and supporting documents (Figure 2).

The quality manual and related documents are reviewed annually by the QA/QC officer and modified after consultation with the project manager if necessary. Since 2007, most contributors to the GHG inventory are authorized to access the FOEN-based inventory files by means of a SSL connection to a web platform, including the documents relating to the quality manual.



Last update: ROR, 121016

Figure 2: Overview of the quality manual of the national inventory system

GHG inventory monitoring protocols

All core processes are represented by detailed flowcharts that specify tasks and responsibilities, data sources and collection processes, reference material and guidelines, and archived documents. The flowcharts are accessible on the web platform and contain active hyperlinks (e.g. [A1] or [QC]) that redirect to the corresponding folder. Six sector specific processes and four generic processes or sub-processes are defined:

- Energy (Figure 3 and Figure 4), industrial processes, solvents and other product use, agriculture, LULUCF, waste
- Continual improvement: Inventory development plan (Figure 5)
- Recalculations
- EMIS database: Data import/export
- Internal review (Figure 6, see also Annex C: Internal review)

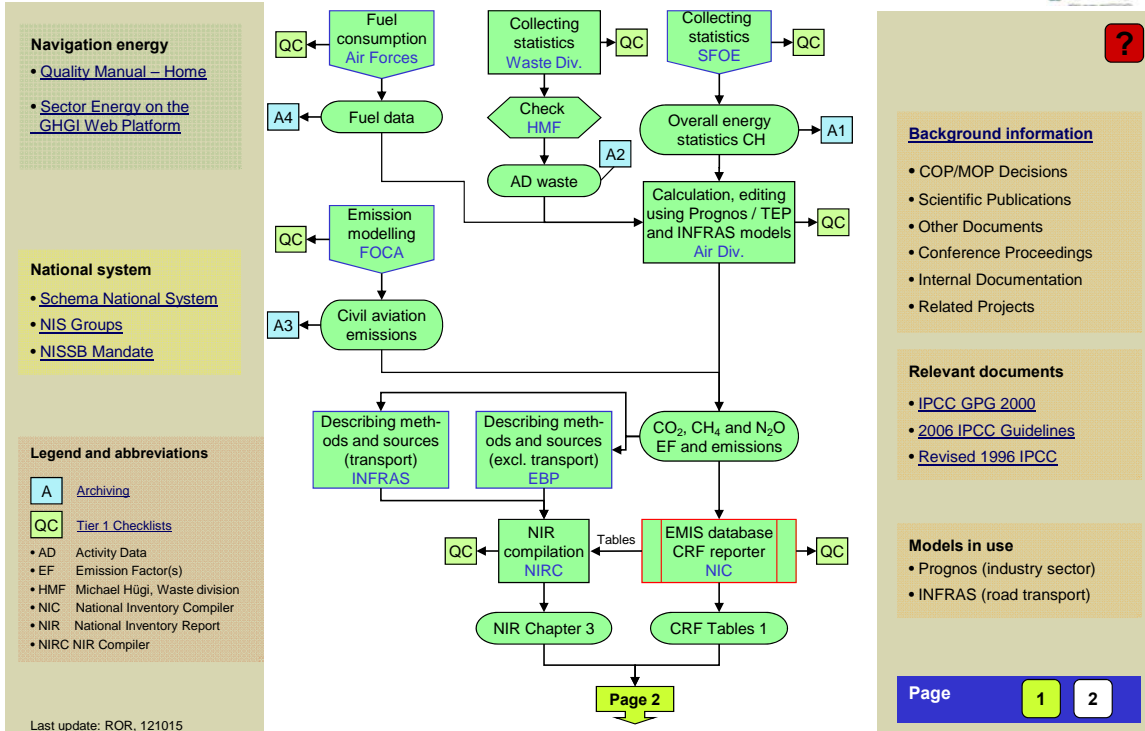


Figure 3: Monitoring protocol - Energy (page 1)

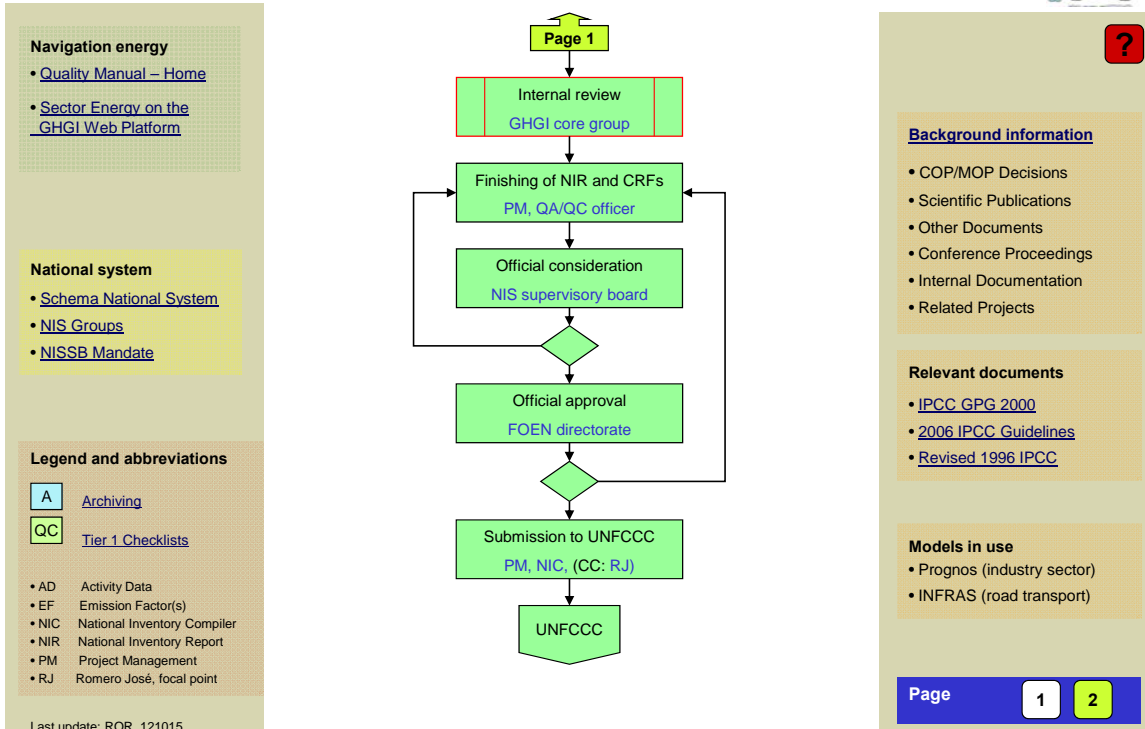


Figure 4: Monitoring protocol - Energy (page 2)

7 Annex C: Internal review

Chapter	Reviewers
ES Executive summary	P. Filliger, R. Röthlisberger (FOEN)
1 Introduction	P. Filliger, R. Röthlisberger (FOEN)
2 Trends in GHG emissions	P. Filliger, R. Röthlisberger (FOEN)
3 Energy (excl. transport)	J. Füssler (Infras); A. Bass, R. Röthlisberger (FOEN)
3 Energy (transport)	H. Frantz (EBP); T. Rindlisbacher (FOCA); A. Bass (FOEN)
4 Industrial processes (F-gases)	C. Stettler (Carbotech)
4 Ind. proc. (excl. F-gases)	S. Schenker (FOEN)
5 Solvent and other prod. use	S. Schenker (FOEN)
6 Agriculture	R. Steiner (EBP); D. Bretscher (ART)
7 LULUCF	D. Bretscher (ART); C. Könitzer (Sigmaplan); A. Schellenberger (FOEN); R. Volz (Meteotest)
8 Waste	B. Oettli (Infras); R. Kegel (FOEN)
9 Other	R. Kegel (FOEN)
10 Recalculations	D. Bretscher (ART); P. Filliger, R. Kegel, A. Bass, A. Schellenberger, S. Schenker (FOEN); C. Stettler (Carbotech)
11 KP-LULUCF	A. Schellenberger (FOEN); R. Volz (Meteotest)
12 Kyoto units	Y. Keckeis, M. Kohler, R. Röthlisberger (FOEN)
13 National system	P. Filliger (FOEN)
14 National registry	Y. Keckeis, M. Kohler, (FOEN)
15 Minimization of adverse effects	R. Röthlisberger (FOEN)
16 Other information	R. Röthlisberger (FOEN)
A1 KCA	P. Filliger, R. Röthlisberger (FOEN)
A2 CO ₂ from fuel combustion	A. Bass, R. Röthlisberger (FOEN)
A3 Detailed methodological description	A. Bass (FOEN), D. Bretscher (ART), H. Frantz, R. Steiner (EBP); T. Rindlisbacher (FOCA), C. Stettler (Carbotech)
A4 Reference approach	B. Müller (FOEN)
A5 Completeness	R. Röthlisberger (FOEN)
A6 Additional information	R. Röthlisberger (FOEN)
A7 Tables 6.1 and 6.2 of GPG	P. Filliger, R. Röthlisberger (FOEN)
A8 Other annexes	R. Röthlisberger (FOEN)
QA/QC supplement	P. Filliger, A. Schellenberger (FOEN)

8 Annex D: List of QC tier 2 projects

In addition to general QA/QC activities, the inventory project manager ensures tier 2 QC procedures by providing a FOEN (co)-funding of various projects in specific sectors. References that are not considered confidential are available at www.bafu.admin.ch/ghginv-ref

Cross-sectoral activities

- Periodic update of EMIS comments (permanent; EMIS 2013)
- Verification of Swiss implied emission factors (completed, Infrac 2012)
- Verification of Swiss methane emissions through inverse modelling of atmospheric methane measurements (2013-2015)

1 Energy

- Emission modelling of road transport (completed; SAEFL 2004);
- FOCAWIN: Measurement of fossil CO₂ emissions from waste incineration (completed; EMPA 2007, Mohn et al. 2008)
- Measurement of fossil CO₂ emissions from waste incineration, follow-up of previous FOCAWIN study. (completed, Mohn 2011)
- Greenhouse gas emissions from biogenic transport fuels (EBP, completed 2009)
- Offroad fuel consumption and pollutant emissions in Switzerland. Study for the period from 1980 to 2020 (completed; INFRAS 2008)
- Comparison of CRF and IEA CO₂ emission data for the energy sector (completed, FOEN 2011d)
- Intertek: Reevaluation of CO₂ emission factors for fossil fuels (completed, Intertek 2008)
- Intertek: Reevaluation of CO₂ emission factors for fossil fuels (completed, Intertek 2012)
- Estimating marine bunkers in Switzerland (completed, Infrac 2011a)
- Analysis of the reference approach and the reporting of feedstocks in the Swiss greenhouse gas inventory (completed, Infrac 2010a)
- Reassessment of N₂O emissions from waste incineration (completed, Mohn 2013)
- Reassessment of fugitive emissions in the natural gas industry (completed, Quantis 2014)
- Reassessment of CO₂ emission factors of fossil fuels (ongoing, 2012-2014)

2 Industrial processes

- HALCLIM: Continuous measurement of halogenated GHG at the Jungfrauoch, inter alia to check for the completeness of F-gases in the inventory (ongoing since 2000; HALCLIM-3 completed, Reimann et al. 2009; HALCLIM-4 from 2009-2012, Reimann et al. 2010; HALCLIM-5 from 2012-2015) See Annex 6 of FOEN, 2014.

4 Agriculture

- Emission model for ammonia from agriculture (AGRAMMON; completed, Agrammon 2009, updated Kupper et al. 2013, <http://www.agrammon.ch/documents-to-download/>)
- Agricultural CH₄ and N₂O emissions in Switzerland: QA/AC. Compilation of QA/QC activities at ART (ART 2013a)
- Study on potential of technical measures to reduce CH₄ and N₂O emissions from animal livestock (ETHZ, 2008-2011; completed, Kreuzer 2012)
- Compilation of uncertainty of agricultural CH₄ and N₂O emissions in Switzerland (ART 2008a)
- Revision of methodology for methane emissions estimates from the agriculture sector (completed; Soliva 2006, Soliva 2006a)
- Categorization of livestock animals in Switzerland. D. Bretscher and T. Kupper. Agroscope Research Station Zürich (ART), Schweizerische Hochschule für Landwirtschaft Zollikofen (SHL). March 2012 (ART/SHL 2012).
- Greenhouse gas Exchange Over Grazed Systems (CO₂, N₂O, CH₄, NH₃; GEOGS)(Agroscope 2012-2014)

5 LULUCF

2009

- Lime application in Swiss agriculture (ART, completed 2009; ART 2009)
- Comparison of area data LULUCF – Agriculture (ART, completed 2009; ART 2009a)
- Emission factor of drained peatlands in Switzerland – A brief analysis of recent studies and comparison to EF used in the Swiss GHG Inventory (ART, completed 2009; ART 2009b)
- Validation of model results from Biome-BGC with tree ring measurements (Basel University, Institute of Botany, completed 2009; Zumbrunn and Körner 2010)
- Validation of model results from Biome-BGC with measurements from the FLUXNET site in Lägeren and Davos (ETHZ, completed 2009; Zweifel et al. 2009)
- Soil respiration and carbon sequestration of two mountain forests in Switzerland (ETHZ, completed 2009; Rühr and Eugster 2009)
- Soil carbon after wind throw – a source of CO₂? (WSL, completed 2009; Rusch et al. 2009)
- Quantifying of wood decay on wood density and carbon content in dead wood (WSL, completed; Dobbertin and Jüngling 2009)

2010

- Analysis of changes in forest land for reporting under the Kyoto Protocol – comparison of Swiss Statistics of Deforestation with AREA (Meteotest, FOEN, completed, Meteotest 2010a, FOEN 2010d).
- Identification of Kyoto Deforestations from the AREA dataset (Sigmaplan, completed; Sigmaplan 2010a)
- Living biomass of trees in Non-Forest Land (Sigmaplan, WSL, completed 2010, Mathys and Thürig 2010)

2011

- Evaluation of ERT recommendations and room for improvement in LULUCF sectors 5B Cropland and 5C Grassland (ART, presentation by D. Bretscher on 23 September 2010)
- Mapping organic soils – tests with the National Inventories of Raised Bogs and Fens (Meteotest, completed; Meteotest 2009a, Meteotest 2011a)
- Modelling soil organic carbon in Swiss Forests with Yasso07 (WSL, completed; Internal documentation; Weggler et al. 2011)
- Testing the Yasso07 model with long term litterbag data from five LTFER sites and two elevation gradients in the Swiss Prealps (WSL, completed; Frey 2011)
- Realization of an international workshop on the Swiss Yasso07 modelling results (FOEN, WSL; 4th October 2011)
- Summary of the available published data on root biomass and root carbon in Swiss grasslands (ART, completed 2011; ART 2011a)
- First estimate on CO₂ emission factor of organic soils under unproductive wetland (ART, completed 2011; ART 2011b)

2012

- Comparison of area classification under LULUCF und KP-LULUCF with a special focus on land-use changes from forest land to non forest land. Quality Check (Sigmaplan, completed; Sigmaplan 2012a)
- LULUCF and KP-LULUCF – Comparison of Activity Data. Comparison of area classification and reporting methods under LULUCF und KP-LULUCF with a special focus on land-use changes on, from and to forest land. (Meteotest, completed; Meteotest 2013a)
- Improvement of BEF values (BCEF – Estimates of Biomass from National Forest Inventory data (Stock, Growth, Cut and Mortality): Biomassconversion factors versus allometric single-tree functions (WSL, completed; Thürig and Herold 2013)
- Turnover and stabilization of soil matter and N: effect of land-use change in alpine regions (ART, co-funding of project in COST action 639 (BurnOut); completed 2011; Leifeld et al. 2011; Meyer et al. 2012)
- Turnover and stabilization of soil organic matter: effect of land-use change in alpine regions (WSL, COST E639, completed; Zimmermann and Hiltbrunner 2011, 2012)

- Modelling soil organic carbon in Swiss Forests with Yasso07 – Validation (WSL, completed; Weggler et al. 2012a)
- Testing the warming and nitrogen theory of carbon sequestration (Basel University, Institute of Botany, COST E639; completed; Caprez et al. 2012)
- Stocks of soil organic carbon in Swiss forest soils: a geostatistical approach (ETHZ, WSL, completed; Nussbaum et al. 2012)

2013

- Revision of the Spatial Strata in the Activity Data (Meteotest, completed; Meteotest 2013b)
- Rewetting of peatlands as climate mitigation action: the new LULUCF activity under the Kyoto Protocol “Wetland Drainage and Rewetting (University of Basel, completed; Paul and Alewell 2013)
- Living biomass of trees in Non-Forest Land II (Sigmaplan, WSL, completed)
- Methane emissions from Swiss lakes and reservoirs (Sigmaplan, completed; internal documentation Sigmaplan 2013a; see also Hiller et al. 2014)

2014

- Lime application in Swiss Agriculture. Internal documentation by Bretscher, D., Agroscope Research Station, Zürich. (Update of ART 2009; Agroscope 2014a)
- Unproductive forests (CC13): Verification activities in response to FCCC/ARR/2013/CHE (FOEN 2014f; Ginzler 2014; Huber and Thürig 2014)

Ongoing

- Activity data and allocation of fens/bogs and organic soils: a survey for the Swiss GHG inventory (ART, Nov 2011, ongoing until 2014)
- GHGI Module NFI 4: Contribution of WSL to the Swiss GHG Inventory and KP reporting with a focus on the carbon budget of Swiss forests and in forest soils (WSL, November 2011, ongoing until December 2014; Didion et al. 2012, 2013, 2014; Thürig and Herold 2013; Didion 2014; Thürig 2014)
- Improvement of climate dependency of growth curves for analyzing forest development scenarios (WSL, ongoing until 2014; Thürig et al. 2009)
- Carbon stock, gain, cut and mortality of biomass on land converted to forest land areas (WSL, ongoing)
- Heart rot in Swiss forests (WSL, Wunder Consulting, November 2013 ongoing)
- Task Force on Yasso (JRC Ispra, WSL, ongoing until Summer 2014)
- Data processing and analysis of soil organic carbon pools as provided by the Swiss Soil Monitoring Network (NABO) and other soil surveys (Agroscope -NABO, 2011 until August 2014)
- Carbon sources and sinks in agricultural soils. Tier 3 methodological approaches for the quantification of carbon stocks and carbon stock changes in agricultural soils. (Agroscope, ongoing until 2016; Köck et al. 2013)
- Determination of sources and sinks of greenhouse gases in Swiss arable soils (Research Institute of Organic Agriculture FiBL, Frick, May 2012 until September 2015; Gattinger et al. 2013)
- GHG emissions from peatlands under different land use (Agroscope, University of Basel, October 2013 until September 2016)
- Lake Wohlen – a source of methane emissions (University of Bern, March 2014 until October 2015)

6 Waste

- Update of wastewater treatment plant data in EMIS (EBP, completed 2009; EMIS2010/6B1, EMIS2010/6B2)
- Update of EMIS data base for industrial and agriculture digestion plants (EBP, completed: EMIS2012/1A1a and 6D)

9 Annex E: Inventory development plan

The Inventory development plan has been updated at the GHGI core group meeting on 2nd May 2013. Issues raised by the UNFCCC review team were added after the centralized review in September 2013. Status of implementation as of 15 April 2014.

1) Responsibility: If more than one institution/person is mentioned, the first one has the lead.

- **Agencies / Consultants / Federal Research Institutes**

AgroscopeSwiss Federal Agricultural Research Station, Institute for Sustainability Sciences

Carbotech Carbotech AG, private consultants (Experts synthetic gases)

EBP Ernst Basler + Partner AG, private consultants (NIR co-authors)

FiBL Research Institute of Organic Agriculture, Frick

FOEN Federal Office for the Environment

INFRAS INFRAS, private consultants (NIR co-authors)

Meteotest Meteotest, private consultants (NIR co-authors)

Sigmaplan Sigmaplan, private consultants (Experts land-use change)

WSL Swiss Federal Institute for Forest, Snow and Landscape Research

- **FOEN and other federal administration staff members, lead authors**

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THE	Thürig Esther (WSL)		
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3) Priority / Workload: H: High; M: Medium; L: Low

High priority is assigned to all key recommendations of the ARR.

4) Status:

F:	Work finished (marked in grey font)
pR:	Work partially realized
P:	Work in progress
NS:	Work not yet started

5) Reference: Refers to the relevant document where further details regarding the planned improvement can be found. E.g. 2013_13 directs to paragraph 13 of FCCC/ARR/2013/CHE, internal review refers to the review forms, e.g. 4(3.) refers to review form of chapter 4, item 3, SAll refers to items listed in the synthesis and assessment report part II (August 2013), ERT2013 relates to questions from the expert review team in September 2013.

Cross-cutting issues / Miscellaneous

No	Planned improvement	Dead line	Responsibility	Prio- rity	Work- load	Sta- tus	Reference
1	Mandate for Core Group	2011	FOEN (FP)	L	L	NS	
2	Explain fully any recalculations made for all categories	on-going	EMIS Team: Recalc.File; Authors: NIR	H/R	M	F	2012_24
3	Provide quantitative uncertainty assessments also for non-KC.	2014	DEF	H/E	H	F	2011_18 2012_21
4	Improve the documentation in the NIR	2014	Authors	H/R	H	F	2012_28 ERT2013
5	Highlight the planned improvements related to key categories	2014	ROR	M/E	M	NS	2013_13

Energy sector

No	Planned improvement	Dead- line	Responsibility	Prio- rity	Work- load	Sta- tus	Reference
1	High N ₂ O IEF in 1A1a. Provide explanation. N ₂ O emission from MSW incineration plants (effect of DeNO _x kit) Rytec p.6	2014	KER/EBP	M	M	F	2010_58 2011_35 ERT2013
2	1.A.4.b: CH ₄ and N ₂ O from wood: EF are lower than IPCC range. Provide explanation	2014	SCS/EBP	M	M	pR	2011_35 ERT2013
3	Waste input-output balance	2014	DEF/WOM	M	M	F	2011_47 2012_101 ERT2013
4	C-content of waste	2014	KER	M	M	F	Rytec p.6
5	Leakage and methane slip in landfill gas engines (Rytec p. 10): Where is this CH ₄ reported in NIR	2014	EBP, LSI/KER	M	L	P	Rytec, ERT2013
6	Provide more background information on country-specific EFs (esp. gasoline)	2014	Infras/EBP	H/R	L	F	2012_40 ERT2013
7	Discrepancy CRF 1.A(b) and 1.C	2014	MBU	H/R	L	P	2012_43 SAII- Energy
8	Provide disaggregated feedstocks (as far as possible)	2014/2015	MBU/SCS; Infras: NIR	H/R	M	pR	2012_46 2013_28
9	Provide background information of EF for solid fuels in 1A2, correction of error	2014	DEF	H/R	L	F	2012_47 2013_30
10	Improve description of 1A2	2014	DEF	H	H	F	Internal review 1(5),

No	Planned improvement	Dead-line	Responsibility	Prio- rity	Work- load	Sta- tus	Reference
							2012_28
11	1A3b gaseous fuels: Con- tinue to report N2O emis- sions	2014	BNA	H/R	L	F	2012_50
12	1.B.2.a: Fugitive emissions from oil pipelines	Sat- Pap	BNA DEF: NIR	H/R	L	F	2012_51
13	1.B.2.c: Continue to report N2O from flaring; improve documentation of 1B2c	2014	BNA DEF: NIR	H/R	L	F	2012_53 2013_44
14	1.b.2.b: Fugitive emissions from gas production: Include natural gas production 1990-1994, reassessment of emissions and improve documentation	2014	BNA DEF: NIR	H/R	M	F	2012_54 2013_42 2013_43
15	Include information from manufacturing industry available under the revised national legislation as far as possible	2015	SCS	H	H	P	Internal review 1(4)
16	CO2-EF of refinery gas	2014	BNA/ROR DEF: NIR	H/R	M	F	2013_29
17	Include information on the reallocation of fuel con- sumption data (Energy model)	2014	DEF	H/R	M	F	2013_23
18	Communicate correct data for charcoal production to FAO	2014	BAFU Forest Division	H/R	M	F	2013_37
19	Re-evaluation of CO2-EF of liquid fuels	2015	ROR/BNA	H/R	M	P	2013_24
20	CH4 Emissionen Geother- miebohrung St. Gallen	2015	BNA; Input FP	L	H	NS	
21	CH4 Emissionen der Infra- struktur Flüssiges Erdgas	2015	BNA; Input ROR	L	H	NS	

Industrial processes and solvent and other product use

No	Planned improvement	Dead- line	Responsibility	Prio- rity	Work- load	Sta- tus	Reference
1	Provide documentation of confidential information in the industrial processes sector	on- going	CHS	H	L	F	
2	2B1/2B5: Reconsider un- certainty N2O; provide background information regarding plant specific data	2014	SCS/CHS	H	M	F	Internal review 2012: 4(7)
3	2A1 Geogenic emissions from cement industry	2014	SCS/KER CHS: NIR	H	L	F	SAIL; Review CSD

No	Planned improvement	Dead-line	Responsibility	Pri- ority	Work- load	Sta- tus	Reference
4	2A1 Explanation for ce- ment kiln dust correction factor = 1.0	2014	CHS	H/R	L	F	2012_61
5	2A1 Information regarding EF blasting operations, correction of emissions from blasting	2014	CHS	M/E	L	F	2012_62 2013_47 Review CSD
6	2A2 Lime production: Su- gar industry	2014	CHS	H/R	L	F	2012_63
7	2A3 Bricks & tiles: Justifi-ca-tion for assump- tions made. Include infor- mation from monitoring	2014	SCS: EMIS CHS: NIR	H/R	M	pR	2012_67 2011_60 2011_61 2012_65 2013_51
8	2B2 HNO ₃ -production: Category-specific QC. Veri- fication of plant specific data. Improve documenta- tion of EF	2014	SCS: EMIS CHS: NIR	H/R	H	F	2012_66 2013_52
9	Provide information regard- ing category-specific QA/QC	2014	NIR: CHS	H/R	M	F	2012_68
10	3D N ₂ O: Updated informa- tion regarding N ₂ O emissi- ons	2014	NIR: CHS	H/R	L	F	2012_69
11	Reporting of additional F- Gases in table 9(b)	2014	BNA	L	M	F	Internal review 2(4)

Agriculture

No	Planned improvement	Dead-line	Responsibility	Pri- ority	Work load	Sta- tus	Reference
1	Consolidation and harmo- nization of activity data: Establish direct relation with the FSO	on- going	LSI	M	M	P	
2	QA/QC: update of the QA/QC-documentation for agriculture	on- going	brd	M	H	P	
3	Manure use for biogas production: Coordination with sector 6D	2015	brd	H/E	M	pR	ERT2011 2013_56
4	Description of livestock categorization in the NIR	2014	brd/Infras	M/E	M	F	2012_73 ERT2013
5	4B: Include detailed expla- nation and references for MCF of 10%	2014	brd/Infras	H/R	M	F	2012_78 2013_60
6	4B: Report outcome of new surveys	2014	brd/Infras	H/R	M	F	2012_80
7	4D: Improve description in the NIR	2015	brd/Infras	H/R		pR	2012_82 2013_64
8	4F: Field burning of agricul- tural residues. Provide	2014	brd/EBP	H/R		F	2012_85

	<p>which a method would be applied), and the reasoning behind this. Further, include a clear and independent identification of references to the sources of information, including for AD, factors and parameters used.</p> <p>The ERT recommends that Switzerland report separated carbon pools in its annual submission as it enables a comparison of the order of magnitude in gains and losses of above-ground and below-ground biomass.</p>		RN	H	M	F	2013_72
4	<p>(KP-)LULUCF, Forest land, soil: Evaluation of availability of soil data to separate mineral and organic soils under forest.</p> <p>ART project "Activity data and allocation of fens/bogs and organic soils: a survey for the Swiss GHG inventory".</p> <p>The ERT encourages Switzerland to provide information justifying the use of the notation key "NE" or to report N₂O emissions from drainage of soils under forest management.</p> <p>CH₄ and N₂O emissions from drainage of forest soils and wetlands; CH₄, N₂O emissions from wetlands, settlements and other lands; and GHG emissions from harvested wood products are not reported. The ERT encourages Switzerland to report these emissions.</p>	<p>Sep 2014</p> <p>Sep 2013</p>	<p>ART (wuc), SA</p> <p>RN, BR</p>	<p>H</p> <p>M</p>	<p>H</p> <p>M</p>	<p>pR</p> <p>pR</p>	<p>Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden. Fehler! Verweisquelle konnte nicht gefunden werden. (AD) Fehler! Verweisquelle konnte nicht gefunden werden.</p> <p>QC Tier 2</p> <p>2012_122</p> <p>2013_67</p>
4	(KP-)LULUCF, Forest land remaining forest land – CO ₂ , soil:		RN, SA	H	H	F	<p>2008_78</p> <p>2010_93</p> <p>2010_99</p>

	<p>Improve estimate of carbon stock changes (by using a higher-tier method) in forest soils; improve documentation.</p> <p>Modelling soil organic carbon in Swiss Forests with Yasso07 (Part of GHGI Module NFI 4)</p> <p>The ERT strongly recommends that Switzerland improve the method used for calculating the carbon stock changes for certain activities under FM.</p> <p>ART-NABO project "Data processing and analysis of soil organic carbon as provided by the Swiss Soil Monitoring Network and other soil investigations"</p> <p>The ERT recommends that the Party describes in the NIR how the model Yasso07 is able to cover the impacts of management practices (including harvesting) with respect to changes in soil carbon, litter and dead wood carbon pools and also add extend the respective NIR chapter with a literature review.</p>	<p>Dez 2014</p> <p>ongoing</p> <p>Oct 2014</p> <p>Feb 2014</p>	<p>MD, THE</p> <p>MD, RN</p> <p>ART (ker), SA</p> <p>RN, MD</p>			<p>pR</p> <p>F</p> <p>pR</p> <p>F</p>	<p>2010_122 2010_123 2011_122</p> <p>QC Tier 2</p> <p>2012_121</p> <p>QC Tier 2</p>
5	<p>LULUCF, Cropland remaining cropland – CO₂: Improve estimate of carbon stock changes for mineral soils, improve documentation.</p> <p>FiBL project: "Determination of sources and sinks of greenhouse gases in Swiss arable soils."</p> <p>ART project: "Carbon sources and sinks in agricultural soils."</p>	<p>Sep 2013 ongoing</p> <p>Oct 2015</p> <p>2016</p>	<p>brd, SA</p> <p>FiBL</p> <p>ART</p>	H	H	<p>P</p> <p>pR</p>	<p>2008_79 2009_72 Fehler! Verweisquelle konnte nicht gefunden werden.</p> <p>QC Tier 2</p> <p>QC Tier 2</p>
6	<p>LULUCF, Cropland remaining cropland – Carbon Emissions from Agricultural Lime Application</p> <p>Update ART (2009) or discuss constant data in the NIR.</p>	Oct 2013	bt da	M	L	F	IR 2013_18
7	<p>LULUCF, Land converted to cropland – N₂O: The Party reports only N₂O emissions from mineral</p>	Sep 2013	BR, bt da	H	M	F	IR 2013_17 2011_94

	soils for conversions of forest land and grassland into cropland. It is not clear in the NIR why emissions for other land conversions are reported as "NO", when areas are reported in CRF table 5(III). The ERT recommends that the Party either include documentation on the notation key or report emissions in these categories using tier 1 approaches. The ERT reiterates the recommendation that Switzerland report the relevant emission estimates and document the relevant methods used.						2012_95
8	Wetlands – CH4: Implementation of CH4 emissions from reservoirs	Oct 2013	SA, BR	M	L	F	QC Tier 2
9	KP-LULUCF: Information required in paragraph 9(c) of the annex to 15/CMP.1 is not included in the submission.	Dec 2013	RN	H	L	F	ASR 2013 2013_84
10	LULUCF – KP-LULUCF: The ERT recommends that Switzerland provide a table in the NIR showing the relationship between AD of FL and FM (incl. respective LUCs).	Dec 2013	RN, BR, RV, SA	H	M	F	2012_113 2012_115 2013_83
11	KP-LULUCF – Overview: The ERT strongly recommends that Switzerland provide estimates for changes in litter under FM.	Dec 2013	RN	H	H	F	2012_110
12	LULUCF – KP-LULUCF, Forest land remaining for forest land: The ERT recommends that Switzerland provides transparent and verifiable information, which demonstrates that SOC is not a net source of emissions in accordance with chapter 4.2.3.1 of GPG	Dec 2013	RN	H	M	F	2013_74
13	KP-LULUCF – afforestations: The ERT recommends to include information on changes in mineral soils, dead wood and litter under afforestations < 20 years	Dec 2013	RN	H	M	F	2013_71 2013_87
14	KP-LULUCF – FM: The ERT recommends to further document its meth-	Dec 2013	RN	H	M	F	2013_88

	od to calculate carbon stock changes for certain practices under forest management in						
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Waste

No	Planned improvement	Dead-line	Responsibility	Prio- rity	Work- load	Status	Reference
1	Improvements based on domestic review: see items with "Rytec, p.xy" in IDP. Summary of recommendations p.19-22	2014	KER, SO	H	H	pR	domestic review report
2	Revise reporting of wastewater in accordance with GL. Provide AD for wastewater in CRF 6.B (instead of IE). Revise Fig. 8-5 in NIR	2014/ 2015	NIR: EBP	H	L	pR	2010_110 2011_98 2011_105 ERT2012 ERT2013
3	Methane recovery from SWDS. Consistency with energy sector and reporting in CRF tables.	2014	KER	H	L	P	2011_102
4	Revise projections for future EFs and equipment/operation improvements based on updated data and expert judgement (6C Sewage sludge incineration)	2014	EBP: EF KER: AD	M	L	pR	2008_94
5	EFs for special waste (CO ₂ , CH ₄ and N ₂ O)	2013	KER	L	M	NS	Rytec p.7
6	Improve description of waste streams (see also energy sector)	2014	WOM	H/R	M	F	2012_101 2013_78
7	6B-N ₂ O Provide information on consistency of AD on protein consumption between FAO and GHGInv	2014	WOM	M/E	L	F	2012_103
8	6D: Report emissions for the subcategories separately, i.e. emission data table for table 8-17	2014	EMIS: KER NIR: WOM	H/R	M	F	2012_104 2013_81
9	6B CH ₄ : Provide explanation on country-specific method in the NIR and provide additional info on industrial wastewater streams in CRF 6.B	Sub 2014	NIR: WOM CRF: KER	H/R	M	F	2012_105 2013_77

No	Planned improvement	Dead-line	Responsibility	Priority	Work-load	Status	Reference
10	6B CH ₄ : Use correct EF for sewage gas upgrading	Sub 2013	KER	H/R	L	F	2012_106
11	Provide documentation regarding waste categories and their composition	Sub 2014	WOM	H/R	L	F	2013_79
12	Enhance investigations of N ₂ O emissions from waste water	2015		M/E	H	NS	2013_80