



Review and restructuring of the Swedish NIR and IIR

Suggestions for improvements

Karin Kindbom, IVL Swedish Environmental Research Institute
Mats Jernström, Maria Lidén, Statistics Sweden
Erik Karlun, Swedish University of Agricultural Sciences

2008-03-14

Contract No: 309 0814

Commissioned by the Swedish Environmental Protection Agency

Published at: www.smed.se

Publisher: Swedish Meteorological and Hydrological Institute

Address: SE-601 76 Norrköping, Sweden

Start year: 2006

ISSN: 1653-8102

SMED is short for Swedish Environmental Emissions Data, which is a collaboration between IVL Swedish Environmental Research Institute, SCB Statistics Sweden, SLU Swedish University of Agricultural Sciences, and SMHI Swedish Meteorological and Hydrological Institute. The work co-operation within SMED commenced during 2001 with the long-term aim of acquiring and developing expertise within emission statistics. Through a long-term contract for the Swedish Environmental Protection Agency extending until 2014, SMED is heavily involved in all work related to Sweden's international reporting obligations on emissions to air and water, waste and hazardous substances. A central objective of the SMED collaboration is to develop and operate national emission databases and offer related services to clients such as national, regional and local governmental authorities, air and water quality management districts, as well as industry. For more information visit SMED's website www.smed.se.

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Background and Introduction

The primary purpose of the National Inventory Report (NIR) submitted to the UNFCCC and the Informative Inventory Report (IIR) submitted to CLRTAP is to facilitate the inventory review processes in the two conventions. The reports are a complement to the inventory data reported in the CRF or NFR format, with the intention of being transparent enough for the review experts to be able to assess if the inventory fulfills the requirements for reporting.

There are two primary reasons for conducting a review and possible restructuring of the Swedish NIR and IIR:

- 1) In the reports from the review process within the UNFCCC there has been comments regarding insufficient explanations and transparency, and that the NIR could be better in line with the UNFCCC reporting requirements on presenting source-specific information (e.g. on activity data, emission factors, methodology, time-series consistency, recalculations etc).
- 2) There is a practical need of structuring the NIR and IIR in a way that the annual work with the update of these reports will be as smooth and cost-effective as possible. This includes also to critically assess if information already in the NIR and IIR is necessary from the point of view of reporting requirements and of transparency in the review process.

The objective of this project is to develop suggestions aiming at a better structure and content of the NIR and IIR, ensuring:

- that the requirements in the UNFCCC Guidelines are fulfilled.
- that the requirements according to the Monitoring Mechanisms are fulfilled.
- that the NIR and IIR will be clear, informative and easy to use in the review processes.
- that the NIR and IIR are structured in a way that the annual update of these reports is facilitated.

Guidelines and requirements

UNFCCC Guidelines for NIR

The UNFCCC guidelines on reporting and review (FCCC/CP/2002/8) state that Annex I Parties shall submit a NIR containing detailed and complete information on their inventories. The NIR should ensure transparency and contain sufficiently detailed information to enable the inventory to be reviewed.

41. The NIR should include:

- (a) Descriptions, references and sources of information of the specific methodologies, assumptions, emission factors and activity data, as well as the rationale for their selection. It also should include an indication of the level of complexity applied (Tier) and a description of any national methodology used by the Annex I Party, as well as information on anticipated future improvements. For key sources, an explanation should be provided if the recommended methods from the appropriate decision tree in the IPCC Good Practice Guidance are not used. In addition, activity data, emission factors and related information should be documented in accordance with the IPCC Good Practice Guidance.
- (b) A description of the national key sources including:
 - (i) Reference to the key source tables in the CRF;
 - (ii) Information on the level of source category disaggregation used and its rationale;
 - (iii) Additional information relating to the methodology used for identifying key sources;
- (c) With regard to possible double counting or non-counting of emissions, an indication in the corresponding sectoral part of the NIR:
 - (i) Whether feedstocks and non-energy use of fuels have been accounted for in the inventory, and if so, where they have been accounted for in the energy or industrial processes sector;
 - (ii) Whether CO₂ from agricultural soils has been estimated and if so, where it has been accounted for in the agriculture sector (under category 4.D – Agricultural soils) or in the land-use change and forestry (LUCF) sector (category 5.D – CO₂ emissions and removals from soil);
 - (iii) Whether emissions of CO₂ corresponding to atmospheric oxidation of CO, NMVOCs and CH₄ emissions from non-combustion and from non-biogenic processes, such as solvent use, coal mining and handling, venting and leakages of fossil fuels, have been accounted for in the inventory;

- (iv) Information on source or sink categories excluded or potentially excluded, including efforts to develop estimates for future submissions;
- (d) Background data used to estimate emissions and removals from the LUCF sector to enhance transparency;
- (e) Information on how the effects of CO₂ capture from flue gases and subsequent CO₂ storage are accounted for in the inventory;
- (f) Information on uncertainties, as requested in paragraph 32 above;
- (g) Information on any recalculations relating to previously submitted inventory data, as requested in paragraphs 33 to 35 above, including changes in methodologies, sources of information and assumptions, as well as recalculations in response to the review process;
- (h) Information on changes from previous years, not related to recalculations, including the changes in methodologies, sources of information and assumptions, as well as changes in response to the review process;
- (i) Information on QA/QC as requested in paragraph 36 above, describing the QA/QC plan, and the QA/QC activities implemented for the entire inventory as well as for individual source categories, in particular key sources, and the entire inventory performed internally, as well as on the external reviews conducted, if any. Key findings on the quality of the input data, methods, processing and archiving and how they have been addressed, should be described;
- (j) A description of the institutional arrangements for inventory preparation.

42. If any of the information required under paragraph 41 (a) to (h) above is provided in detail in the CRF, Annex I Parties should indicate in the NIR where in the CRF this information is provided.

43. The NIR should be reported in accordance with the outline contained in the Annex I to these guidelines, ensuring that all information requested in paragraph 41 above is included.

Annex I of the UNFCCC guidelines on reporting and review (FCCC/CP/2002/8) presents the structure of the National Inventory Report (presented in Appendix 1 of this report).

Monitoring Mechanism

In order to comply with requirements under the Monitoring Mechanism a NIR containing the information according to the FCCC/CP/2002/8) is sufficient. In decision 280/2004/EG, Article 3 on the reporting from the Member States it is, in relation to the NIR, stated that:

1. Senast den 15 januari varje år (år X) skall medlemsstaterna fastställa och rapportera följande till kommissionen, för bedömning av de faktiska framstegen och för att möjliggöra utarbetandet av gemenskapens årliga rapporter i enlighet med ramkonventionen och Kyotoprotokollet:

[...]

f) De delar av den nationella inventeringsrapporten som är nödvändiga för utarbetandet av gemenskapens inventeringsrapport över växthusgaser, såsom information om medlemsstatens plan för kvalitetssäkring/kvalitetskontroll, en generell osäkerhetsbedömning, en generell bedömning av hur uttömmande uppgifterna är samt information om de omräkningar som gjorts.

[...]

i) Åtgärder som vidtagits för att förbättra beräkningarna, exempelvis när det gäller områden där inventeringen ändrats.

[...]

k) Varje ändring av det nationella inventeringssystemet.

CLRTAP Guidelines for IIR

The new Draft UNECE 2007 Guidelines for Estimating and Reporting Emissions have been revised by the Task Force on Emission Inventories and Projections (TFEIP) to update the 2002 Guidelines. The revised Guidelines were presented for consideration by the EMEP Steering Body at its thirty-first session (document ECE/EB.AIR/GE.1/2007/15, available at http://www.unece.org/env/emep/emep31_docs.htm) and their legal status was considered by the Working Group on Strategies and Review at its fortieth session (document (ECE/EB.AIR/WG.5/2007/16 available at <http://www.unece.org/env/wgs/docs40th%20session.htm>). The technical contents of the Annexes to the Guidelines have been agreed on, and should be used as a basis for reporting as of 2009. There are still some pending issues concerning legal matters in the Guidelines, e.g. the choice of "should" or "shall" for some reporting requirements (see below, paragraphs 11 and 17 from the Draft 2007 Guidelines).

Matters relating to the IIR in the draft 2007 Guidelines are presented below, and Annex VI of the Guidelines presenting a recommended structure for the IIR is in Appendix 2 of this report.

8. The Guidelines aim to ensure that national emission inventories and projected emissions conform to the principles of transparency, consistency, comparability, completeness and accuracy [.....]

11. In addition to submitting emission data reports by filling out the reporting templates in Annex IV, Parties within the geographical scope of EMEP [should][shall] submit an Informative Inventory Report (IIR) prepared according to the outline provided in Annex VI.

17. Parties within the geographic scope of EMEP [should][shall] use the methodologies in the latest version of the EMEP/CORINAIR Atmospheric Emission Inventory Guidebook (the Guidebook), as endorsed by the Executive Body to estimate emissions and projections for each source category. Parties can use national or international methodologies that they consider better able to reflect their national situation, provided that the methodologies produce more accurate estimates, are scientifically based, are compatible with the Guidebook, and are documented in their Informative Inventory Report (IIR, as described in paragraph 8 and Annex VI).

The present NIR and IIR

The NIR is used in the international formal review process within the UNFCCC, but also in the national independent review. The IIR is primarily used in the review process within CLRTAP, which has been under development for the last few years. The review program within CLRTAP is still not an officially formal process, but will probably become more legally important in the near future. In this project the UNFCCC requirements are prioritized and the recommendations from UNECE CLRTAP are used as a source for good suggestions.

The first NIR in which SMED was involved was submitted in 2001, covering the year 1999 emissions. That NIR consisted of 66 pages, including emission factor tables. In submission 2002, the NIR was 73 pages and in submission 2003 99 pages. During 2003 a project to improve the NIR was performed, which resulted in a NIR better in line with the structure from FCCC/CP/2002/8 (see Appendix 1) and consequently expanded to between 200 - 300 pages in the following annual submissions.

The first inventory report submitted to CLRTAP was that of submission 2002, covering the year 2000 data. This report consisted of 28 pages. The IIR has been developed along with the NIR and the structures of both NIR and IIR are similar and based on the NIR. To produce the IIR, originally all issues relating to greenhouse gases were excluded from the NIR and matters concerning pollutants not reported to the UNFCCC but to CLRTAP were added.

The present practice for annual updates of the NIR and IIR starts with the previous year's reports. The text in the reports is changed primarily where methodologies have changed, and an update of issues relating to the last year is made, where e.g. the last year's data have to be added. All recalculations from last year described in each chapter are deleted and replaced by present year recalculations.

Practical considerations

Since the NIR and IIR have to be updated and submitted every year, and both contain a lot of information, there is a need for a structure which facilitates as easy and reliable update as possible. This could be accomplished by structuring the reports in a way that information which is known to be rather stable and with less need of annual update are kept separate from parts clearly needing annual updates. In practice this would mean choosing which information should be in the actual chapters (or parts of chapters) and what could be moved to appendices. This is the approach in the new recommended structure for IIR, where the information is structured in chapters which need annual update, and others which are expected to stay more stable over time.

A second practical issue to consider is how to ensure that information is updated in both the NIR and IIR, when there is such a need.

The objective is that the NIR and IIR should be kept in similar structures also in the future. An alternative would be to produce one report covering information for both conventions (and the upcoming NEC directive requirements). This will, however, result in a huge and probably rather unmanageable report. Another problem is that the due dates for delivery of the respective NIR and IIR to the Swedish EPA are different, with an earlier delivery of a draft NIR for Swedish EPA to add material in the Executive Summary and in Chapter 2 on Trends in Greenhouse Gas Emissions. The NIR needs to be delivered in a draft, but almost final format, prior to the national independent review. The IIR on the other hand is delivered at a later date and is reviewed by the Swedish EPA. At present, the IIR is not subject to a formal national independent review process.

Identified needs for overall structural changes

At present the NIR main report in principle is in line with the required structure for NIR according to FCCC/CP/2002/8. There are however some deviations concerning the prescribed Annexes. Table 1 shows the present Annexes of the Swedish NIR in comparison with what is prescribed in the FCCC Guidelines.

Table 1 Comparison of Annexes in the present Swedish NIR and in the Guidelines.

According to FCCC/CP/2002/8	Present Swedish NIR
Annex 1, Key sources	Annex 1, Methodology for analysis of Key Sources
Annex 2, Detailed discussion of methodology and data for estimating CO ₂ emissions from fossil fuel combustion	Annex 2, Methodology for Uncertainty analysis
Annex 3, Other detailed methodological descriptions for individual source or sink categories	Annex 3, Energy consumption stationary combustion
Annex 4, CO ₂ reference approach and comparison with sectoral approach, and relevant information on the national energy balance	Annex 4, The ARTEMIS road model
Annex 5, Assessment of completeness and (potential) sources and sinks of greenhouse gas emissions and removals excluded	Annex 5, The Swedish National System
Annex 6, Additional information to be considered as part of the NIR submission or other useful information	Annex 6, The Quality System as part of the National System
Annex 7, Uncertainties (Tables 6.1 and 6.2 of IPCC Good Practice Guidance).	Annex 7, Normal-year corrected emissions
Annex 8, Other Annexes	Annex 8, Description of the National Registry
	Annex 9, Description of Sweden's Emission Trading Scheme and comparison to the national inventory system
	Annex 10, Abbreviations

It is obvious that the Annexes in the present Swedish NIR need to be reorganised in order to be in line with the FCCC template, but also that there is opportunities for

moving and, if relevant, expanding information presently in the main report of the NIR into Annexes.

Annex 3, Other detailed methodological descriptions, Annex 4, Reference approach and Annex 5, Assessment of completeness in the Guidelines are currently not developed or used in the present Swedish NIR.

At present the emission factor tables and table of thermal values are reported in a separate excel file. This is not available on the UNFCCC web, where only the NIR and the CRF-tables are uploaded. It should be considered whether it is appropriate to include these tables as an Annex in the NIR.

Identified needs for improvement of content

Issues which have not been included in the NIR

Some issues have not been covered in previous Swedish NIR:s, but should be included to respond to the requirements for documentation. Provisions need to be made for information on:

- Changes to the National System: The present Annex 5 in the Swedish NIR describes the National System. A heading on Changes to the National System could be added to the information in this Annex. This Annex is the responsibility of the Swedish EPA.
- Changes to the National Registry: The present Annex 8 in the Swedish NIR describes the National Registry. A heading on Changes to the National Registry could be added to the information in this Annex, which is the responsibility of the Swedish EPA.
- Information on the Assigned Amount: The Assigned Amount is at present not mentioned in the NIR. An Annex covering information on the Assigned Amount should be added.
- Concerning LULUCF: The future reporting according to Kyoto for LULUCF has to be investigated further, but could be included as a separate part in the sectoral chapter for LULUCF.

General issues for all inventory sectors, NIR and IIR

- Develop a clear structure on which type of information should be in the main chapters (or in identified parts of chapters) and which type of information should be moved to appendices.
- Review the present NIR/IIR to identify sections that are too extensive in relation to relevance for the review process, and can be shortened or moved to an appropriate annex.
- Include more explanations on observed time trends, such as significant "dips and jumps" in activity data, emission factors and emissions.
- Include clear references to, and, if needed, discussions about which method was used according to the IPCC Guidelines, Good Practice

Guidance and the new EMEP CORINAIR Guidebook (e.g. Tier 1, 2 or 3).

- Analyse if underlying information needs to be collected or presented in order for the data to be transparently explained (e.g. energy balances, annual mileage travelled per vehicle category etc.)
- Review the presentation of recalculations. Should these be made in sectoral chapters as opposed to in chapter 10, and how to present impacts? Clearly state if recalculations (or other changes) have been made in response to the review process.
- How much "results" should be in the NIR/IIR, how detailed and where? A suggestion is that this information is put in the initial overview part for each sector, which needs to be updated annually.
- Better descriptions on completeness, e.g. in each overview section and in annex.

General issues from the independent national review

The independent national review of submissions 2007 and 2008 to UNFCCC lead to several detailed source specific enquiries for more explanations in the NIR or alternatively in the work documentation. These include the need for more explanations and discussion on:

- Trends and reasons for changes between years
- Emission factors, the origin and updating of emission factors
- Uncertainties for source specific activity data and emission factors
- The reasoning behind choices of emission factors and activity data
- More elaborated explanations on methodology/underlying information in some cases
- An overview (in table format) of what is and is not included in the reporting (NE, IE, NO etc)

All the above needs from the national reviewers are covered by the requirements according to the FCCC Guidelines, except the overview table of what is/is not included in the reporting. This proposed overview table is in the reporting to UNFCCC covered by the CRF-tables, and should be covered in Annex 5 on completeness according to the FCCC Guidelines.

Review of NIR from other countries

The NIR reports from other countries were downloaded from:

http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4303.php

Austria

In the Austrian NIR the overview section for all sectors, except for 1A in the Energy sector, is well developed and contains a general overview, relating to the last year's submission. The section also provides a very good analysis of the sector development over time. The structure of CRF sector 2 (industrial processes) in the Austrian NIR is given below:

4 INDUSTRIAL PROCESSES (CRF SECTOR 2)	149
4.1 Sector Overview	149
4.1.1 Emission Trends	149
4.1.2 Key Categories.....	156
4.1.3 Methodology.....	157
4.1.3.1 Emission data reported under the European Emission Trading Scheme (ETS).157	
4.1.4 Uncertainty Assessment	158
4.1.5 Quality Assurance and Quality Control (QA/ QC).....	158
4.1.6 Recalculations.....	159
4.1.7 Completeness.....	160
4.1.8 Planned Improvements	161

Following the overview section, each source within the sector is described according to the structure from FCCC, that is a source category description, a methodological description etc for each source (see page 20, Structure of sectoral chapters).

For 1A an approach of aggregating the source category description is taken, while there are separate descriptions covering methodological issues for each source.

3 ENERGY (CRF SECTOR 1)	71
3.1 Sector Overview	71
3.1.1 Emission Trends	71
3.2 Fuel Combustion Activities (CRF Source Category 1.A)	73
3.2.1 Source Category Description	73
3.2.1.1 Key Sources.....	74
3.2.1.2 Completeness.....	75
3.2.2 Methodological Issues	78
3.2.2.1 1.A.1.a Public Electricity and Heat Production.....	88
... etc	

For each source (e.g. 1A, 2B etc) the recalculations are described by tables showing the change from the previous submission. In Chapter 9 (should be Chapter 10

according to FCCC Guidelines) on recalculations, only the general/total implications by gas and sector are given in tables and figures.

Generally in the Austrian NIR there are a lot of tables which need annual updates in the main text. The NIR is very systematic and seems to include information needed for review. However, the vast number of tables in the text could be questioned. For each source the gases covered as well as whether this is a key category is stated.

In Annex 2 there is additional detailed tables and descriptions of trends, fuels etc for sub-categories in 1A.

United Kingdom

In the UK NIR a different approach from that of Austria is taken. The main report contains comparably little information which needs annual update. Much more of this kind of information, as well as elaborated and detailed methodological descriptions, are available in Annexes. The UK main report does not contain any descriptions of results etc., other than in the trend chapter (2). All such information is put in an ANNEX 6: Additional Information - Quantitative Discussion of 2006 Inventory.

The UK NIR is probably rather manageable to update annually, with the main report consisting of 245 pages and the Annexes of 325 pages.

Switzerland

In a structural aspect, the Swiss NIR is similar to the Swedish NIR with most tables and information in the main report, but with some additional tables and information in Annexes. Annexes are not according to the FCCC requirements.

In each overview of a sector a figure like the one below shows the relative development of emissions of the individual GHGs since 1990.

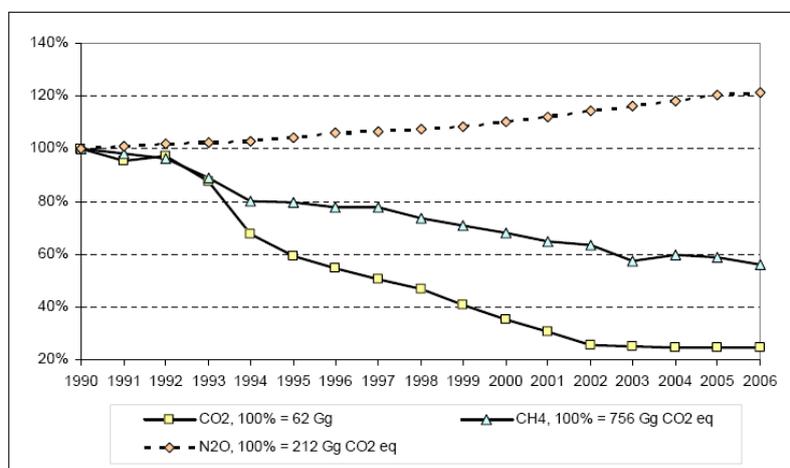


Figure 41 Trend of total GHG emissions from waste management in Switzerland 1990-2006.

Quantitative recalculations are only given in Chapter 9, Recalculations (Chapter 10 according to FCCC Guidelines).

Denmark

The Danish NIR contains numerous tables in the main report, but also extensive background material in Annexes.

Finland

The Finnish NIR does not follow the FCCC regarding Annexes. The need for additional background information is solved by introducing Annexes for each sectoral chapter. There is also a lot of information which needs annual update in the text (tables etc).

The Finnish NIR contains nice overview sections for each sectoral chapter, with the headings:

- **Description and quantitative overview**, containing trend tables as well as the following two figures and additional explanatory text.

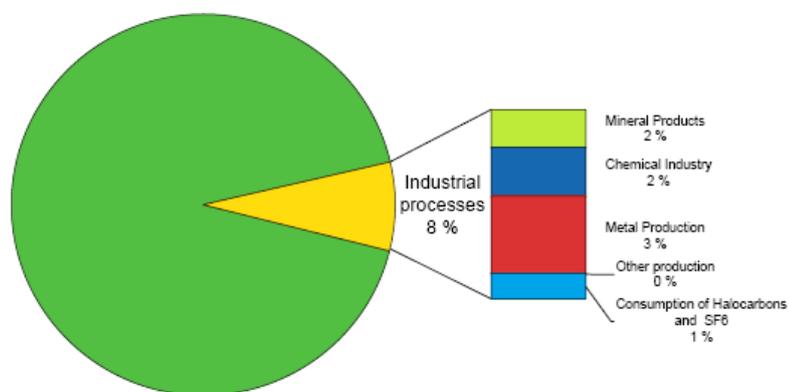


Figure 4.1_1. Emissions from industrial processes compared with total emissions in 2006.

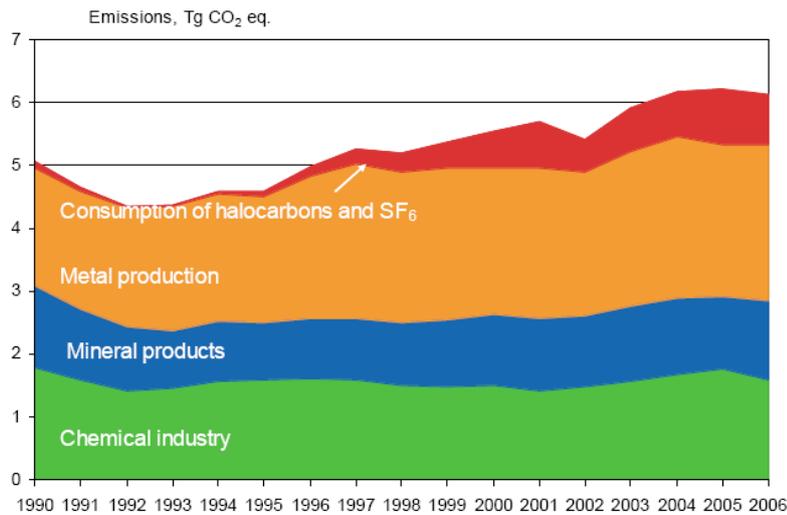


Figure 4.1_2. Total greenhouse gas emission from industrial processes in Finland in 1990-2006 (Tg CO₂ eq.).

- **Key categories**, a table with key categories in the sector.

In the source category descriptions, (aggregated for e.g. 2A) this type of overview information is presented in a similar way, but on the level of the different sources e.g. within 2A. The methodological descriptions are then individual for each source, but an aggregated table (in the text) for all sources present time series for activity data, emission factors etc for all sources in 2A.

A structured table on recalculations in response to the review process is included in Chapter 10.

The Netherlands

The NIR follows the proposed structure according to the FCCC Guidelines. In the NIR from the Netherlands the problem of extensive background information and descriptions is solved by links within the chapters to methodological descriptions and to emission factor protocols on www.greenhousegases.nl, and these parts are rather short in the report.

In the overview sections for each sector there is a box specifying the major changes in the sector since the last submission, in emissions, key categories and methodologies. There are also overviews of the contribution and development of emissions over time, e.g.:

2. Industrial processes

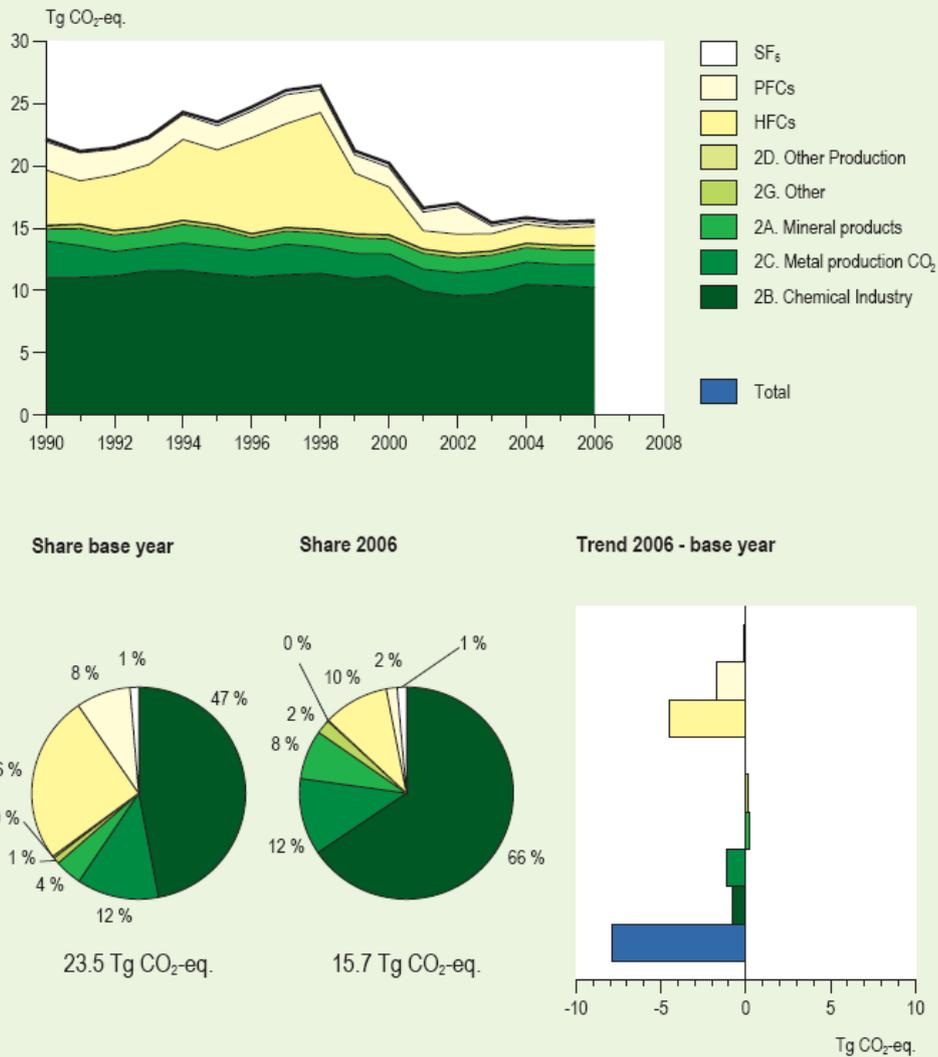


Figure 4.1 Sector 2 'Industrial processes: trend', emission levels and share of source categories in emissions from industrial processes, 1990-2006

Following this, there is a description of key categories in the sector, as well as a very detailed table on trends and contributions from each sub-sector (which seem to be unnecessarily detailed).

In the sections for "source specific recalculations" there are examples of tables as the one below, which is in line with how also the Finnish NIR presents recalculations in response to the review process (but aggregated in Chapter 10). In the Netherlands Chapter 10, Recalculations, there is a distinction between recalculations due to methodological changes and to error corrections.

Sector, category, sub-category (with code)	Gas	KC (e.g. L,T)/non-KC	Identified inventory problem in terms of:		
			Missing estimate	Estimate provided but not in line with GPG	Estimate provided but lack of transparency
4. Agriculture	All gases	Not applicable		X	

Description of problem identified:
During the review, the ERT found that the Party rounded the values of activity data (AD) and final estimates of emissions before importing them into the CRF tables. This practice can lead to over- or underestimation of emissions in the base year. The ERT also found that the total amount of nitrogen excreted from animals was adjusted for N from NH₃ volatilization during manure management, which is not allowed since the Party uses default IPCC emission factors. This practice can lead to underestimation of emissions in the base year.

Recommendation by ERT:
The ERT recommends that the Party reports the values of AD and emissions in the CRF tables without prior rounding, i.e., with the same number of digits in the values as in the background calculations. The ERT also recommends that the Party adjusts the calculation method for N₂O emission from manure management to make it consistent with the IPCC Good Practice Guidance (IPCC, 2001).

Response / Information by Party:
The Netherlands has incorporated the recommendations of the review team in the CRF leading to an increase of N₂O emissions and a small decrease of CH₄ emissions from manure management (expressed in CO₂ eq. accounting for +0.118 and -0.003 Tg in 1990).

Ideas for improvements of the Swedish NIR/IIR from the survey

The general impression from the survey of the above mentioned National Inventory Reports is that the Swedish NIR/IIR could be improved by:

- Including more **analysis** of the data in general, e.g. in the overview sections of the sectoral chapters. There is also a need for more description, justifications and discussions of trends and time series consistency (e.g. in the appropriate sections for each source if not in the overview section).
- Including more information on **activity data and emissions factors**. Emission factors (for the Energy sector) are at present in an appendix in the form of an excel file, which is not uploaded on the UNFCCC web. However, we prefer to have the emission factor annex in an excel file, why some discussion with UNFCCC on uploading of this information is recommended. Other information of this kind in the Swedish NIR, presently within the main text, could be moved to a new Annex 3, entitled Detailed methodological descriptions, if it is judged to be too detailed or too extensive for the main report.
- Including more clear references for sources on which are **key sources**, and **Tier methodology** applied.
- Including a clear table/tables on **recalculations in response to the review process**, e.g. in chapter 10, or in the source-specific sections.
- Including more **records and explanations of changes**, e.g. like in the Dutch NIR, in which a box for each sector summarises the major changes since last submission.
- Appointing a responsible **editor** for the NIR and IIR to work with consistency and balancing of information throughout the reports.

Suggested general improvements

The production of NIR and IIR

In developing a new structure for NIR and IIR it is important to keep both reports in mind. Preferably the structure should facilitate the reuse of whole sections in both reports. This implies that information that is valid for both the NIR and IIR reports should be kept as static as possible, minimizing the insertion of data which needs to be updated annually. Especially in annexes it could also be argued that some surplus information relating to the "other" convention (UNFCCC or LRTAP) can be acceptable.

Structure of sectoral chapters

It is mandatory to adhere to the UNFCCC Guidelines, but a non-mandatory recommendation regarding the suggested structure for the IIR from UN-ECE CLRTAP.

For both the NIR and IIR, the suggestion is to use exactly the table of contents for each source category, as given in the UNFCCC Guidelines. According to the FCCC Guidelines it is allowed to aggregate information from several sources in order to avoid repetition. This has been done in the present Swedish NIR for example concerning methodological descriptions in the Energy chapter, and for uncertainties and time-series consistency in the Industrial processes chapter. This does not always provide sufficient transparency and should be reconsidered for each source.

The headings that should be covered for each source category are as follows:

- Y.1 Source Category 2X2 – Name of source
- Y.1.1 Source category description
- Y.1.2 Methodological issues
- Y.1.3 Uncertainties and time-series consistency
- Y.1.4 Source-specific QA/QC and verification
- Y.1.5 Source-specific recalculations
- Y.1.6 Source-specific planned improvements

The **source category descriptions** should be kept as permanent as possible, and any information that needs annual update, such as matters concerning the present year, should be gathered in the last paragraph under the heading. This makes the information easy to find and facilitates and secures that the annual updates will not be overlooked. Information on whether the source is a key source, and the gases covered should be included.

The **methodological issues** should include a reference and a short description of the Tier methodology that has been used as well as e.g. tables on implied emission factors, activity data development over time, and other data that need to be updated regularly. Detailed methodological descriptions, which are probably more stable over time, could be moved to annexes.

The chapters on **uncertainties and time series consistency** are in the present NIR underdeveloped in relation to the needs for explanations and transparency in the review process. They are also sometimes aggregated for several sources and contain only very general statements. These chapters should be used, for each source, to explain and discuss timeseries, trends, deviant values and any other reasons for changes between years. The chapters would need annual updates.

Practices for **QA/QC and verification** are in general stable over time, and could be developed in an Annex (present Annex 6 covers the Quality system, could be developed). There are exceptions such as verification which could be more occasional if e.g. relevant isolated datasets from other sources become available. If this is the case, such verifications will still be valuable to describe and retain over time in the NIR or Annex even if they were made some years ago, but still are considered to be relevant to support the inventory data.

Chapters on **recalculations** have to be updated annually. Last year's recalculations should be deleted and only the recalculations performed in the present submission should be covered. The sectoral chapters should include source specific recalculations in terms of what changes has been made, but not discuss its impact on emission levels. Chapter 10 include implications for emission levels and trends on "CRF-table" level. Chapter 10 also includes a summary of recalculations made in response to reviews, which can be added on for each year.

The text on source specific **planned improvements** is to be updated every year.

Structure and reorganisation of Annexes

The Annexes in the present Swedish NIR need to be reorganised in order to be in line with the FCCC template, but there are opportunities for moving and expanding the present information in the Swedish NIR into Annexes, permitting a division of information in the chapters of the main report in annual updates and more stable information, respectively. In Table 2 a suggested general reorganisation of the material in the present Annexes to the Swedish NIR is presented. From the table it is also obvious that some proposed/prescribed Annexes and contents according to the Guidelines are not developed or used in the present Swedish NIR. These are Annexes 3, Other detailed methodological descriptions, Annex 4, Reference and sectoral approach and Annex 5, Assessment of completeness.

Some of the Annexes need annual updates, why other relevant and suitable information also needing annual updates from the main report could be included in an appropriate Annex.

Table 2 Suggested general reorganisation of present material in Annexes in the NIR.

Annexes according to FCCC/CP/2002/8	Suggested changes from present NIR
Annex 1, Key sources	The present Annex 1 covers Key categories, which is correct according to the Guidelines
Annex 2, Detailed discussion of methodology and data for estimating CO ₂ emissions from fossil fuel combustion.	The future name of Annex 2 should be changed to include all gases. The present Annex 3, Energy consumption, should be included in a future Annex 2,
	The present Annex 4, The ARTEMIS model should be one part in a future Annex 2.
Annex 3, Other detailed methodological descriptions for individual source or sink categories	To be developed
Annex 4, CO ₂ reference approach and comparison with sectoral approach, and relevant information on the national energy balance	To be developed
Annex 5, Assessment of completeness and (potential) sources and sinks of greenhouse gas emissions and removals excluded	To be developed
Annex 6, Additional information to be considered as part of the NIR submission or other useful information	The present Annex 5, The Swedish National System, and Annex 6, The Quality system should be parts of a future Annex 6.
Annex 7, Uncertainties (Tables 6.1 and 6.2 of IPCC Good practice Guidance).	The present Annex 2 on Uncertainty analysis should become Annex 7
Annex 8, Other Annexes	The present Annexes 7, 8, and 9 on normal-year correction, on the national registry and on the ETS could be individual parts of a future Annex 8. Also the present Annex 10, Abbreviations could be put here

Detailed suggestions

Structure and content of introductory chapters

Executive Summary

The Executive Summary follows the structure of headings according to FCCC/CP/2002/8.

The Executive Summary needs annual update (responsibility of Swedish EPA).

Chapter 1, Introduction

The Introduction chapter follows the structure of headings according to FCCC/CP/2002/8.

This chapter should be fairly stable for the sections 1.1 to 1.4 (Background, Institutional arrangements, Process of inventory preparation, General description of methodologies) and for section 1.6 (QA/QC). The sections 1.4, Key categories, section 1.7, Uncertainties and 1.8, Completeness, all need annual updates to a larger or smaller extent.

Several issues covered in this chapter are, or can be, further elaborated in Annexes. This applies primarily to the following sections, where an assessment of what information to include where should be performed (report chapter or Annex):

1.4, Key categories and methodology is further described in Annex 1.

1.6, QA/QC (as part of the National System) is also covered in the present Annex 6, and could be moved to a future Annex 6, Additional information to be considered as part of the NIR submission.

1.7, Uncertainties are at present covered in Annex 2, but should be moved to Annex 7 according to the FCCC Guidelines.

1.8, Completeness should be further elaborated in a future Annex 5, assessment of completeness. This issue is at present underdeveloped in the Swedish NIR.

Chapter 2, Trends in greenhouse gas emissions

Chapter 2 on Trends in greenhouse gas emissions follows the structure of headings according to FCCC/CP/2002/8. This chapter must be updated with new information annually. This chapter is written by the Swedish EPA.

Chapter 3-9, Sectoral chapters

According to the FCCC/CP/2002/8 Annex I, the descriptions in the sectoral chapters (Chapters 3–9) should follow the structure below:

- 3.1. **Overview of sector** (e.g., quantitative overview and description)
- 3.2. **Source category (CRF source category number)** For each IPCC source category (i.e., at the level of the table Summary 1.A of the CRF, or the level at which IPCC methods are described, or at the level that the Annex I Party estimates its greenhouse gas emissions) the following information should be provided:
 - 3.2.1. **Source category description** (e.g., characteristics of sources)
 - 3.2.2. **Methodological issues** (e.g., choice of methods/activity data/emission factors, assumptions, parameters and conventions underlying the emission and removal estimates – the rationale for their selection, any specific methodological issues (e.g. description of national methods))
 - 3.2.3. **Uncertainties and time-series consistency**
 - 3.2.4. **Source-specific QA/QC and verification**, if applicable
 - 3.2.5. **Source-specific recalculations**, if applicable, including changes made in response to the review process
 - 3.2.6. **Source-specific planned improvements**, if applicable (e.g., methodologies, activity data, emission factors, etc.), including those in response to the review process

Annex I Parties may report some of the information requested above in an aggregate form for some/several source categories if the same methodology, activity data and/or emission factors are used, in order to avoid repetition of information. For key source categories, the information should be detailed in order to enable a thorough review of the inventory.

In addition, information previously included in the additional information and the documentation boxes of the CRF version for the trial period (FCCC/CP/1999/7) should be included and expanded in the NIR, where relevant, as specified in the appendix to this proposed structure.

The sectoral chapters should follow the proposed structure for each source category. For each sector and their specific source categories the following adjustments should be made:

Chapter 3, Energy

The current chapter covering the Energy sector is in principle structured in accordance with the FCCC Guidelines, but the information is presented on an aggregated level. The initial source category description include descriptions of each source category within the sector, the methodological description presents CRF 1A and parts of CRF 1B bundled instead of presenting methodology for each source. This structure was chosen in line with the FCCC Guidelines in order to avoid repetition, since the calculations are based on the energy statistics, and the methodology description applies to many sources. The sections on Uncertainty analysis and time series consistency, QA/QC and verification, Recalculations and on Coming improvements are also aggregated for the whole energy sector.

The suggestion for the new NIR/IIR is basically to abandon the old structure with aggregated descriptions and introduce a structure where each source category is

presented separately according to the FCCC guidelines. Since most of the information that concerns more than one source category will be moved to the Annexes, it should not lead to increased repetition of information. Our suggestion involves the following adjustments and modifications of the energy chapter of the current NIR.

OVERVIEW OF SECTOR

The current text in chapter 3.1 could be kept but expanded with information on matters concerning the last year's work/results for the sector. The part of information that needs frequent updates should ideally be kept in the last paragraph/s of the chapter.

SOURCE CATEGORY DESCRIPTION (ONE FOR EACH SOURCE FROM CRF1A1A TO CRF1A5B)

Begin with stating whether it is a key source and which gases that are covered.

The source category descriptions in the current NIR chapter 3.2 could be kept, but need to be updated or added for those source categories which lack a specific category description.

METHODOLOGICAL ISSUES

Begin with stating which Tier method that is used for the specific source category.

Describe methodology. All information in the current NIR chapter 3.3 on specific methods could be kept and used for presentation in this section. Detailed methodology descriptions should be moved to Annex 2. This also applies to methodological descriptions currently presented in Annexes, as for example descriptions of the ARTEMIS model in the current Annex 4.

All information in the current NIR chapter 3.3.1 on sources for activity data in CRF 1A and parts of CRF 1B should be moved to Annex 2. When describing which activity data that is used for each source category reference should be made to this Annex. This also applies to the description of the model for allocation of fuels for mobile sources in the current NIR chapter 3.3.4.3.2.1.

Information on emission factors used for the energy sector currently presented in separate Annexes not included in the NIR should be included in Annex 2. Detailed methodological descriptions on specific emissions factors could also be presented in Annex 2 where available. When describing which emission factors that is used for each source reference should be made to Annex 2. For source categories where further presentation or discussions of emissions factors are needed to facilitate an inventory review, we should use this section of the NIR to present and discuss it.

UNCERTAINTIES AND TIME-SERIES CONSISTENCY

Information presented in the chapter "estimations of emissions from fuel combustion" in the current NIR chapter 3.4 could partly be presented in this section. Parts of the information from other current chapters could be added as well, but in general a lot of new information and discussions on trends and outliers etc. need to be added. This section of the NIR should be used to address such issues, as has been pointed out earlier in this report, where for example reviewers have asked for further explanations and clarifications.

Source specific information on uncertainties should be presented in this section of the NIR, while general information concerning uncertainty and methods should be presented in Annex 7.

SOURCE SPECIFIC QA/QC AND VERIFICATION

The general information on QA/QC in the beginning of the sector specific QA/QC and verification section in the current NIR should be moved to the Introduction chapter or to Annex 6. Source-specific information presented in the current chapter 3.5 could be kept and presented under this section for each specific source category.

SOURCE-SPECIFIC RECALCULATIONS

Any source-specific recalculations should be described in this section, but its impact on GHG emissions should be presented in chapter 10.

Chapter 4, Industrial processes

The sectoral chapter for Industrial processes is in principle in accordance with the FCCC Guidelines. A source category description is made for each source, but an aggregation has been made in the sections on uncertainties and time-series consistency and QA/QC and verification.

OVERVIEW OF THE SECTOR

The first part of the chapter, Overview of the sector, could be divided in several parts, of which one could be used for analysis and to concentrate and expand information on matters relating to the last year's work, results for the sector, changes, time series overview, contribution to total emissions etc which will be updated annually. Presently there is one short part on the relative importance of the sector, but the larger part covers the environmental report system in Sweden (which should be retained).

SOURCE CATEGORY DESCRIPTION

State whether the source is a key category, and which gases are covered.

All source categories are described individually in the present NIR, but in some cases these could be expanded to explain *how* the emitted gases arise from the process.

METHODOLOGICAL ISSUES

State the Tier methodology applied, or if it is a country specific method.

Generally for the industrial processes sector there is a need to explain the allocation between energy and processes more clearly in the methodological issues chapters. Most sections on methodological issues are quite short in the industrial processes sector. A possible need for expansions and addition of information on activity data and emission factors should be considered; alternatively this type of information could be put in an annex.

For the F-gases the methodological issues could partly be moved to an annex, and further developed.

UNCERTAINTIES AND TIME-SERIES CONSISTENCY

This is in the present NIR aggregated for CRF 2A-D and contains only a short statement. This needs to be developed with further source specific explanations and presentations of data if needed, and/or presented in the overview section. Possibly information could be aggregated and discussed on the level of e.g. 2A, 2B, 2C etc. For 2F, fluorinated gases, these issues are at present treated separately, but no presentations or discussions regarding the time-series are made.

SOURCE SPECIFIC QA/QC AND VERIFICATION

The present aggregated information on QA/QC for 2A-2D is general (with reference to the Introduction chapter) and could be moved and referred to Annex 6. The need for source-specific information on QA/QC and verification needs to be assessed and developed if needed.

SOURCE SPECIFIC RECALULATIONS

Any source specific recalculations should be described in this section, but its impact on emissions should be presented in chapter 10.

Chapter 5, Solvent and product use

OVERVIEW OF THE SECTOR

As for the other sectors, this part should be expanded with more analysis of the results.

SOURCE CATEGORY DESCRIPTION

State whether the source is a key source, and which gases are covered. The present source category descriptions are very short, and could be expanded somewhat e.g.

with the theory and reasoning behind the estimating of emissions as both NMVOC and CO₂.

METHODOLOGICAL ISSUES

State the Tier methodology applied, or if it is a country specific method.

Large parts of the methodology description for the solvent model should be moved to a new Annex 3, Methodological descriptions.

UNCERTAINTIES AND TIME-SERIES CONSISTENCY

The present NIR contain only a short statement regarding uncertainties and time series consistency. This needs to be developed with further source specific explanations and presentations of data if needed, and/or presented in the overview section.

SOURCE SPECIFIC QA/QC AND VERIFICATION

The present information on QA/QC is general (with reference to the Introduction chapter) and could be moved and referred to Annex 6. The need for source-specific information on QA/QC and verification should be assessed and eventually developed.

SOURCE SPECIFIC RECALULATIONS

Any source specific recalculations should be described in this section, while its impact on emissions should be presented in Chapter 10.

Chapter 6, Agriculture

The chapter on Agriculture does not follow the FCCC Guidelines regarding disaggregated information and source specific headings. It might be that the aggregations of information made in the present NIR are relevant, but the choices should be reconsidered.

OVERVIEW OF THE SECTOR

This section could be somewhat expanded, and include also the type of information in the present "Source category description".

SOURCE-CATEGORY DESCRIPTION

This heading is at present not used on a disaggregated level. This should be reconsidered.

METHODOLOGICAL ISSUES

The majority of the chapter on agriculture is under this heading. Some parts, e.g. from the present chapter on Activity data and also from the chapter on Emission factors could be moved to Annex 3, Methodological descriptions.

UNCERTAINTIES AND TIME SERIES CONSISTENCY

This part could be expanded if explicit explanations on time series are needed, alternatively this can be covered in the overview section.

SOURCE SPECIFIC QA/QC AND VERIFICATION

The general text on QA/QC should be treated in the same way as for the other sectors, while source specific information should be retained and possibly moved to an Annex.

An assessment should be done if parts of this aggregated chapter could be moved to an Annex (e.g. verifications from some years back).

Chapter 7, LULUCF

7.1 The overview can be improved giving condensed information on the most important aspects of the sector and the most important observations of the present reporting.

7.2 The result parts can be expanded and contain more figures showing trends.

7.3 Source category description. Can be simplified and large parts moved to an Annex. Contains too little comments and presentation of data and too much methodology. Some parts can be moved to 7.4.

7.4 Methodological issues. Large parts that contain a lot of detail can be moved to an Annex. The chapter should be clear on the major features of the inventory and comment on methodological changes. Some results presented here can probably be moved to section 7.2.

7.5 Sections on methods for uncertainty estimations can be moved to an Annex. More discussion and comments on uncertainties can be included.

7.6 QA/QC. Only minor changes needed

7.7 Coming improvements. Only minor changes needed

Chapter 8, Waste

OVERVIEW OF THE SECTOR

This part should be expanded and contain more analysis according to the suggestions for the other sectors.

SOURCE CATEGORY DESCRIPTION

Parts of this chapter, e.g. on waste statistics, could be moved to an Annex.

METHODOLOGICAL ISSUES

Parts of this chapter, e.g. on waste statistics, could be moved to an Annex.

UNCERTAINTIES AND TIME SERIES CONSISTENCY

The information is aggregated for the whole waste sector. It could be assessed if information should be given for each specific source.

Chapter 9, Other

Sweden does not report any "Other", why only a short statement about that is necessary.

Chapter 10, Recalculations and improvements

The FCCC Guidelines state that:

Information should be provided in this chapter that provides an overview of recalculations and improvements made to the inventory, but it is not necessary to repeat information that is provided in the sector chapters, specifically the source specific information to be provided, and in particular, Annex I Parties should cross-reference information provided in the sector chapters.

10.1. Explanations and justifications for recalculations

10.2. Implications for emission levels

10.3. Implications for emission trends, including time series consistency

10.4 Recalculations, including in response to the review process, and planned improvements to the inventory (e.g., institutional arrangements, inventory preparation)

To be in line with the FCCC Guidelines this chapter needs to be developed. In the review process it is generally regarded as important to know if and what changes have been made in response to the review process. This can for example be made in a table as in the Finnish NIR Chapter 10.

Structure and content of Annexes

Annex 1, Key categories

Annex 1 should include a description of the methodology used for identifying key sources, reference to the key source tables in the CRF, information on the level of disaggregation, and tables 7.A1 - 7.A3 of the IPCC Good Practice Guidance.

Annex 2, Detailed discussion of methodology and data for estimating emissions from fossil fuel combustion

Annex 2 should include any necessary detailed presentations of methodologies and data for estimating *all* emissions from fuel combustion. Information in the current NIR/IIR to be included in Annex 2 is e.g. descriptions of sources of activity data and the ARTEMIS model.

Annex 3, Other detailed methodological descriptions for individual source or sink categories (where relevant)

Annex 3 needs to be developed and should include any necessary detailed presentations of methodologies and data for estimating *all* emissions from sources other than fuel combustion. Some information presently in the main report of the NIR could be moved to this annex.

Annex 4, CO₂ reference approach and comparison with sectoral approach, and relevant information on the national energy balance

Annex 4 needs to be developed and should contain information on CO₂ reference approach and comparison to sectoral approach, as well as information on the national energy balance.

Annex 5, Assessment of completeness and (potential) sources and sinks of greenhouse gas emissions and removals excluded

This annex needs to be developed.

Annex 6, Additional information to be considered as part of the NIR submission (where relevant) or other useful reference information

Annex 6 should include the present Annex 5, The Swedish National System, and the present Annex 6, The Quality system, and eventually information on the Assigned Amount.

Annex 7, Uncertainties (Tables 6.1 and 6.2 of the IPCC good practice guidance)

Annex 7 should include the present Annex 2 on Uncertainty analysis and probably also be further developed.

Annex 8, Other Annexes - (Any other relevant information – optional).

Annex 8 should include the present Annexes 7, 8, and 9 on normal-year correction, on the national registry and on the ETS. Also the present Annex 10, Abbreviation could be put here

Plan for implementation

Annexes

1. Reorganise and develop the present Annexes to be in accordance with the FCCC GL.
2. Identify possibilities for re-using Annexes in the IIR (some surplus information either in the NIR or IIR Annexes is acceptable)
3. Develop presently missing Annexes, including moving of relevant information from the main NIR/IIR report.

Sectoral chapters

4. Develop the overview sections for all sectoral chapters, taking the IIR in to consideration.
5. Assess the need for all suggested headings from the FCCC Guidelines for each specific source or if information could be aggregated.

Source-specific information

6. Identify sections of text relevant to both the NIR and in the IIR.
7. Include information on which are key sources as well as gases covered in each source-specific section on "Source category description" and Tier methodologies used in all source-specific sections on "Methodological issues".
8. Develop all source-specific sections on uncertainties and time-series consistency, and/or refer to appropriate annexes or overview sections.
9. Detailed rewriting and reorganization of parts of sections within all chapters in order to separate stable information from information needing annual updates and/or different treatment in the NIR and IIR.

References

FCCC (2002). UNFCCC Guidelines on Reporting and Review. FCCC/CP/2002/8. Annex I. (<http://unfccc.int/resource/docs/cop8/08.pdf>)

UNECE (2007). Draft 2007 Guidelines for Estimating and Reporting Emission Data. ECE/EB.AIR/GE.1/2007/15, 
http://www.unece.org/env/emep/emep31_docs.htm

Sweden's National Inventory Report, submission 2008

Sweden's Informative Inventory Report, submission 2008

NIR reports from several countries,
http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4303.php

Europarådets och Parlamentets beslut nr 280/2004/EG av den 11 februari 2004 om en mekanism för övervakning av utsläpp av växthusgaser inom gemenskapen och för genomförande av Kyotoprotokollet.

Appendix 1, Structure of National Inventory Report

From FCCC/CP/2002/8

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English
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Annex I

STRUCTURE OF NATIONAL INVENTORY REPORT

EXECUTIVE SUMMARY

- ES.1. Background information on greenhouse gas inventories and climate change (e.g., as it pertains to the national context, to provide information to the general public)
- ES.2. Summary of national emission and removal related trends
- ES.3. Overview of source and sink category emission estimates and trends
- ES.4. Other information (e.g., indirect greenhouse gases)

Chapter 1: INTRODUCTION

- 1.1. Background information on greenhouse gas inventories and climate change (e.g., as it pertains to the national context, to provide information to the general public)
- 1.2. A description of the institutional arrangement for inventory preparation
- 1.3. Brief description of the process of inventory preparation (e.g., data collection, data processing, data storage)
- 1.4. Brief general description of methodologies and data sources used
- 1.5. Brief description of key source categories
- 1.6. Information on the QA/QC plan including verification and treatment of confidentiality issues where relevant
- 1.7. General uncertainty evaluation, including data on the overall uncertainty for the inventory totals
- 1.8. General assessment of the completeness (with reference to annex 5 of the structure of the national inventory report (NIR))

Chapter 2: TRENDS IN GREENHOUSE GAS EMISSIONS

Information should be provided in this chapter that provides an overview of emission trends, but it is not necessary to repeat information that is provided in the sector chapters and in the common reporting format (CRF) trend tables.

- 2.1. Description and interpretation of emission trends for aggregated greenhouse gas emissions
- 2.2. Description and interpretation of emission trends by gas
- 2.3. Description and interpretation of emission trends by source
- 2.4. Description and interpretation of emission trends for indirect greenhouse gases and SO₂

Chapters 3–9: (e.g. SECTOR NAME (CRF sector number))

The structure outlined below should be followed in each of the following sectoral chapters. The information should be reported following the IPCC sectors.

- 3.1. Overview of sector (e.g., quantitative overview and description)
- 3.2. Source category (CRF source category number)

For each IPCC source category (i.e., at the level of the table Summary 1.A of the CRF, or the level at which IPCC methods are described, or at the level that the Annex I Party estimates its greenhouse gas emissions) the following information should be provided:

- 3.2.1. Source category description (e.g., characteristics of sources)
- 3.2.2. Methodological issues (e.g., choice of methods/activity data/emission factors, assumptions, parameters and conventions underlying the emission and removal estimates – the rationale for their selection, any specific methodological issues (e.g. description of national methods))
- 3.2.3. Uncertainties and time-series consistency
- 3.2.4. Source-specific QA/QC and verification, if applicable
- 3.2.5. Source-specific recalculations, if applicable, including changes made in response to the review process
- 3.2.6. Source-specific planned improvements, if applicable (e.g., methodologies, activity data, emission factors, etc.), including those in response to the review process

Annex I Parties may report some of the information requested above in an aggregate form for some/several source categories if the same methodology, activity data and/or emission factors are used, in order to avoid repetition of information. For key source categories, the information should be detailed in order to enable a thorough review of the inventory.

Chapter 3: ENERGY (CRF sector 1)

In addition, the energy information should include the following:

- Fuel combustion (CRF 1.A), including detailed information on:
- Comparison of the sectoral approach with the reference approach
 - International bunker fuels
 - Feedstocks and non-energy use of fuels
 - CO₂ capture from flue gases and subsequent CO₂ storage
 - Country-specific issues

Fugitive emissions from solid fuels and oil and natural gas (CRF 1.B)

Chapter 4: INDUSTRIAL PROCESSES (CRF sector 2)

Chapter 5: SOLVENT AND OTHER PRODUCT USE (CRF sector 3)

Chapter 6: AGRICULTURE (CRF sector 4)

Chapter 7: LUCF (CRF sector 5)

Chapter 8: WASTE (CRF sector 6)

Chapter 9: OTHER (CRF sector 7) (if applicable)

In addition, information previously included in the additional information and the documentation boxes of the CRF version for the trial period (FCCC/CP/1999/7) should be included and expanded in the NIR, where relevant, as specified in the appendix to this proposed structure.

Chapter 10: RECALCULATIONS AND IMPROVEMENTS

Information should be provided in this chapter that provides an overview of recalculations and improvements made to the inventory, but it is not necessary to repeat information that is provided in the sector chapters, specifically the source specific information to be provided, and in particular, Annex I Parties should cross-reference information provided in the sector chapters.

- 10.1. Explanations and justifications for recalculations
- 10.2. Implications for emission levels
- 10.3. Implications for emission trends, including time series consistency
- 10.4. Recalculations, including in response to the review process, and planned improvements to the inventory (e.g., institutional arrangements, inventory preparation)

REFERENCES

ANNEXES TO THE NATIONAL INVENTORY REPORT

Annex 1: Key sources

- Description of methodology used for identifying key sources
- Reference to the key source tables in the CRF
- Information on the level of disaggregation
- Tables 7.A1 - 7.A3 of the IPCC good practice guidance¹

Annex 2: Detailed discussion of methodology and data for estimating CO₂ emissions from fossil fuel combustion

Annex 3: Other detailed methodological descriptions for individual source or sink categories (where relevant)

Annex 4: CO₂ reference approach and comparison with sectoral approach, and relevant information on the national energy balance

Annex 5: Assessment of completeness and (potential) sources and sinks of greenhouse gas emissions and removals excluded

Annex 6: Additional information to be considered as part of the NIR submission (where relevant) or other useful reference information

Annex 7: Tables 6.1 and 6.2 of the IPCC good practice guidance²

Annex 8: Other annexes - (Any other relevant information – optional).

Appendix A

ADDITIONAL GUIDANCE ON SECTORAL REPORTING TO BE INCLUDED IN THE CORRESPONDING SECTION OF THE NIR

This appendix provides guidance on additional information that Annex I Parties could include in their NIR in order to facilitate the review of the inventory. This list is not exhaustive. Additional information may be included in the NIR, depending on the Annex I Party's national approach for estimating greenhouse gas emissions and removals.

Energy

Fuel combustion

More specific information than that required in CRF table 1.A(a) could be provided, e.g.,

- Autoproduction of electricity
- Urban heating (in manufacturing industries, commercial and residential sectors).

Fugitive fuel emissions

Coal mining:

More specific information than that required in CRF table 1.B.1 could be provided, e.g.

- Number of active underground mines
- Number of mines with drainage (recovery) systems.

Oil and natural gas

More specific information than that required in CRF table 1.B.2 could be provided, e.g.

- Pipeline length
- Number of oil wells
- Number of gas wells
- Gas throughput¹
- Oil throughput¹

Industrial processes

Metal production

More specific information than is required in CRF table 2(I).A-G could be provided, e.g., data on virgin and recycled steel production.

Potential emissions of halocarbons and SF₆

In CRF table 2(II)s2, reporting of "production" refers to production of new chemicals. Recycled substances could be included in that table, but it should be ensured that double counting of emissions is avoided. Relevant explanations should be provided in the NIR.

¹ In the context of oil and gas production, throughput is a measure of the total production, such as barrels per day of oil, or cubic metres of gas per year. Specify the units of the reported values. Take into account that these values should be consistent with the activity data reported under production in table 1.B.2 of the CRF.

PFCs and SF₆ from metal production / Production of halocarbons and SF₆

The type of activity data used is to be specified in CRF tables 2(II).C-E (under column "description"). Where applying tier 1b (for 2.C Metal production), tier 2 (for 2.E Production of halocarbons and SF₆) and country-specific methods, any other relevant activity data used should be specified.

Consumption of HFCs, PFCs and SF₆

With regard to activity data reported in CRF table 2(II).F ("Amount of fluid remaining in products at decommissioning"), Annex I Parties should provide in the NIR information on the amount of the chemical recovered (recovery efficiency) and other relevant information used in the emission estimation.

CRF table 2.(II).F provides for reporting of the activity data and emission factors used to calculate actual emissions from consumption of halocarbons and SF₆ using the "bottom-up approach" (based on the total stock of equipment and estimated emission rates from this equipment). Some Annex I Parties may prefer to estimate their actual emissions following the alternative "top-down approach" (based on annual sales of equipment and/or gas). Those Annex I Parties should provide the activity data used in that CRF table and provide any other relevant information in the NIR. Data these Annex I Parties should provide include:

- The amount of fluid used to fill new products
- The amount of fluid used to service existing products
- The amount of fluid originally used to fill retiring products (the total nameplate capacity of retiring products)
- The product lifetime
- The growth rate of product sales, if this has been used to calculate the amount of fluid originally used to fill retiring products.

Alternatively, Annex I Parties may provide alternative formats with equivalent information.

Solvents and other product use

The IPCC Guidelines do not provide methodologies for the calculation of emissions of N₂O from solvent and other product use. If reporting such data in the CRF, Annex I Parties should provide additional information (activity data and emission factors) used to make these estimates in the NIR.

Agriculture

Cross-cutting

Annex I Parties should provide livestock population data in CRF table 4.A. Any further disaggregation of these data, e.g. for regions, for type (according to the classification recommended in the IPCC good practice guidance), could be provided in the NIR, where relevant. Consistent livestock population data should be used in the relevant CRF tables to estimate CH₄ emissions from enteric fermentation, CH₄ and N₂O emissions from manure management, N₂O emissions from soils, and N₂O emissions associated with manure production and use, as well as emissions from the use of manure as fuel and sewage-related emissions reported in the waste sector.

Enteric fermentation

More specific information than is required in CRF table 4.A could be provided, e.g., parameters relevant to the application of good practice guidance.

Manure management

More specific information than is required in CRF tables 4.B(a) and 4.B(b) could be provided, e.g., parameters relevant to the application of the IPCC good practice guidance. Information required in the additional information table may not be directly applicable to country-specific methods developed for methane conversion factor (MCF) calculations. If relevant data cannot be provided in the additional information box, information on how the MCF are derived should be described in the NIR.

Rice cultivation

More specific information than is required in CRF table 4.C could be provided. For example, when disaggregating by more than one region within a country and/or by growing season, provide additional information on disaggregation and related data in the NIR. Where available, provide activity data and scaling factors by soil type and rice cultivar in the NIR.

Agricultural soils

More specific information than is required in CRF table 4.D could be provided. For example,

- The IPCC Guidelines do not provide methodologies for the calculation of CH₄ emissions or removals by agricultural soils. If reporting such data, Annex I Parties should provide in the NIR additional information (activity data and emission factors) used to make these estimates;
- Annex I Parties which choose to account for CO₂ emissions and removals from agricultural soils under the agriculture sector (4.D Agricultural soils) should report background information on CO₂ emissions and removals estimates from agricultural soils (activity data, emissions factors) in the NIR;
- In addition to the data required in the additional information box of table 4.D, disaggregated values for Frac_{GRAZ} according to animal type, and for Frac_{BURN} according to crop types, should be provided in the NIR.

Prescribed burning of savannas and field burning of agricultural residues

More specific information than is required in CRF tables 4.E and 4.F could be provided. For example, the IPCC Guidelines do not provide methodologies for the calculation of CO₂ emissions from savanna burning or agricultural residues burning. If reporting such data, Annex I Parties should provide in the NIR additional information (activity data and emission factors) used to make these estimates.

Waste

Solid waste disposal and waste incineration

More specific information than is required in CRF tables 6.A and 6.C could be provided, e.g.,

- All relevant information used in the calculation should be provided in the NIR, if it is not already included in the additional information box of the CRF
- Composition of landfilled waste (%), according to paper and paperboard, food and garden waste, plastics, glass, textiles, other (specify according to inert or organic waste, respectively)
- Fraction of wastes recycled
- Fraction of wastes incinerated
- Number of solid waste disposal sites recovering CH₄.

Waste-water handling

More specific information than is required in CRF table 6.B could be provided. For example, with regard to data on N₂O from waste-water handling to be reported in CRF table 6.B, Annex I Parties using other methods for estimation of N₂O emissions from human sewage or waste-water treatment should provide in the NIR corresponding information on methods, activity data and emission factors used.

Appendix 2, Recommended structure for Informative Inventory report (IIR)

Annex VI of Draft UNECE 2007 Guidelines

1. Executive Summary (to be updated yearly)

Date updated
Summaries
<ul style="list-style-type: none">• main differences from last submission• particular trends or timeseries inconsistencies• incompleteness• priorities for improvement

2. Introduction

2.1 National Inventory Background (to be updated yearly)

Date updated
Explanation of the inventory in a national context, including:
<ul style="list-style-type: none">• geographic scope (e.g. explanation of differences between totals presented in table IV1A).• national total for the entire territory• national total for the entire territory (1997 Guidelines)• national total for the EMEP grid domain
Explanation of the reason for differences in reported national totals for the entire territory with NEC and UNFCCC reports.
Explanation of differences between activity data in the inventory and published national statistics.

2.2 Institutional arrangements (to be updated every 5 years)

<ul style="list-style-type: none">• Date updated• A description of the institutional arrangement for inventory preparation, institutional responsibilities, stakeholders responsibilities.• Information on archiving
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2.3 Inventory preparation process (to be updated every 5 years)

Date updated
<ul style="list-style-type: none">• A brief description of the process of inventory preparation (e.g. data collection, data processing, data storage, data base systems and procedures)

2.4 Methods and data sources (to be updated every 5 years)

Date updated
<ul style="list-style-type: none">• Brief general description of methodologies and data sources used. e.g. national statistics, regulated process information and country/default emission factors used.

2.5 Key Categories (To be updated yearly)

- Date updated
- Explanation of methods used to determine key categories
- List of key categories by pollutant

2.6 QA/QC and Verification methods (to be updated every 5 years)

- Date updated
- Identification of quality assurance/quality control (QA/QC) and verification methods used to ensure quality and time-series consistency of the inventory.

2.7 General uncertainty evaluation (to be updated every 5 years)

- Date updated
- Identification of methods used to assess uncertainty and the use of uncertainty analysis to prioritise inventory improvement.

2.8 General Assessment of Completeness (to be updated **yearly**):

i) Sources Not Estimated (NE)

- Date updated
- List of sources not estimated in the inventory.
- A qualitative assessment of their importance, currently and in future
- Description of intentions to calculate these in future or an explanation of why there are no such plans.

ii) Sources Included Elsewhere (IE)

- Date updated
- Identification of sources aggregated in table IV1A and not assigned to a specific NFR
- Justification of the decision to aggregate them rather than report the data under specific NFR categories and intentions for future aggregation.

iii) Other notation keys

Chapter 3: Explanation of key trends (to be updated yearly)

- Date updated
- Explanation of significant changes in the time trend for key categories (i.e. dips and jumps) to enable a reviewer or data user to be confident that the changes result from changes in the activity/abatement/process of the source and not as a result of different methods or source data used for different years.
- Identification of methodology or activity data based timeseries inconsistencies.

Chapter 4: ENERGY (NFR sector 1)

To be updated every 5 years (unless otherwise specified) while presenting yearly updates when there have been major changes from the last report

- Date updated
- Detail of key activity statistics if not in Table IV1A e.g. energy balance and key energy statistics for key categories

- Basis of fuel based estimates (fuel combusted or on fuel sold basis)
- Identification of major changes in estimation methodologies for key categories (annual update)

Explanation of methods used to calculate emission estimates for key categories and other sources. Including:

- Country specific emission factors, assumptions and methods per NFR code or sector group as appropriate and where transparency permits
- Reference to default guidebook factors used for other sectors
- Quantitative or qualitative assessment of uncertainties per NFR or sector group.

Chapter 5: INDUSTRIAL PROCESSES (NFR sector 2)

To be updated every 5 years (unless otherwise specified) while presenting yearly updates when there have been major changes from the last report

- Date updated
- Detail of key activity statistics if not in Table IV1A e.g. production statistics for key categories
- Identification of major changes in estimation methodologies for key categories (annual update)

Explanation of methods used to calculate emission estimates for key categories and other sources. Including:

- Country specific emission factors, assumptions and methods per NFR code or sector group as appropriate and where transparency permits
- Reference to default guidebook factors used for other sectors
- Quantitative or qualitative assessment of uncertainties per NFR or sector group.

Chapter 6: SOLVENT AND OTHER PRODUCT USE (NFR sector 3)

To be updated every 5 years (unless otherwise specified) while presenting yearly updates when there have been major changes from the last report

- Date updated
- Detail of key activity statistics if not in Table IV1A e.g. solvents and paints consumed, % solvent based paints (annual update)
- Identification of major changes in estimation methodologies for key categories (annual update)

Explanation of methods used to calculate emission estimates for key categories and other sources. Including:

- Country specific emission factors, assumptions and methods per NFR code or sector group as appropriate and where transparency permits
- Reference to default guidebook factors used for other sectors
- Quantitative or qualitative assessment of uncertainties per NFR or sector group.

Chapter 7: AGRICULTURE (NFR sector 4)

To be updated every 5 years (unless otherwise specified) while presenting yearly updates when there have been major changes from the last report

- Date updated

- Detail of key activity statistics if not in Table IV1A e.g. animal population and fertilizer statistics (annual update)
- Identification of major changes in estimation methodologies for key categories (annual update)

Explanation of methods used to calculate emission estimates for key categories and other sources. Including:

- Country specific emission factors, assumptions and methods per NFR code or sector group as appropriate and where transparency permits
- Reference to default guidebook factors used for other sectors
- Quantitative or qualitative assessment of uncertainties per NFR or sector group.

Chapter 8: LAND USE AND LAND-USE CHANGE (NFR sector 5)

To be updated every 5 years (unless otherwise specified) while presenting yearly updates when there have been major changes from the last report

- Date updated

Explanation of methods used to calculate emission estimates for key categories (if applicable) and other sources reported as a memo item.

Chapter 9: WASTE (NFR sector 6)

To be updated every 5 years (unless otherwise specified) while presenting yearly updates when there have been major changes from the last report

- Date updated
- Detail of key activity statistics if not in Table IV1A e.g. municipal waste and clinical waste generation, % waste incinerated
- Identification of major changes in methodology for key categories (annual update)

Explanation of methods used to calculate emission estimates for key sources and other sources, including:

- Country specific emission factors, assumptions and methods per NFR code or sector group as appropriate and where transparency permits
- Reference to default guidebook factors used for other sectors

Quantitative or qualitative assessment of uncertainties per NFR or sector group.

Chapter 10: OTHER

To be updated every 5 years (unless otherwise specified) while presenting yearly updates when there have been major changes from the last report

- Date updated
- Detail of key activity statistics
- Identification of major changes in methodology for key categories (annual update)

Explanation of methods used to calculate key categories and other sources, including:

- Country specific emission factors, assumptions and methods per NFR code or sector group as appropriate and where transparency permits
- Reference to default guidebook factors used for other sectors

- Quantitative or qualitative assessment of uncertainties per NFR or sector group.

Chapter 11: Recalculations and Improvements (to be updated every year)

Recalculations

- Date updated.
- Identify and justify recalculations (by sector, year and pollutant)
- Highlight implications for the inventory totals and trends with reference to the new methods documented in Sector methodology section.
- Identify new sources added to the inventory (reference new methods on the methodology chapter)
- Overview of recalculations since the base year of each Protocol (relevant for assessment of compliance with each Protocol) (including a description of sources that were not included in the base year but have been added since or sources that were included in the base year and no longer is)

Planned improvements

- Date updated.
- Identify any improvements and sector and pollutants affected

Chapter 12: Projections

- Date updated
- Description of methods and background data used for reported projected emissions and activity data in tables 2a and 2b.

Chapter 13: Explanations of exceptional circumstances justifying emissions that are temporarily higher than the ceilings established for it for one or more pollutants (after 2010) (Optional)

- Date updated
- Explanations of exceptional circumstances justifying emissions that are temporarily higher than the ceilings established for it for one or more pollutants (after 2010)

IIR REFERENCES (to be updated every five years)

IIR ANNEXES (to be updated every five years)

Annexes necessary to improve transparency

- Annex 1: Key category analysis
- Annex 2: Detailed methodological descriptions for individual source categories (where relevant)
- Annex 3: Further elaboration of completeness use of IE and (potential) sources of air pollutant emissions excluded (where relevant)
- Annex 4: National energy balance
- Annex 5: Additional information to be considered part of the IIR submission (where relevant) or other useful information
- Annex 6: Other Annexes (Any other relevant information – optional)