Description of the Quality Management System

Supplement to Switzerland's Greenhouse Gas Inventory 1990-2010

Submission of 13 April 2012
under the United Nations Framework Convention on Climate Change
and under the Kyoto Protocol

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1 Introduction

This supplement to the greenhouse gas inventory 1990-2010 documents the current status (April 2012) of the NIS quality management system (QMS) and provides additional information to chapter 1 of the national inventory report (NIR) (FOEN 2012). 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 essential for this QA/QC paper. All definitions are taken from 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 and consistent 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[1] 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.

[1] The term used in UNFCCC (2006a) is "Key source category".

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 2012). 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, 2.4, 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 project management** has the overall responsibility for the integrity of the inventory. The main tasks of the project management 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 periodic 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 (hereafter: EMIS-NIR tables);
- 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.

Selected **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 2012). 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, flow charts of the core processes, and results of the GHG inventory project;
- current QA/QC activities (QA, tier 1/2 QC, internal audit plan, IDP);
- links to supporting documents;
- links to 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, the most important 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 system 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, as well as 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.

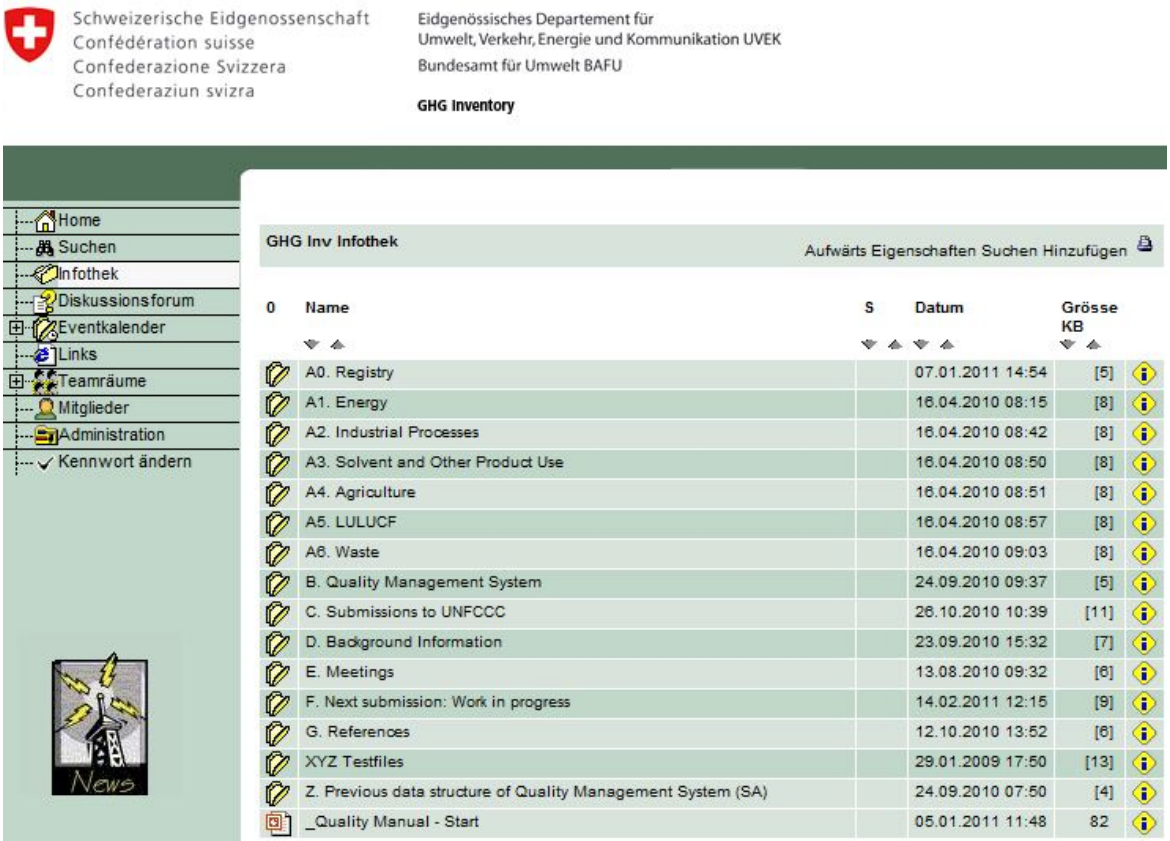

Figure 1: Screenshot "Infothek" showing the directory structure on the GHG inventory web platform.

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	◆ Selection												
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 management.

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 management 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. Based on the evaluation of the checklists, possible follow-up activities for the next GHG inventory cycle will be defined by the QA/QC officer in close cooperation with the inventory project management. Important findings will be listed in the inventory development plan.

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 **project management**

- 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 2011c; INFRAS with respect to the tier 2 uncertainty analysis, INFRAS 2008a; Meteotest 2012; Sigmaplan 2012) 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 and staff members have started to compose a comprehensive manual for the EMIS database, at this stage focusing on a detailed description of the diverse QC procedures implemented. Once finished it will replace the reference FOEN (2006c). The inventory project management stipulates and supports such activities.

2.3.3 Category-specific QC procedures

In addition to general QC, the inventory project management 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.

For the submission 2012, the implied emission factors of all key categories have been compared to the values used by other Parties (Infras 2012). The results are discussed in the section on category-specific QA/QC in the respective chapters in the NIR (FOEN 2012).

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 (Rytec 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.

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 will contribute to the preparation of the sectoral estimates for the next submission.

For 2012, the review of the industrial processes sector is planned. The decision to chose this sector was triggered by the recommendations of the in-country review in 2010.

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 2011, 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/2011/CHE). The synthesis and assessment report (FCCC/WEB/SAI/2011) has been published by the UNFCCC secretariat by end of June 2011. On 01 September 2011, 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 2011 were taken up straight away. The draft of the review report (FCCC/ARR/2011/CHE; UNFCCC 2012), was not received until 12 March 2012. Recommendations have been taken into consideration as far as possible (see section 1.6.1.5 in the NIR; FOEN 2012). Outstanding issues will be 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, all revised text files and review forms are available on demand.

2.4.4 Comparison of CRF and IEA CO_2 emission data

In 2006, an internal study (FOEN 2006g) was conducted to explain the small discrepancies that exist between the 1990-2003 Swiss CO_2 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 management was interested in learning about the reasons behind it. A compilation of the most relevant results is 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 CO_2 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 small deviations in stock changes. Differences in energy use were larger due to additional differences in net calorific values used to calculate the energy content.

2.4.5 Public information

FOEN operates a homepage (www.climatereporting.ch) from which the Swiss GHG inventories (NIR, CRF and SEF tables, KP LULUCF 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. The inventory project management plans to further expand the online availability of significant documents – and thereby the options for public review – in the future. As a major improvement in the recent past, the online-provision of most papers, internal reports, domestic reviews, Excel calculation sheets, and other difficult-to-access material ('grey literature'[2]) quoted in the GHG inventory has been achieved.
The national registry operates an independent public website (www.national-registry.ch), where e.g. information regarding account holders or the commitment period reserve is provided.

[2] '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. It specifically does not include normal scientific journals, books or popular publications that are available through traditional commercial publication channels (Wikipedia, [01.03.2008]).

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 file background information (e.g. interim worksheets, references, rationale for choice of methods) for any subset of inventory-related data (EMIS 2012/(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 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 management 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. In principle, it would be possible to grant UNFCCC review teams an own account to the GHG inventory web platform.
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 or inconsistent numbers in tables) 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 all pending actions and those that have been 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 2010 and in order to facilitate the overall view over the status of implementation of the suggestions made by the ERT, key recommendations and actions taken in response to them are listed in table 1-12, section 1.6.1.5 in the NIR (FOEN 2012).

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[3] Unless stated otherwise or considered confidential, references are made available at: http://www.bafu.admin.ch/climatereporting/00545/01913/index.html?lang=en

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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. It is currently redeveloped and will be updated regularly. The lists below correspond to the status as of April 2012. 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, GHGI project leader)
Andreas Götz (FOEN vice director, chair of NISSB)
Christine Hofmann (FOEN vice director)
Yvan Keckeis (Climate division; QA/QC officer national registry)
Christine Kieffer (Climate division; national registry administrator)
Rolf Manser (Head of forest division)
Franz Perrez (Head of international affairs division)
Susanne Riedener (Climate division, head of section for CO_2 act implementation)
Regine Röthlisberger (Climate division; QA/QC officer GHG inventory, NISSB secretary)
Martin Schiess (Head of air pollution control and non-ionizing radiation division)

National registry administrator
Christine Kieffer, Stefan Meier (alternate)

Quality supervisor of the national registry
Yvan Keckeis, Matthias Kohler (alternate)

GHG inventory project leader
Paul Filliger, Regine Röthlisberger (alternate)

QA/QC officer for the national inventory
Regine Röthlisberger, Paul Filliger (alternate)

GHG inventory core group
Daniel Bretscher (ART; agriculture)
Paul Filliger (FOEN; project leader)
Jürg Heldstab (INFRAS; NIR lead author and NIR compiler)
Fabio Leippert (INFRAS; NIRC alternate)
Beat Müller (FOEN; NIC, 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)
Markus Sommerhalder (EBP; NIR lead author)

National inventory compiler NIC
Sophie Hoehn (until 29.2.2012), Beat Müller (ad interim from 1.3.2012)

NIR lead authors
Jürg Heldstab (INFRAS; energy (transport), industrial processes (synthetic gases), agriculture)
Beat Rihm (Meteotest; LULUCF)
Nele Rogiers (FOEN; KP-LULUCF)
Markus Sommerhalder (EBP; energy (stationary), industrial processes, solvent & other product use, waste)

Swiss GHG inventory working group
All members of the GHG inventory core group
FOEN
Rainer Kegel, Simon Liechti, Sabine Schenker (Air pollution control division)
Keith Anderson, Michael Reinhard, Paolo Camin (alternate) (Forest division)
Elena Havlicek, Fabio Wegmann (Soil division)
Blaise Horisberger, Michael Hügi (Waste management, chemicals and biotechnology division)
Federal administration
Amilcare Foglia (Swiss Air Forces)
Pia Baumann (SFOE)
Daniel Felder, Christine Zundel (FOAG)
Jens Leifeld (ART)
Edgar Kaufmann, Esther Thürig (WSL)
Theo Rindlisbacher (FOCA)
Felix Weibel (SFSO)
External experts
Fredy Dinkel (Carbotech)
Christoph Könitzer, Lukas Mathys (Sigmaplan)
Richard Volz (Meteotest)
Selected experts from EBP and Infras (depending on topics discussed)

National focal point climate
José Romero
FOEN
International affairs division, head of Rio conventions section
jose.romero@bafu.admin.ch
+41 31 322 68 62

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 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.

5.2.2 Meetings of the GHG inventory core group

The GHG inventory core group meets bi-monthly during the half year preceding 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 subgroups address specific methodological topics.

5.2.5 Meetings of the agriculture group

The agriculture group meets on an ad hoc basis. Relevant experts for a particular topic are invited to discuss issues regarding agricultural emissions.

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 management 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 quality manual with the underlying documents.

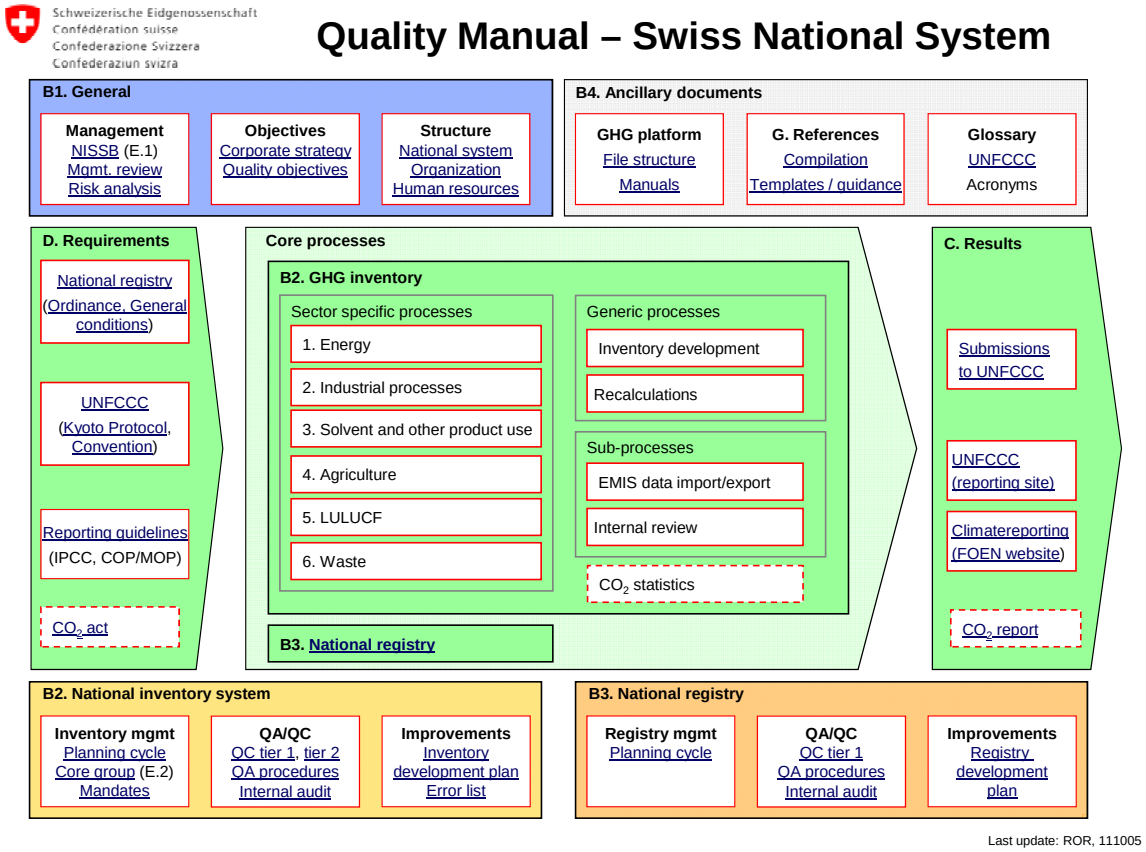

Figure 2: Overview of the quality manual of the national inventory system

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. 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)

As illustrative examples, a few examples are shown below. All sectors are treated in a similar manner. The flowcharts are accessible on the web platform. They contain active hyperlinks (e.g. [A1] or [QC]) that redirect to the corresponding folder.

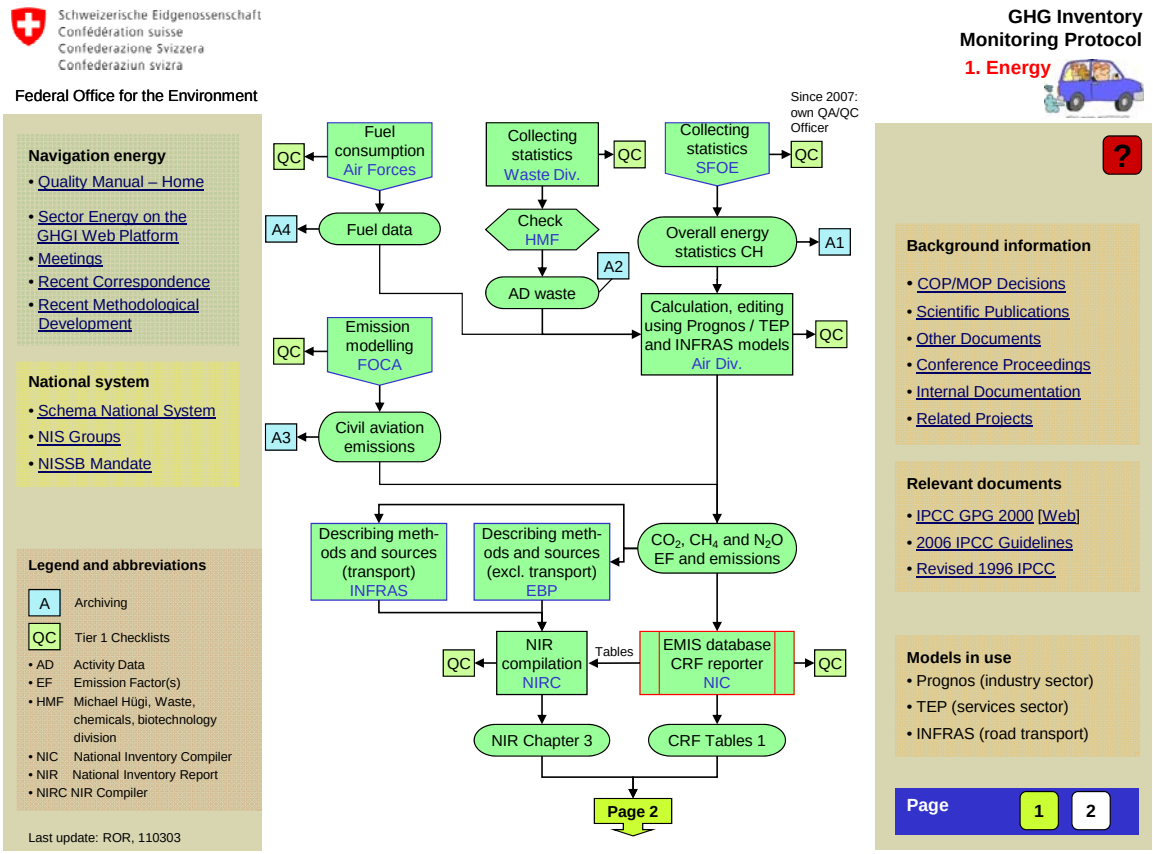

Figure 3: Monitoring protocol - Energy (page 1)

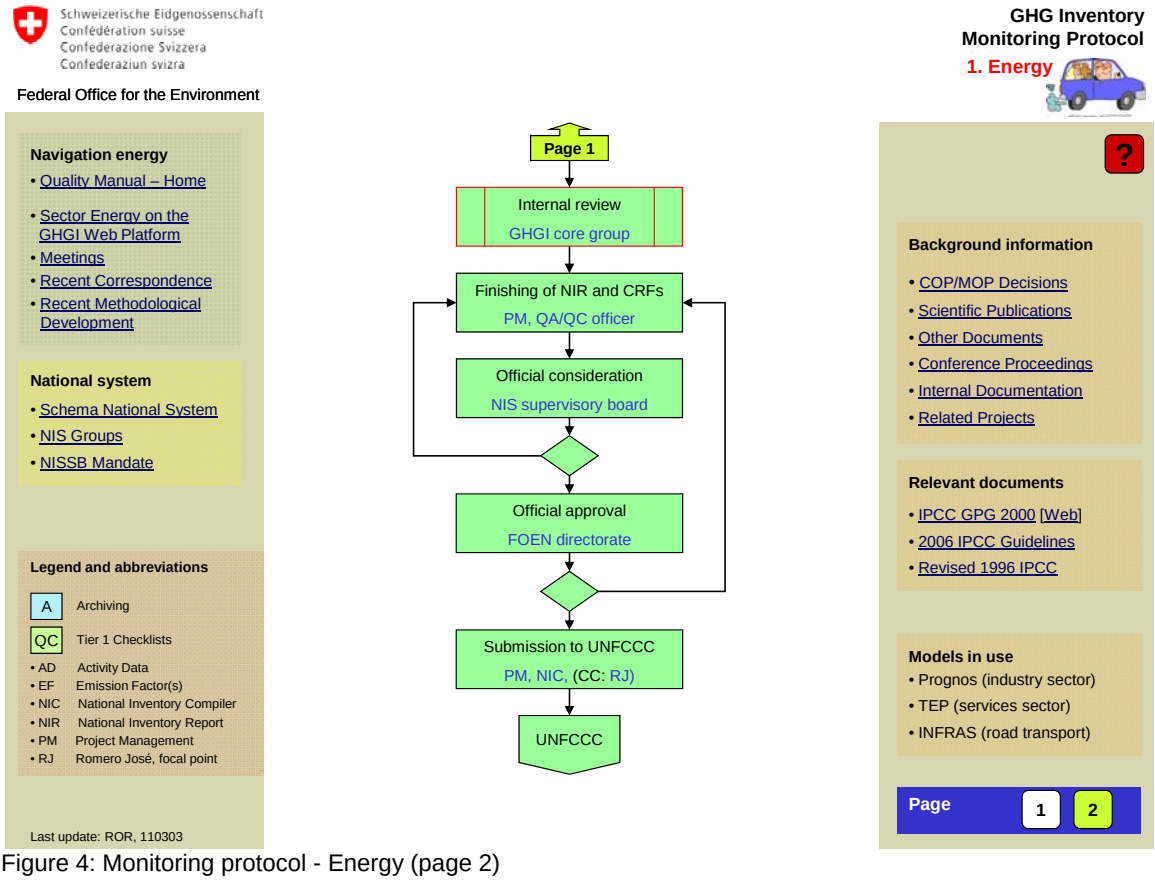

Figure 4: Monitoring protocol - Energy (page 2)

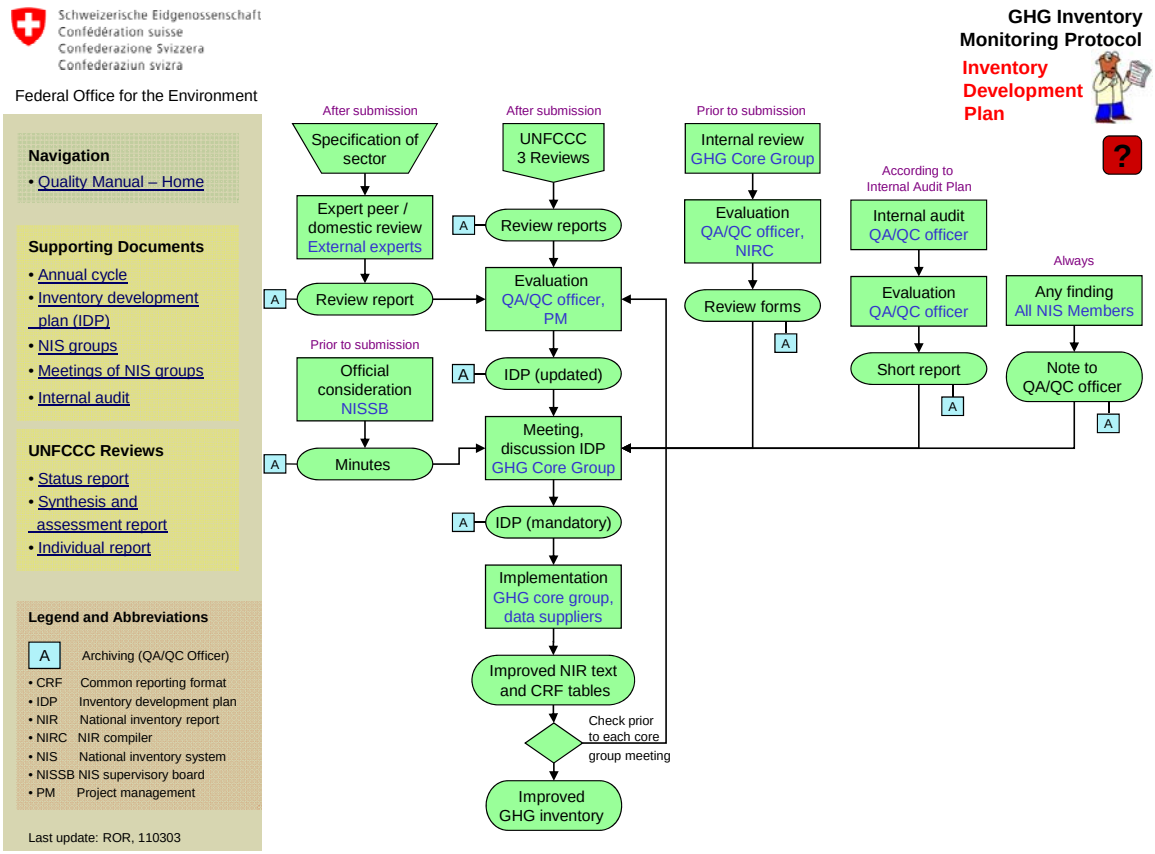

Figure 5: Monitoring protocol - Inventory development plan

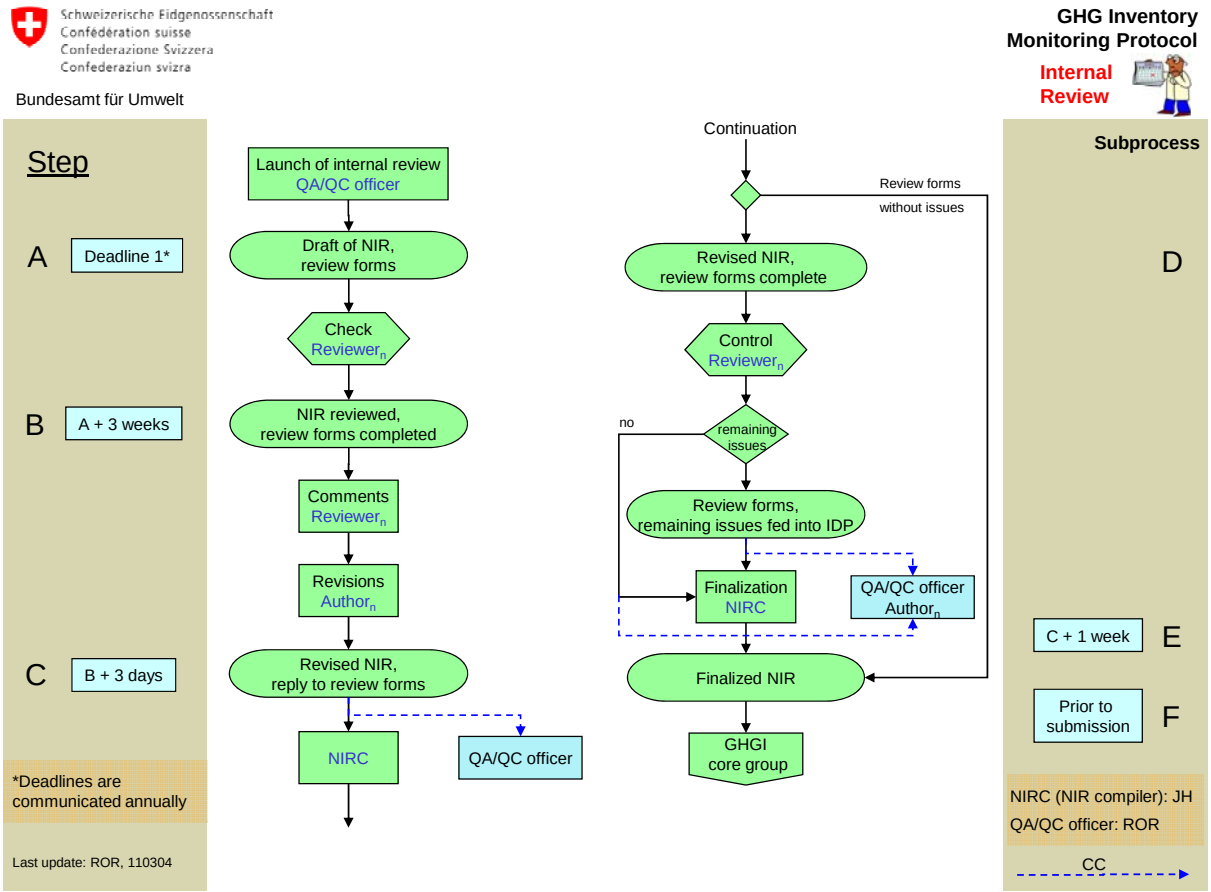

Figure 6: Monitoring protocol - Internal review

7 Annex C: Internal review

Chapter	Reviewers
ES Executive summary	Paul Filliger, Regine Röthlisberger (FOEN)
1 Introduction	Paul Filliger, Regine Röthlisberger (FOEN)
2 Trends in GHG emissions	Paul Filliger, Regine Röthlisberger (FOEN)
3 Energy (excl. transport)	Jürg Füssler (Infras); Beat Müller (FOEN)
3 Energy (transport)	Thomas Leutenegger (EBP); Theo Rindlisbacher (FOCA); Beat Müller (FOEN)
4 Industrial processes (synthetic gases)	Cornelia Stettler (Carbotech)
4 Ind. proc. (excl. synth. gases)	Sabine Schenker (FOEN)
5 Solvent and other prod. use	Simon Liechti (FOEN)
6 Agriculture	Reto Steiner (EBP); Daniel Bretscher (ART)
7 LULUCF	Daniel Bretscher (ART); Christoph Könitzer (Sigmaplan); Andreas Schellenberger (FOEN); Richard Volz (Meteotest)
8 Waste	Bernhard Oettli (Infras); Rainer Kegel (FOEN)
9 Other	Rainer Kegel (FOEN)
10 Recalculations	Daniel Bretscher (ART); Paul Filliger, Rainer Kegel, Beat Müller, Sabine Schenker (FOEN); Cornelia Stettler (Carbotech); Richard Volz (Meteotest)
11 KP-LULUCF	Richard Volz (Meteotest); Andreas Schellenberger (FOEN)
12 Kyoto units	Yvan Keckeis, Matthias Kohler, Regine Röthlisberger (FOEN)
13 National system	Paul Filliger (FOEN)
14 National registry	Yvan Keckeis, Matthias Kohler, (FOEN)
15 Minimization of adverse effects	Regine Röthlisberger (FOEN)
16 Other information	Regine Röthlisberger (FOEN)
A1 KCA	Paul Filliger, Regine Röthlisberger (FOEN)
A2 CO_2 from fuel combustion	Beat Müller, Regine Röthlisberger (FOEN)
A3 Detailed methodological description	Daniel Bretscher (ART), Thomas Leutenegger, Reto Steiner (EBP); Theo Rindlisbacher (FOCA), Cornelia Stettler (Carbotech)
A4 Reference approach	Regine Röthlisberger (FOEN)
A5 Completeness	Regine Röthlisberger (FOEN)
A6 Additional information	Regine Röthlisberger (FOEN)
A7 Tables 6.1 and 6.2 of GPG	Paul Filliger, Regine Röthlisberger (FOEN)
A8 Other annexes	Regine Röthlisberger (FOEN)
QA/QC supplement	Paul Filliger, Andreas Schellenberger (FOEN) ; Jürg Heldstab (Infras)

8 Annex D: List of QC tier 2 projects

In addition to general QA/QC activities, the inventory project management ensures tier 2 QC procedures by providing a FOEN (co)-funding of various projects in specific sectors. References that are not considered confidential or internal are available at
http://www.bafu.admin.ch/climatereporting/00545/01913/index.html?lang=en

8.1 Cross-sectoral activities

- Periodic update of EMIS comments (permanent; EMIS 2012)
- Verification of Swiss implied emission factors (completed, Infras 2012)

8.2 1 Energy

- Emission modelling of road transport (completed; SAEFL 2004);
- FOCAWIN: Measurement of fossil CO_2 emissions from waste incineration (completed; EMPA 2007, Mohn et al., 2008)
- Measurement of fossil CO_2 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 CO_2 emission data for the energy sector (completed, FOEN 2011d)
- Intertek: Reevaluation of CO_2 emission factors for fossil fuels (completed, Intertek 2008)
- Intertek: Reevaluation of CO_2 emission factors for fossil fuels (completed, Intertek 2012)
- Estimating marine bunkers in Switzerland (completed, Infras 2011a)
- Analysis of the reference approach and the reporting of feedstocks in the Swiss greenhouse gas inventory (completed, Infras 2010a)

8.3 2 Industrial processes

- HALCLIM: Continuous measurement of halogenated GHG at the Jungfraujoch, 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)

8.4 4 Agriculture

- Emission model for ammonia from agriculture (AGRAMMON; completed, Agrammon 2009)
- Agricultural CH_4 and N_2O emissions in Switzerland: QA/AC. Compilation of QA/QC activities at ART (ART 2011c)
- Study on potential of technical measures to reduce CH_4 and N_2O emissions from animal livestock (ETHZ, 2008-2011; completed, Kreuzer 2012)
- Compilation of uncertainty of agricultural CH_4 and N_2O 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).

8.5 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 CO_2? (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: Implementation and validation of the predictive soil carbon model Yasso07 on the basis of Swiss NFI data)
- 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: Langfristige Streuabbauexperimente auf LWF-Flächen – Daten zur Validierung von Bodenkohlenstoffmodellierungen im Schweizer Wald)
- Realization of an international workshop on the Swiss Yasso07 modelling results (FOEN, WSL; September 2011)
- 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)
- Summary of the available published data on root biomass and root carbon in Swiss grasslands (ART, completed 2011; ART 2011a)
- First estimate on CO_2 emission factor of organic soils under unproductive wetland (ART, completed 2011; ART 2011b)

Ongoing

- Activity data and allocation of fens/bogs and organic soils: a survey for the Swiss GHG inventory (ART, Nov 2011, ongoing until 2014)

- 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, ongoing until October 2012)
- Improvement of climate dependency of growth curves for analyzing forest development scenarios (WSL, ongoing until 2013; Thürig et al. 2009)
- Revision of increase in living biomass data for CC11 (WSL, ongoing until October 2012)
- Testing the warming and nitrogen theory of carbon sequestration (Basel University, Institute of Botany, COST E639; 2008 ongoing until 31.03.2012)
- Modelling soil organic carbon in Swiss Forests with Yasso07 – Validation (WSL, until April 2012)
- Stocks of soil organic carbon in Swiss forest soils: a geostatistical approach (ETHZ, WSL, ongoing until June 2012; internal documentation: preliminary report by Papritz and Nussbaum 2011)
- Turnover and stabilization of soil organic matter: effect of land-use change in alpine regions (WSL, COST E639; 2008 ongoing until March 2012; preliminary report by Zimmermann and Hiltbrunner 2011);
- Carbon sources and sinks in agricultural soils - Evaluation of Tier 3 methodological approaches for the quantification of carbon stocks and carbon stock changes in agricultural soils (ART, ongoing until February 2013)
- Data processing and analysis of soil organic carbon pools as provided by the Swiss Soil Monitoring Network (NABO) and other soil surveys (ART-NABO, ongoing until August 2014)
- Determination of sources and sinks of greenhouse gases in Swiss arable soils (Research Institute of Organic Agriculture FiBl, Frick, starts in spring 2012)

8.6 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 31st May 2011. Questions from the UNFCCC review team were added after the centralized review inSeptember 2011. Status of implementation as of 15 April 2012.

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

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

ART	Swiss Federal Research Station for Agroecology and Agriculture
Carbotech	Carbotech AG, private consultants (Experts synthetic gases)
EBP	Ernst Basler + Partner AG, private consultants (NIR co-authors)
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**

BR	Rihm Beat (Meteotest)	LSI	Liechti Simon (FOEN)
brd	Bretscher Daniel (ART)	MBU	Müller Beat (FOEN)
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HSO	Hoehn Sophie (FOEN)	ROR	Regine Röthlisberger (FOEN)
JH	Heldstab Jürg (INFRAS)	SA	Schellenberger Andreas (FOEN)
ker	Armin Keller (ART)	SCS	Sabine Schenker (FOEN)
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lm	Lukas Mathys (Sigmaplan)	THE	Thürig Esther (WSL)

3) Priority / Workload: H: High; M: Medium; L: Low
High priority is assigned to all key recommendations of the ARRs.

4) Status:

F:	Work finished
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. 2009_40 directs to paragraph 40 of FCCC/ARR/2009/CHE, internal review refers to the review forms, e.g. 4(3.) refers to review form of chapter 4, item 3, ERT-2011 refers to questions from the ERT during the review 2011 or to recommendations of the draft review report of 12 March 2012.

Cross-cutting issues / Miscellaneous

No	Planned improvement	Dead line	Responsibility	Priority	Workload	Status	Reference
1	Mandate for Core Group	2011	FOEN (FP)	L	L	NS	
2	Allocation of roles and accountability (for each sector)	2011	ROR / core group	H	M	F	2010_24
3	Documentation of recalculations at disaggregated level	Subm. 2012	Infras / HSO	H	M	F	2010_31 Internal review 10(1.) 2011_20 2011_23
4	Enhance QA/QC activities	2011/ 12	ROR	H	M	F	2010_32 2011_22 2011_23
5	Compare IEF with other countries	2012	ROR/Infras	M	H	F	2011_23 2011_35
6	Improve sectoral subsections on uncertainties, time-series consistency etc.	2012	Infras/EBP	M	M	F	Internal review 4(3.)
7	Improve description of uncertainty estimate	2012	Infras	M	M	F	Internal review Annex7(2.)

Energy sector

No	Planned improvement	Deadline	Responsibility	Priority	Workload	Status	Reference
1	Provide description of production methods in NIR	2012	EBP	H	H	F	2010_48 2011_34
2	Discrepancy between NIR and IEA energy consumption	2011	FOEN (MBU/ROR)	M	M	F	2006_29; 2008_26; 2009_40; 2010_49; 2011_41
3	Bunker fuels: Insert table with modelled and actual fuel sales for bunker and domestic aviation	2012	Infras (with rit)	L	L	F	2010_51 2011_43
4	Details regarding feedstocks and non-energy use of fuels. Consistency between reference and sectoral approach.	2011	FOEN (MBU) / Infras (FL)	H	M	F	2006_31; 2008_28; 2008_46; 2009_42; 2009_52; 2010_53; 2011_39 2011_45 2011_46
5	FOCAWIN: Planning and	2012	FOEN (FP,	M	L	F	2008_30;

No	Planned improvement	Dead-line	Responsibility	Prio-rity	Work-load	Sta-tus	Reference
	realisation of follow-up studies. Measurements in 2010 and 2011; (Rytec, p.6)		KER, HMF)				2009_44; 2010_55; 2011_48
6	Report assumption regarding composition of imported MSW in table 1.A(b); Check with WI plants, compare with NIR DE und IT	2011	EBP (SO)	M	L	F	2008_29;
7	Repeat measurements of EF for various fuels (Table 3-3 in NIR)	2010 and later	FOEN (KER/DF)	M	L	F	2009_37 2011_35
8	Provide uncertainty estimate of energy statistics	2013	FOEN in collab. with SFOE, Infras, EBP	H	M	pR	2008_11;
9	Biomass consumption (NIR Table 3-17 vs. CRF 1A1a) consistently reported	2011	HSO/SCS (Daten) EBP (NIR)	H	L	F	2010_57 ERT-2011
10	High N2O IEF in 1A1a. Is this realistic? N2O emission from MSW incineration plants (effect of DeNOx kit) Rytec p.6	2012	KER/HSO	M	M	NS	2010_58 2011_35
11	New EF for alternative fuels from Cemsuisse	2011	ROR/HSO	H	L	F	
12	Geogenic emissions from Cemsuisse: AD	2013	FP/HSO	H	L	P	
13	Leakage and methane slip in landfill gas engines (Rytec p. 10): Where is this CH4 reported in NIR	2012	EBP, LSI/KER/ (HSO)	H	L	NS	Rytec
14	1.A.4.b: CH4 and N2O (?) from wood: EF are lower than IPCC range. Provide explanation	2013	EBP			F	2011_35
15	1.A.1.a: Provide brief information what “special waste” comprises	2012	EBP			F	2011_49
16	Outline of energy chapter	2012	Infras			F	ERT-2011

Industrial processes and solvent and other product use

No	Planned improvement	Dead-line	Responsibility	Prio -rity	Work -load	Sta-tus	Reference
1	Improve transparency by providing short technical	2011	EBP in collab. with FOEN	H	M	F	2008_43; 2010_62

No	Planned improvement	Dead-line	Responsibility	Prio-rity	Work-load	Sta-tus	Reference
	description of production process, time series of AD, EF, documentation of as-sumptions made		(SCS (Daten), CHS (NIR))				2011_57
2	Bricks and tiles: Justifica-tion for assumptions made.	2011	SCS/CHS	H	M	pR	2010_67 2011_60 2011_61
3	Nitric acid prod. (N2O): describe prod. and abate-ment technology, justify use of EF	2011	(SCS)/CHS	H	L	F	2006_64; 2006_65; 2008_53; 2010_69 2011_65
4	Validate updated AD and EF for carbide production	2011	SCS/CHS	H	M	F	2010_70 2011_67 2011_68
5	Provide detailed reporting on ammonia and ethylene production (2B1/2B5), in particular how EF was derived	2011	SCS/CHS	H	M	pR	2010_71 internal review 4(5.)
6	Solvent and other product use: use country-spec. carbon content of NMVOC; designate FOEN expert responsible for solvent	2011	FOEN (SCS)/CHS	L	M	pR	2006_58
7	Clarify description of 2C1 and 2C2 in NIR	2012	CHS			F	ERT-2011
8	2F1 Refrigeration and AC equipment	2012	Infras (SK)/ Carbotech			F	2011_63

Agriculture

No	Planned improvement	Dead-line	Responsibility	Prio-rity	Work load	Sta-tus	Reference
1	Consolidation and harmo-nization of activity data: Establish direct relation with the FSO	On-going	brd (LSI)	M	M	P	
2	Adoption of consolidated input data from AGRAM-MON	Oct 2012	brd	H	L	P	
3	Exploration of the possibili-ty to adopt new input data from GruDAF: crop yields, %DM, crop/ residue-ratios, N-content	Sep 2012	brd	H	M	pR	
4	QA/QC: update of the QA/QC-documentation for	April 2012	brd	M	H	F	

	agriculture						
5	GEI for mules and asses is high compared to other parties	Sep. 2012	brd	L	M	P	2010_81 2011_77
6	Volatilization of NH3 from fertilizer: Investigate emission rate for various compound mineral fertilizers	Sep. 2011	brd / Infras	M	H	F	2010_85
7	Description of animal categories: Need for clarification?	2012	Brd / Infras			F	2011_74
8	Manure use for biogas production: Coordination with sector 6D	2013	Brd / Infras; coordination with EBP			pR	ERT-2011

(KP-)LULUCF

No	Planned improvement	Deadline	Responsibility	Priority	Work-load	Status	Reference
1	(KP)-LULUCF, Forest land remaining forest land – CO_2: Use the appropriate BEF values in future submissions.	Oct 2012	THE, RN	H	H	P	2006_92 see also 2010_121
2	(KP-)LULUCF, Forest land remaining forest land – CO_2, soil: Improve estimate of carbon stock changes (by using a higher-tier method) in forest soils; improve documentation. Provide additional information about increased litter input to the soil system and provide evidence that decomposition rate has not increased since 2000.	Oct 2010 ongoing	RN, SA	H	H	pR	2008_78 2010_93 2010_122 2010_123
	Implementation of WSL studies “Modelling soil organic carbon in Swiss Forests with Yasso07” and “Testing the Yasso07 model with long term litterbag data from five LTFER sites and two elevation gradients in the Swiss Prealps”.	Sep 2012	RN		H	pR pR	QC Tier 2
	Implementation of WSL studies “Modelling soil organic carbon in Swiss Forests with Yasso07 – Validation” and Realization	Sep 2012	RN		H	pR	QC Tier 2

	of an international Workshop on the Swiss Yasso07 modelling results.	Oct 2011				F	
	Implementation of the results of COST 639 projects “Turnover and stabilization of soil organic matter: effect of land-use change in alpine regions” and “Testing the warming and nitrogen theory of carbon sequestration”.	Jun 2012 Jun 2012	RN		M	pR P	QC Tier 2
	Implementation of ETHZ/WSL model results “Stocks of soil organic carbon in Swiss forest soils” (geostatistic approach).	Jun 2012	RN		M	pR	QC Tier 2
	Evaluation and implementation of soil organic carbon data provided by the Swiss Soil Monitoring Network.	2014	ker, SA		H	P	QC Tier 2
3	(KP-)LULUCF, Forest land remaining forest land – CO_2, soil: Evaluation of availability of soil data to separate mineral and organic soils under forest.	Nov 2011	BR	H	M	F	QC Tier 2
	Evaluate EFs of organic soils under forest.	Sep 2011	lej			F	
4	(KP)-LULUCF, Land converted to forest land – CO_2: Increase transparency by including a table illustrating the methodological approach (most recent year).	Feb 2012	BR, RN, SA	H	M	F	2010_95 2010_118 vTi 2011
5	LULUCF, Cropland remaining cropland – CO_2: Improve estimate of carbon stock changes (by using a higher-tier method) for mineral soils, improve estimate of carbon stock changes in living biomass; improve documentation.	Oct 2010 ongoing	brd, SA	H	H	pR / F	2008_79 2009_72 2010_94
6	LULUCF, Grassland remaining grassland – CO_2: Improve estimate of carbon stock changes (by using a higher-tier method) for mineral soils, improve es-	Oct 2010 ongoing	brd, SA	H	H	pR / F	2006_97

	timate of carbon stock changes in living biomass; improve documentation.						
7	Biomass burning – CO_2: Provide (more detailed) rationale for including CO_2 emissions from biomass under forest land and for use of notation keys “IE” in CRF table 5(V).	Feb 2012	RN, BR	H	L	F	2010_96 2010_97
8	(KP-)LULUCF, QA/QC: vTI Review – Follow ups of expert peer review 2010	Feb 2012	all	H	H	F	vTI 2011
9	QA/QC: Development of a QMS-subsystem for KP-LULUCF	Apr 2010 on-going	RN, ROR	H	M	F	
10	Establish category-specific QA/QC and description thereof in NIR	March 2011 on-going	BR, SA, all	H	M	F	2008_77

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 recom-mendations p.19-22	2010/ 2011/ 2012	FOEN (KER, ROR, FP)	H	H	pR	domestic review report
2	Provide description of DOC calculation in the NIR (not only in EMIS);	2011	EBP	H	M	F	2010_103 2011_101 Rytec (p.9)
3	Improve reporting on wastewater treatment by using year-specific values on protein consumption .	2011	HSO / EBP	H	M	F	2010_106 2011_103
4	Provide AD for wastewater in CRF 6.B (instead of IE).	2011	EBP/KER	M	L	pR	2010_110 2011_98 2011_105
5	Composting and digesting organic waste: provide more information on EF and methods.	2011	FOEN (KER), EBP	M	L	F	2008_90; 2011_ 104 Rytec p. 13 - 15
6	Revise projections for future EFs and equip-ment/operation improve-ments based on updated data and expert judgement (6C Sewage sludge incine-ration)	Subm. 2013	EBP in collab. with FOEN (KER, HMF)	M	L	NS	2008_94

No	Planned improvement	Dead-line	Responsibility	Prio-rity	Work-load	Status	Reference
7	EFs for special waste (CO2, CH4 and N2O)	2012	KER	L	M	NS	Rytec p.7
8	Default parameters for landfill-model: fraction of CH4 in landfill gas, fraction of DOC dissimilated	2012	KER	M	M	NS	Rytec p.9
9	N2O emission from wastewater treatment: Is new study from Eawag considered in EMIS com?	2011	EBP/KER	H	L	(no)	Rytec p.12
10	Illegal waste incineration EF for N2O	2011	KER	H	L	NS	Rytec p.17
11	Description of waste water treatment in NIR	2012	EBP			F	2011_98 2011_105

Other sectors

No	Planned improvement	Dead-line	Responsibility	Prio-rity	Work-load	Status	Reference
1	Estimate CH4 and N2O emissions or use NE.	2011	HSO	L	L	F	2010_114 2011_107
2	Indirect emissions: Check underlying data and calcu-lations	2012	CHS	M	M	F	Internal review 9(1.)(2.)