



Ministry of Housing, Spatial Planning and the Environment

Directorate General for Environmental Protection

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**Initial Report of The Netherlands,
for the calculation of its
assigned amount under the
Kyoto Protocol to the UNFCCC**

Netherlands' Initial Report under the Kyoto Protocol to the United Nations Framework Convention on Climate Change, to facilitate the calculation of its assigned amount, pursuant to Article 3, paragraphs 7 and 8 of the Kyoto Protocol, and to demonstrate its capacity to account for the emissions and assigned amount, as required by Decision 13/CMP.1, article 2.

December 2006

The Netherlands' Ministry of Housing, Spatial Planning and the Environment



This report has been elaborated with contributions from:

- Ministry of Housing, Spatial Planning and the Environment (VROM)
- Ministry of Agriculture, Nature and Food Quality (LNV)
- Netherlands Emission Authority (NEA)
- SenterNovem (government agency, appointed as National Inventory Entity)
- Netherlands Environmental Assessment Agency (MNP)



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Introduction

Under the Kyoto Protocol (KP) to the United Nations Framework Convention on Climate Change (UNFCCC), parties listed in Annex I of the UNFCCC have a quantified greenhouse gas emission reduction commitment, that is expressed as the assigned amount. According to article 3(1) of the KP a party should not exceed its assigned amount during the first commitment period 2008-2012. In articles 3(7) and 3(8) of the KP is elaborated how the assigned amount should be calculated. In article 7(4) of the KP is decided that the COP/MOP will decide further on modalities for the accounting of assigned amounts. At COP11/MOP1 the decision *Modalities for the accounting of assigned amounts* was adopted (Decision 13/CMP.1). In article 2 it states that each party included in Annex I with a commitment shall submit to the secretariat of the UNFCCC a report calculating its assigned amount prior to 1 January 2007. The present report serves as this so called 'Initial report' for the Netherlands. Paragraph 5 of the annex to Decision 13/CMP.1 elaborates the calculation of the assigned amount. Paragraph 6 states that each party should submit a report. Paragraphs 7 and 8 specify the information that the report should contain. The following paragraphs present the information required by paragraphs 7 and 8 of the annex to Decision 13/CMP.1 and are structured accordingly.



PART ONE

A. Complete inventories of emissions and removals of greenhouse gases

The Netherlands submitted to the secretariat of the UNFCCC its final version of the National Inventory Report (NIR)¹ and Common Reporting Formats (CRFs) for 2006 on 3 October 2006 and 19 September 2006 respectively. These submissions are referred to here. They present the complete inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for all years from 1990, or another approved base year or period under Article 3, paragraph 5, to the most recent year available, prepared in accordance with Article 5, paragraph 2, and relevant decisions of the COP/MOP, taking into account any relevant decisions of the COP. The assigned amount and commitment period reserve in the present report are consistent with these submissions of NIR and CRFs 2006.

B. Identification of selected base year for F-gases

The Netherlands has selected 1995 as base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride (further referred to as 'F-gases') in accordance with Article 3, paragraph 8 of the KP.

C. Agreement under Article 4 of the KP: the EU Burden Sharing Agreement

The Netherlands, as a Member State of the European Union, agreed to fulfil its commitment under article 3 of the KP jointly with other Member States within the European Union, as provided by article 4 of the KP. This agreement was laid down in decision 2002/358/EC of the Council of Europe. The quantified commitment for the European Community as a whole is 92% of its base year. In annex II to decision 2002/358/EC is laid down that for the Netherlands the quantified commitment is 94% of the base year. A copy of the decision is added as an annex to this report. The assigned amounts of the Member States under this decision have been laid down in another decision of the European Commission. The assigned amount of the Netherlands in there equals the one in the present report.

D. Calculation of the assigned amount

In this paragraph the calculation of the assigned amount for the Netherlands is described, pursuant to Article 3(7) and (8) of the KP and article 3 of Decision 2002/358/EC, following the establishment of final base-year emissions in the NIR and CRFs 2006 and on the basis of the quantified commitment set out in Annex II to Decision 2002/358/EC, taking into account the methodologies for estimating anthropogenic emissions by sources and removals by sinks referred to in Article 5(2) of the KP and the modalities for the calculation of assigned amounts pursuant to Article 3(7) and (8) of the KP in Decision 13/CMP.1.

¹ Brandes L.J., **Greenhouse Gas Emissions in the Netherlands 1990-2004**. National Inventory Report 2006 (MNP report 500080 001), 2006



The assigned amount is based on the Netherlands' NIR and CRFs submitted in October respectively September 2006, see also paragraph A. In the past years, the Netherlands has improved its national greenhouse gas monitoring in order to comply with the guidelines from the UNFCCC and IPCC. The data sources used, methods applied and procedures followed have been laid down in protocols. These are part of the Netherlands' National System for the monitoring of greenhouse gas emissions, that has been established legally at the end of 2005. The Netherlands expects that its national greenhouse gas monitoring complies with the guidelines. The NIR and CRFs 2006 are the first in which the new methods are applied completely. They can therefore be used for the calculation of the assigned amount. The Netherlands' National System is described in detail in paragraph E of this report.

According to articles 3(7) and 3(8) of the KP, and paragraph 5 of the annex to Decision 13/CMP.1 *Modalities for the accounting of assigned amounts*, the assigned amount of a party equals the percentage inscribed for it in annex B of the KP of the emissions of greenhouse gases in the base year, multiplied by five, whereby the following should be taken into account:

- the base year is 1990, or 1995 for the F-gases in case this year is selected by a party as base year for the total emissions of F-gases
- parties for which land-use change and forestry constituted a net source of greenhouse gas emissions in the base year, shall include the net emissions from land-use change in relation to the conversion of forests in their base year emissions
- parties that have reached an agreement to fulfil their quantified emissions reduction commitments under the KP jointly shall use the emission level allocated in that agreement instead of the percentage in annex B of the KP

For the Netherlands, this results in the following:

- The Netherlands' base year for CO₂, CH₄ and N₂O is 1990. The Netherlands' base year for the F-gases is 1995.
- For the Netherlands, the total IPCC source category sinks resulted in a net emission of greenhouse gases in 1990. Therefore the net emissions of land-use change in relation to the conversion of forests in 1990 are included in its assigned amount.
- The Netherlands reached a burden sharing agreement within the European Union (decision 2002/358/CE). In annex II to this decision is laid down that the quantified emission reduction for the Netherlands is 94% of its base year emissions. See also paragraph C.

Based on the NIR and CRFs 2006 submitted in October respectively September 2006, this results in the following base year emissions for the Netherlands (in tonnes CO₂-equivalents):

Gas	Year		
	1990	1995	Base year
CO ₂	159.389.484		159.389.484
CH ₄	25.440.861		25.440.861
N ₂ O	21.219.280		21.219.280
HFCs		6.019.536	6.019.536
PFCs		1.937.818	1.937.818
SF ₆		301.260	301.260
Land-use change in relation to the conversion of forests ²	280.212		280.212
TOTAL			214.588.451

² The Netherlands has divided its land use category Forest into three subcategories: forest according to the forest definition, trees outside forest and nature. In the NIR2006 (which contains reporting under the UNFCCC) the emissions of the conversion of forestland to other land categories for these subcategories are reported together. For the calculation of the assigned amount (under the KP) only the emissions from the conversion from forest according to the forest definition to other land categories should be used (75,8% of the total deforestation emissions)



Following the information listed above, the Netherlands' assigned amount equals:

$$5 \times 0,94 \times 214.588.451 = \mathbf{1.008.565.720 \text{ tonnes CO}_2\text{-equivalents}^3} (=1.009 \text{ Mt CO}_2\text{-equivalents})$$

³ The assigned amount is presented in tonnes of carbon dioxide equivalent. Please see the NIR and CRFs 2006 for more information on the uncertainty that should be taken into account with these figures.



PART TWO

A. Calculation of commitment period reserve

Following Article 17 of the KP modalities, rules and guidelines for emissions trading are elaborated in Decision 11/CMP.1 *Modalities, rules and guidelines for emissions trading under Article 17 of the Kyoto Protocol*. In paragraph 6 of the annex to this decision is stated that each party included in Annex I of the UNFCCC shall maintain, in its national registry, a commitment period reserve which should not drop below 90 per cent of the Party's assigned amount calculated pursuant to Article 3(7) and 3(8) of the KP, or 100 per cent of five times its most recently reviewed inventory, whichever is lowest.

The most recently completely reviewed inventory of the Netherlands is that presented in the National Inventory Report 2005 (NIR2005). This inventory would result in a higher commitment period reserve than that based on 90% of the assigned amount (please note that in the NIR2005 the recalculations in the NIR2006 have not yet been taken into account. These would lead to an even higher commitment period reserve based on the NIR2005). The Netherlands therefore uses the 90 per cent of the assigned amount as value for the Commitment Period Reserve.

The commitment period reserve consequently amounts to:

$$0,90 \times 1.008.565.720 = 907.709.148 \text{ tonnes CO}_2\text{-equivalents}$$

The following table illustrates the respective values for the commitment period reserve when calculated according to the two alternative methods:

All figures in tonnes CO ₂ -equivalents		Resulting commitment period reserve
Assigned amount / 90% of assigned amount	1.008.565.720	907.709.148
Inventory year 2003 (from NIR2005) / 5 times	214.800.000	1.074.000.000

B. Identification of single minimum values under Article 3(3) of the KP

Under the KP Parties have to provide information on the identification of its selection of single minimum values for tree crown cover, land area and tree height for use in accounting for its activities under Article 3(3) and (4) of the KP, together with a justification of the consistency of those values with the information that has been historically reported to the Food and Agriculture Organisation (FAO) of the United Nations or other international bodies, and in the case of difference, an explanation of why and how such values were chosen, in accordance with definitions, modalities, rules and guidelines relating to land use, land-use change and forestry activities under the KP.

The complete forest definition the Netherlands uses for Kyoto reporting is:

Forest Land is land with woody vegetation and with tree crown cover of more than 20 per cent and area of more than 0,5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ. May consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground; or of open forest formations with a continuous vegetation cover in which tree crown cover exceeds 20 per cent. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 20 per cent or tree height of 5 m are included under forest, as areas normally forming part of the forest



area which are temporally unstocked as a result of human intervention or natural causes but which are expected to revert to forest. Forest Land also includes:

- forest nurseries and seed orchards that constitute an integral part of the forest;
- forest road, cleared tracts, firebreaks and other small open areas, all smaller than 6 m. within the forest;
- forest in national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest, with an area of more than 0,5 ha and a width of more than 30m;
- windbreaks and shelterbelts of trees with an area of more than 0,5 ha and a width of more than 30m.

This excludes tree stands in agricultural production systems for example in fruit plantations and agro forestry systems.

The values for tree crown cover, land area and tree height are consistent with the information that has been reported to the FAO since 1984.

The Netherlands uses the wall-to-wall approach (as per GPG 2003, page 2.12; approach 3: geographically explicit land-use data) for the identification areas of land subject to article 3.3 activities (described in paragraph 3.1 of Protocol 5436 (Soil) of the National System). This allows land-use changes to be explicitly traced and quantified. How harvesting or forest disturbance that is followed by the re-establishment of a forest is distinguished from deforestation is taken into account within the quality improvement programme for LULUCF and is documented⁴.

C. Identification of election of activities under Article 3(4) of the KP

The Netherlands has not elected activities under Article 3(4) of the KP for inclusion in its accounting for the first commitment period.

D. Accounting annually or for the entire commitment period for activities under Article 3(3) and 3(4) of the KP

The Netherlands will account for each activity under Article 3(3) of the KP for the entire commitment period. As indicated in paragraph G, the Netherlands has not elected activities under Article 3(4) of the KP for inclusion in its accounting for the first commitment period.

⁴ Nabuurs G.J. **Updates of the Dutch National System for greenhouse gas reporting of the LULUCF**, 2006.



E. Description of the National System

This section of the report describes the Netherlands national system, established and reported in accordance with Article 5(1) of the KP and in accordance with the guidelines under Article 7 of the KP as outlined in Decision 15/CMP.1. This information has been reported as well previously to the UNFCCC in the Netherlands' 4th National Communication, that was submitted end of 2005. Information on the national system, relevant documents and news can also be found at the national system website www.greenhousegases.nl.

1 SCOPE AND OBJECTIVES OF THE NATIONAL SYSTEM

1.1 Introduction

As Party to the UNFCCC, the Netherlands has to report an inventory of greenhouse gas emissions and sinks each year, in accordance with a defined set of guidelines. Under the KP, further obligations have been defined, among which the obligation (under Article 5.1) to have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol. Under Council Decision 280/2004/EC of the EU, the Netherlands is required to establish such a system as early as possible and by the end of 2005 at the latest. Over the past years, the Netherlands has made every effort to establish a National System that meets the requirements in time. As a result, the national system has been established end of 2005. This report details the system as it operates since then, describing how the required functions are performed in the Netherlands, following the outline from the reporting guidelines (see box below).

Institutional and organisational aspects (chapter 2), including:

- the name and contact information for the national entity and its designated representative with overall responsibility for the national inventory of the Party;
- the roles and responsibilities of various agencies and entities in relation to the inventory development process, as well as the institutional, legal and procedural arrangements made to prepare the inventory.

Methodological and process aspects (chapter 3), including:

- a description of the process for collecting activity data, for selecting emission factors and methods, and for the development of emission estimates;
- a description of the process and the results of key source identification and, where relevant, archiving of test data;
- a description of the process for the recalculation of previously submitted inventory data.

Quality management aspects (chapter 4), including:

- a description of the quality assurance and quality control plan, its implementation and the quality objectives established, and information on internal and external evaluation and review processes and their results in accordance with the guidelines for national systems;
- a description of the procedures for the official consideration and approval of the inventory.

1.2 Objectives of the National System

Objectives of the National System

Under the KP, a National System⁵ 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. The objectives of the Netherlands' national system in accordance with the guidelines are as follows:

⁵ Definitions used in this report are those used in UNFCCC guidelines



- to enable estimation and reporting of anthropogenic GHG emissions by sources and removals by sinks⁶;
- to facilitate meeting the commitments under Articles 3 and 7 of the KP;
- to facilitate the review of the information submitted;
- to ensure and improve the quality of the inventory.

Implications for the Netherlands inventory process

Since 1974, the Netherlands has a pollutant emissions inventory process in place, the Emissions Registration (ER)⁷, which is aimed at producing annual emission inventories for some 170 policy-relevant compounds and compound groups present in the air, water and soil. Ministries and institutes use the data for various purposes, such as policy analyses, annual environmental balances and international reporting. The system is the basis for monitoring of greenhouse gas emissions and removals.

The KP requires a changing role and character of the inventory process, reflected in the requirements of a National System to assure the quality of inventories, one factor being their suitability to demonstrate compliance with relevant requirements. They should not only produce good and reliable figures, but also demonstrate to intended users (UNFCCC) that these are of high quality and suitable as a basis for accounting. The system should ensure:

- transparency, to enable review and control and demonstrate compliance;
- consistency, completeness and comparability, to be of use for accounting;
- accuracy, demonstrating these are the best estimates, reasonably and practicably possible.

1.3 Development of the National System

In recent years, an improvement programme has been implemented to achieve the required transition of the inventory process in terms of both role and culture. The government agency SenterNovem was contracted by the Ministry of Housing, Spatial Planning and the Environment (VROM) to coordinate the programme and to assume the overall co-ordination of QA/QC. The involvement of both ER and SenterNovem should ensure that normal inventory work continues and at the same time sufficient attention is paid to process improvement and ('independent') quality assurance. The programme focused on:

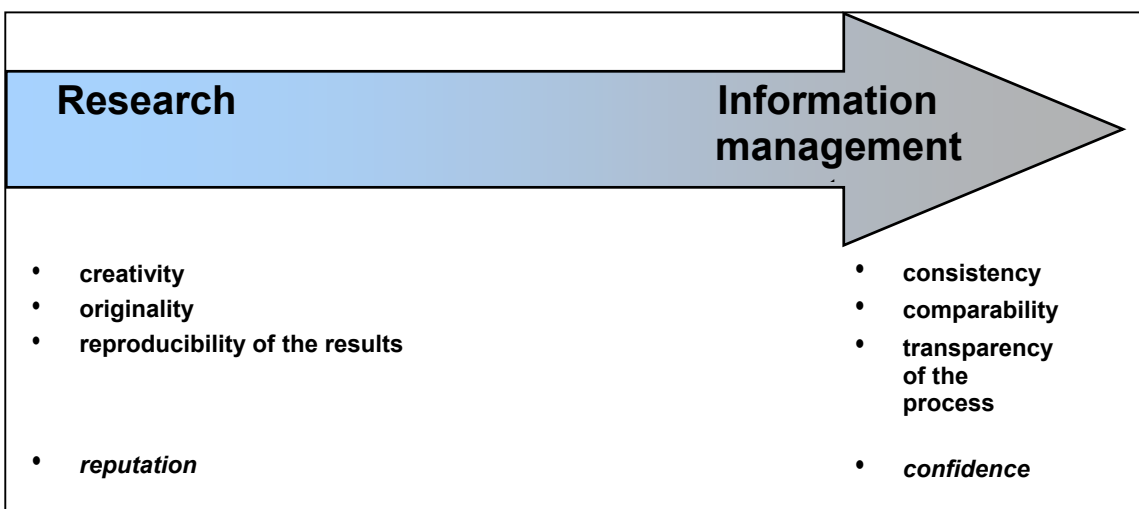


Figure 1: Required transition of the inventory system under the Kyoto Protocol (source: DHV, 2002)

⁶ As required by Article 5 of the KP, and to report these emissions by sources and removals by sinks in accordance with Article 7, paragraph 1, and relevant decisions of the Conference of the Parties (COP) and/or the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (COP/MOP)

⁷ Since 2004, the Ministry (VROM) outsources co-ordination of the ER to the Netherlands Environmental Assessment Agency (MNP)



- assessing, selecting, improving and describing methods and processes in transparent monitoring protocols and process descriptions. This process was instrumental in systematically assessing potential areas for improvement;
- elaborating and implementing a QA/QC programme;
- ensuring implementation and 'maintenance' of agreed methods and tasks, through a mix of covenants, contracts and (other) legal arrangements, including a legal basis for the monitoring of greenhouse gases.

2 INSTITUTIONAL, LEGAL AND ORGANISATIONAL ASPECTS

2.1 General description of the inventory process

Schematic representation

The primary process in preparing the greenhouse gas inventory in the Netherlands is outlined below. Because of the role of the National System in accounting and compliance, 'formal approval' and 'QA/QC' are also essential steps in this system.

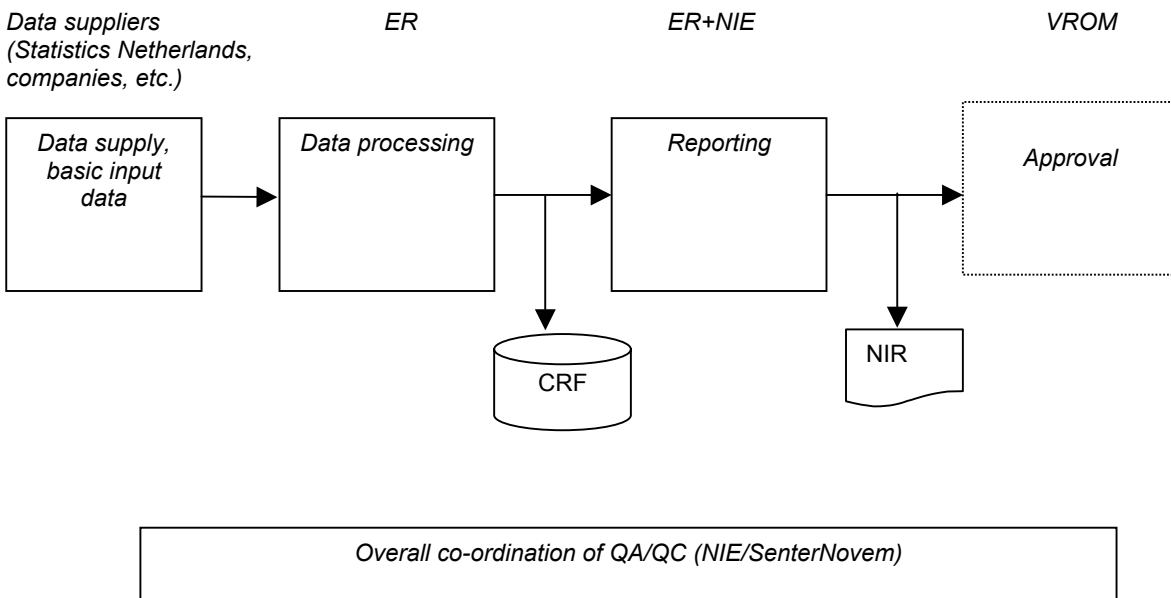


Figure 2: Schematic overview of the main steps in the primary process. In practice, there are various feedback loops

General responsibilities

With the adoption in 2004 of target values for CO₂ emissions from four major sectors and for non-CO₂ greenhouse gases, responsibilities for meeting the Kyoto targets became more delineated and defined for each of the ministries involved, viz. Economic Affairs (EZ), Agriculture, Nature and Food Quality (LNV), Transport, Public Works and Water Management (V&W) and Housing, Spatial Planning and the Environment (VROM). As co-ordinating Ministry, VROM has overall responsibility for establishing and maintaining a National System for monitoring. The responsibility for integrating the monitoring of LULUCF emissions and removals into the system has been delegated to the Ministry of Agriculture, Nature and Food Quality.

The Ministry of VROM assigned SenterNovem the role of National Inventory Entity⁸.

⁸ Also referred to in Art. 5.1 of the Kyoto Protocol as single national entity. Contact information: SenterNovem, PO Box 8242, 3503 RE Utrecht, the Netherlands. Telephone: +31 (0)30 2393429. Co-ordination: D. Both. Email: d.both@senternovem.nl



2.2 Arrangements for data collection

The basic data used for the inventory are collected from various data suppliers. A distinction is made between following data sources:

Statistical data

- Most general statistical data are provided by Statistics Netherlands (CBS) as part of their legal tasks (see box) or the priorities set by the Central Commission for Statistics.
- Many statistical data on agriculture, land use change and forestry are provided by Wageningen University and Research Center (WUR) (i.e. Alterra, LEI) under a broad assignment for legally required research tasks (WOT). The actual tasks are assigned by a Commission each year on a project-to-project basis.
- Waste data are collected by AOO (Waste Coordination Platform, recently merged with SenterNovem) under a longer term assignment from the Ministry of VROM.

Statistics Netherlands (CBS) [Source: CBS, www.cbs.nl, version June 2005]

Statistics Netherlands is responsible for collecting, processing and publishing statistics to be used in practice by policymakers and for scientific research. In addition to its responsibility for (official) national statistics, Statistics Netherlands also has the task of producing European (community) statistics. The legal basis for Statistics Netherlands and its work is the Act of 20 November 2003 governing the central bureau of statistics.

Statistics Netherlands' statistical programmes (the long-term statistical programme and the annual work programme) are set by the Central Commission for Statistics. This is an independent commission that watches over the independence, impartiality, relevance, quality and continuity of the statistical programme. The Director-General decides autonomously which methods to use to make these statistics, and whether or not to publish results.

It uses existing administrative registrations of government and government-funded organisations. The information from these files is supplied to Statistics Netherlands free of charge. Only if they do not contain sufficient information, Statistics Netherlands is allowed to conduct supplementary surveys among companies and private persons. Companies are usually obliged by law to supply information to Statistics Netherlands and can be forced to co-operate under certain circumstances; Statistics Netherlands may use sanctions such as administrative fines. On 3 January 2004, Statistics Netherlands became an autonomous agency with legal personality. There is no longer a hierarchical relationship between the Minister of Economic Affairs and the organisation. However, the minister is responsible for setting up and maintaining a system for the provision of government statistical information; in other words the minister is politically responsible for legislation and budget, for the creation of conditions for an independent and public production of high quality and reliable statistics. The costs of tasks and activities undertaken to put this legislation into practice are accountable to the government's budget.

The provision of the statistical data is not part of greenhouse gas-related contracts. To assure that data and supporting activities for greenhouse gas inventories will be supplied by these organisations, covenants or agreements have been established between ER and the mentioned organisations.

Data from individual companies

A large number of companies are legally required to submit an annual environmental report (MJV). These are validated under responsibility of the competent authorities (provincial, sometimes municipal) that issue the permits. In addition, a number of companies with large combustion plants are required to report information under the BEES/A regulations or within the framework of environmental covenants.

The inventory uses calculations of industrial process emissions of non-CO₂ greenhouse gases that are based mainly on environmental reports (e.g. for N₂O, HFC-23 and PFCs released as by-products). CO₂ emission data from environmental reports from industry, energy, refineries and waste handling are mainly used for verification of calculated emissions. When the reports from major industries contain plant-specific information on activity data and emission factors of sufficient high quality and transparency, these data will be used in national emission estimates.



Additional greenhouse gas-related data

Where sectors are not sufficiently covered in the above-mentioned data sources, other institutes and consultants are specifically contracted, either by the ER or SenterNovem, to provide additional information. For greenhouse gases and sinks, these include:

- ER contracts with TNO on preparation of the CRF;
- SenterNovem contracts with consultants to annually provide F-gas emission estimates from cooling and product use.

2.3 Arrangements for data processing (and storage)

Actual calculation of greenhouse gas emissions and sinks for the various CRF categories is the responsibility of the ER. The objective of the ER is to reach a uniform, well-founded, broadly accepted and accessible set of emission data.

The ER is carried out as a project on behalf of the Ministries of the Environment (VROM), Transport (V & W) and Agriculture (LNV). Since 1 April 2004, co-ordination of the ER has been assigned to the MNP for a period of 4 years. The institutes involved in the ER are responsible for the collection, processing, management and reporting of emission data. Data are collected and processed by five task groups (TG) according to predetermined methods described in the Monitoring Protocols (see box).

Emission Registration (ER)

Tasks and responsibilities

Major decisions on tasks and priorities are taken by the Steering Committee ER (SCER) through approval of the Annual Work Plan. This committee consists of the directors from the commissioning ministries, a representative of regional governments and the director of MNP.

Various organisations are involved in the ER: the Directorate General for Environmental Protection (DGM/VROM), the Directorate General for Public Works and Water Management (RWS), the Institute for Inland Water Management and Waste Water Treatment (RIZA), the Ministry of Agriculture, Nature and Food Quality (LNV), the Agricultural Economics Research Institute (LEI), the Alterra institute from Wageningen University of Agriculture (WUR), Statistics Netherlands (CBS), TNO, the Waste Coordination Platform (AOO; recently merged with SenterNovem), the Facilitary Organisation Industry (FO-I) and MNP. Each of the institutes involved has its own role and responsibilities with respect to the inventory, as described in the annual work plan. The ER project leader at MNP acts as co-ordinator and is responsible for the ER process; the outcomes of that process are the responsibility of the institutes involved. The contribution of the various institutes is ensured by contracts, covenants or other agreements.

Approach

Five Task Groups are responsible for data collection and processing:

- **task group Energy, Industry and Waste Disposal (ENINA)**. Covering air emissions from the mentioned sectors. Participating institutes: MNP, TNO, CBS, RIZA, AOO and FO-I;
- **task group Traffic and Transport**, covering the emissions to air, water and soil generated by traffic and transportation. Participating institutes: MNP, TNO-MEP, CBS, RIZA;
- **task group Agriculture**, covering emissions (and removals) to air, water and soil generated by agriculture and LULUCF sectors. Participating institutes: MNP, LEI, Alterra, TNO, CBS, RIZA;
- **task group Methods Development Water Emissions (MEWAT)**, covering emissions to water generated by all sources not covered by other task groups. Participating institutes: MNP, TNO, CBS, RIZA;
- **task group Other Sources (WESP)**, covering emissions generated by consumers. They also provide information about emission sources of Trade, Service and Government (TSG). Participating institutes: MNP, TNO, CBS.

The data are stored in a Central Database system. At present, this system consists of three partial databases. The database system is being renewed. The new database is planned to be operational for preparation of the emission estimates for the CRF2007. The ER is responsible for maintaining the database. The CRF is completed using these emissions and removals data, a task MNP has assigned to TNO.



2.4 Arrangements for reporting, QA/QC co-ordination and review

The National Inventory Report is prepared by MNP in close co-operation with CBS, TNO and SenterNovem. MNP is responsible for contents, consistency with the CRF and timely delivery. NIE/SenterNovem is responsible for quality assurance and providing input on the National System, QA/QC and the improvement actions. As co-ordinating Ministry, VROM is responsible for formal approval of CRF and NIR before submission to UNFCCC (see 5.4).

NIE/SenterNovem has also been assigned QA/QC co-ordination of the inventory and the national system, facilitation of UNFCCC reviews and co-ordination of requests for clarification.

2.5 Legal arrangements for the National System

An Act on Monitoring of Greenhouse Gases has become effective in December 2005⁹. This Act determines the establishment of a National System for monitoring of greenhouse gases and empowers the Minister of Housing, Spatial Planning and the Environment (VROM) to appoint an authority responsible for the National System and the National Inventory. The Act also determines that the National Inventory be based on methodologies and processes as laid down in the monitoring protocols. With a regulation¹⁰ following to that the Minister has appointed SenterNovem as NIE and published a list of the protocols. Adjustments to the protocols will require official publication of the new protocols and announcement of publication in the official Government Gazette (Staatscourant).

3 METHODOLOGICAL AND PROCESS ASPECTS

3.1 Introduction

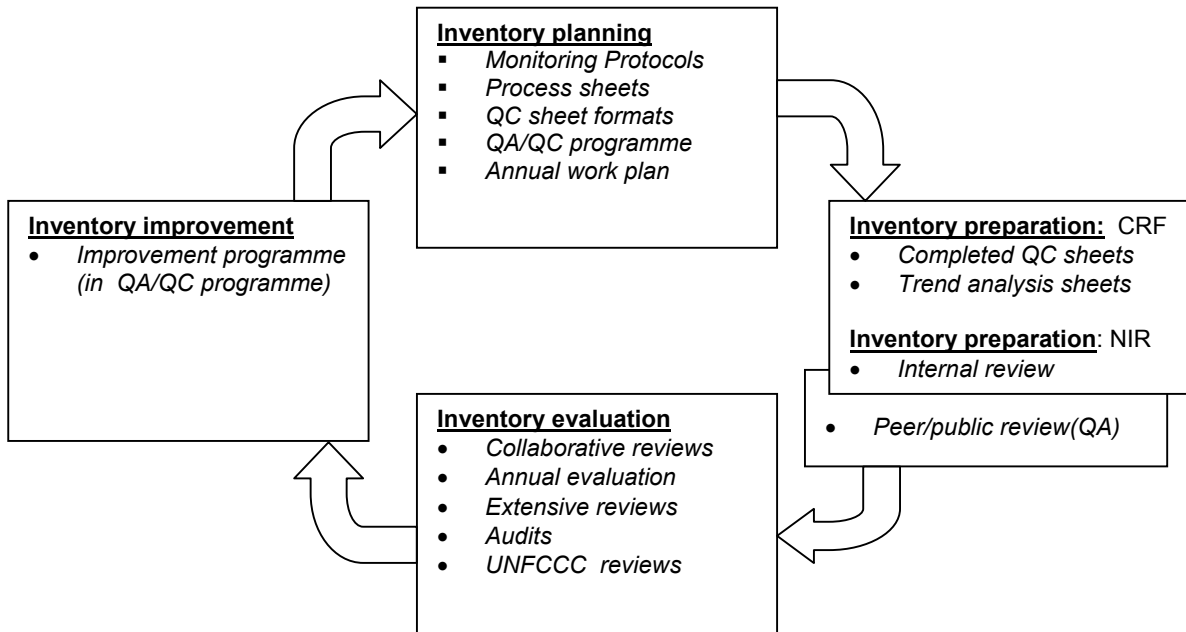
To ensure high quality and continuous improvement, the annual inventory process is implemented as a cyclical project. This annual cycle is a key quality management tool (based on the Deming cycle of plan-do-check-act) and encompasses:

- inventory planning;
- inventory preparation;
- inventory evaluation;
- inventory improvement;
- inventory management.

The following sections describe how the required specific functions are performed for each of these steps. The figure illustrates the steps and the QA/QC tools used in each step.

⁹ Act of 12 December 2005, published in the Staatsblad 2005 (number 664)

¹⁰ Regulation published in the Staatscourant of 21 December 2005, number 248, page 32



3.2 Inventory planning

Quality

High quality requires that the intended use of the inventories be properly understood. This use is reflected in objectives and characteristics of the National System and detailed further in the applicable guidelines and good practice guidance. These user requirements were the starting point for development of the Netherlands National System. During operation of the system, the outcomes of UN reviews are key in measuring the actual quality as perceived by the user.

Inventory planning during development of the National System

The basic structure and elements for the National System were defined and designed during the past few years. This encompasses the following functions and elements:

- agreements on the basic institutional, legal and organisational structure, including the designation of the single national entity and the co-operation between the organisations involved. These agreements have been laid down in contracts, legal arrangements and covenants. The previous chapter provides more details;
- definition and allocation of the specific roles, responsibilities and tasks in the process, as described in the previous chapter. These have been worked out in more detail in:
 - the set of Monitoring Protocols. These describe the choice of method, the activity data and emission factors, as well as specific tasks, responsibilities, working processes and time schedules. Table 1 presents a list of the protocols;
 - a set of Procedures for other relevant processes, e.g. the preparation of CRF and NIR, documentation & archiving, key source and uncertainty analyses (see table 2);
 - methods and emission factors applied are annually listed the NIR. Table 3 summarizes this for the most recent year while the Netherlands list of fuel and standard CO₂ emission factors¹¹ holds more information on the maintenance of emission factors.
- a QA/QC programme¹², including quality objectives and a plan and time schedule for QA and QC activities. This programme includes an improvement plan.

¹¹ Vreuls, H.H.J. **The Netherlands list of fuels and standard CO₂ emission factors**, 2006

¹² SenterNovem, **QA/QC Programma 2005-2006**, 2005



IPCC-code	Description	Gas(es)
All	Reference approach	CO ₂
1A1 1A2 1A4	Stationary combustion (fossil)	CO ₂ N ₂ O CH ₄
1A1b 1B1b 1B2aiv 2A4i 2B1 2B4i 2B5i 2B5vii 2B5viii 2C1vi 2D2 2Giv	Process emissions (fossil)	CO ₂ N ₂ O CH ₄
1A2f 1A4c	Mobile equipment	CO ₂ N ₂ O CH ₄
1A4c	Fisheries	CO ₂ N ₂ O CH ₄
1A3a	Inland aviation	CO ₂ N ₂ O CH ₄
1A3b	Road transport	CO ₂
1A3b	Road transport	N ₂ O
1A3b	Road transport	CH ₄
1A3c	Rail transport	CO ₂ N ₂ O CH ₄
1A3d	Inland navigation	CO ₂ N ₂ O CH ₄
1A5	Defence	CO ₂ N ₂ O CH ₄
1B2	Oil & gas production	CO ₂ CH ₄
1B2	Oil & gas distribution/transport	CO ₂ CH ₄
2A1 2A2 2A3 2A4ii 2A7i 2B5ix 2C1i 2C1vii 2C3 2Gi 2Gii 2Giii 2Gv 3A 3B 3C 3D	Process emissions (non-fossil)	CO ₂ N ₂ O CH ₄
2B2	Nitric acid	N ₂ O
2B5	Caprolactam	N ₂ O
2C3	Aluminium production	PFC
2E1	HCFK-22 production	HFC
2E3	HFC by-product emissions	HFC
2F1	Stationary refrigeration	HFC
2F1	Mobile refrigeration	HFC
2F2	Hard foams	HFC
2F4	Aerosols	HFC
2F8	Double glazing	SF ₆
2F8	Semi-conductors	SF ₆ PFC
2F8	Electrical equipment	SF ₆
4A1	Enteric fermentation, cattle	CH ₄
4A2-13	Enteric fermentation, other	CH ₄
4B	Manure management	N ₂ O
4B1	Manure management, cattle	CH ₄
4B8	Manure management ,swine	CH ₄
4B2-7,9-13	Manure management, other	CH ₄
4D	Agricultural soils, indirect	N ₂ O
4D	Agricultural soils, direct	N ₂ O
5A	Forest	CO ₂
5D	Soil	CO ₂
6A1	Waste disposal	CH ₄
6B	Waste water treatment	CH ₄ N ₂ O
6D	Large-scale composting	CH ₄ N ₂ O
<i>In addition to the emissions described in Protocols, two memo items are included in the National System</i>		
Memo item in reports	Biomass	CH ₄ CO ₂
Memo item in reports	International bunker emissions	CO ₂ N ₂ O CH ₄

Table 1: List of monitoring protocols (protocols can be downloaded from www.greenhousegases.nl)



Inventory planning during operation of the National System

Each year, the above-mentioned agreements, protocols, procedures and QA/QC programme are reviewed, updated (if necessary) and approved for use in the next cycle. Changes in the Monitoring Protocols require the approval of the Ministry of VROM and the Steering Committee ER. SenterNovem is responsible for updating the QA/QC programme, including the improvement programme. Formal approval needs to be given by VROM, after consultation of the Consultative Committee NIE¹³. For LULUCF issues, VROM will need agreement of the Ministry of Agriculture (LNV).

Procedures	
<i>Primary processes</i>	<i>Management and supporting processes</i>
Preparation of the CRF	Annual evaluation and improvement process
Preparing key source analysis	Modification of methods (and performing recalculations)
Preparing uncertainty analysis, including expert elicitation	Treatment of confidential information
Preparation of the NIR (including peer review and formal approval)	Facilitating UN reviews/responding to questions for clarification
Documentation and archiving	Implementation of audits

Table 2: List of procedure in the National System (documents available for UNFCCC review)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	CO ₂		CH ₄		N ₂ O		HFCs		PFCs		SF ₆	
	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor	Method applied	Emission factor
1. Energy	CS,T2,T3	CS,D,PS	CS,T1,T1b,T2,T3	CS,D,PS	CS,T1,T2	CS,D						
A. Fuel Combustion	CS,T2	CS,D	CS,T1,T2,T3	CS,D	CS,T1,T2	CS,D						
1. Energy Industries	T2	CS	T2	CS	T1,T2	CS,D						
2. Manufacturing Industries and Construction	T2	CS	T2	CS	T1	CS,D						
3. Transport	CS,T2	CS	CS,T2,T3	CS,D	CS,T2	CS,D						
4. Other Sectors	T2	CS,D	T1,T2	CS,D	T1	D						
5. Other	T2	D	T2	CS	T2	CS						
B. Fugitive Emissions from Fuels	T2,T3	CS,PS	T1b,T2,T3	CS,D,PS	NA	NA						
1. Solid Fuels	T2	CS	T1b	D	NA	NA						
2. Oil and Natural Gas	T2,T3	CS,PS	T1b,T2,T3	CS,D,PS	NA	NA						
2. Industrial Processes	CS,T1a,T1b,T2	CS,D,PS	CS,T1,T2	CS,D	CS,T1b,T2	CS,D,PS	T2	CS,PS	CS,T1,T2	PS	CS,T2	D,PS
A. Mineral Products	CS	CS,D,PS	NA	NA	NA	NA						
B. Chemical Industry	CS,T1b	CS,PS	T1,T2	D	T2	PS					NA	NA
C. Metal Production	T1a,T2	CS	NA	NA	NA	NA	NA	NA	T2	PS	NA	NA
D. Other Production	T1b	CS										
E. Production of Halocarbons and SF ₆							T2	PS	T1	PS	NA	NA
F. Consumption of Halocarbons and SF ₆							T2	CS	CS,T2	PS	CS,T2	D,PS
G. Other	CS,T1b	CS,D	CS	CS	CS,T1b	CS,D			NA	NA	NA	NA
3. Solvent and Other Product Use		CS	CS			CS	CS					
4. Agriculture			T1,T2	CS,D	T1,T1b,T2,T3	CS,D						
A. Enteric Fermentation			T1,T2	CS,D								
B. Manure Management			T2	CS								
C. Rice Cultivation			NA	NA								
D. Agricultural Soils			NA	NA	T1,T1b,T2,T3	CS,D						
E. Prescribed Burning of Savannas			NA	NA	NA	NA						
F. Field Burning of Agricultural Residues			NA	NA	NA	NA						
G. Other			NA	NA	NA	NA						
5. Land Use, Land-Use Change and Forestry	CS,T2	CS	NA	NA	NA	NA	NA	NA				
A. Forest Land	CS,T2	CS	NA	NA	NA	NA	NA	NA				
B. Cropland	CS	CS	NA	NA	NA	NA	NA	NA				
C. Grassland	T2	CS	NA	NA	NA	NA	NA	NA				
D. Wetlands	NA	NA	NA	NA	NA	NA	NA	NA				
E. Settlements	CS	CS	NA	NA	NA	NA	NA	NA				
F. Other Land	CS	CS	NA	NA	NA	NA	NA	NA				
G. Other			NA	NA	NA	NA	NA	NA				
6. Waste	NA	NA	T2	CS	T2	CS,D						
A. Solid Waste Disposal on Land	NA	NA	T2	CS								
B. Waste-water Handling			T2	CS	T2	D						
C. Waste Incineration	NA	NA	NA	NA	NA	NA						
D. Other	NA	NA	T2	CS	T2	CS						
7. Other (as specified in Summary LA)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Explanation of notation keys used:

Method applied: D, IPCC default; RA, reference approach; T, IPCC tier; C, CORINAIR; CS, country-specific; M, model

Emission factor used: D, IPCC default; C, CORINAIR; CS, country-specific; PS, plant-specific; M, model.

Other keys: NA, not available; NO, not occurring; NE, not estimated; IE, included elsewhere.

Table 3 CRF summary table 3 with methods and emission factors applied

¹³ Consisting of representatives of the Ministries (VROM, LNV) and institutes (CBS, ER/MNP) involved.



The annual planning is further detailed in the Annual Work Plans, specifying staffing, time budgets and scheduling of the next inventory cycle. These plans also describe the tasks in performing the general QC (Tier 1), including the sample calculations, and further describe which work instructions, databases, documentation sheets and other tools should be used. The work plan is approved by the respective organisations¹⁴, after mutual consultation.

Tables 1 and 2 respectively, list the protocols and procedures as developed and implemented since late 2005.

3.3 Inventory preparation

The inventory preparation encompasses the following functions and activities:

- data collection, data processing and emission estimation are implemented in accordance with the Monitoring Protocols and the planning in the Annual Work Plan. The actual process results and deviations (if any are required) from the standard process are annually documented in the NIR and in documentation sheets, thus ensuring a 'paper trail' of relevant calculations.
- performing the general QC procedures (Tier 1), as detailed in the Annual Work Plans; results and corrections (and approval) are documented in documentation sheets;
- performing the key source and the uncertainty analyses as described in the respective Procedures and in accordance with the guidelines. The key source analysis will be performed annually after the emissions have been calculated. Any changes in key sources, as well as the results from the uncertainty analyses, will be taken into account in the improvement programme and planning for the next cycle. Annually also a Tier 1 uncertainty analysis is implemented. Twice a Tier 2 uncertainty assessment has been carried out (last in 2006). The results showed that the annual Tier 1 analysis is sufficiently reliable and a cycle of about 5 years for an update of Tier 2 analyses is sufficient if no major changes occur. The key sources and uncertainty analyses of previous years were also used as an important input in setting priorities in the monitoring improvement programme, implemented over the past years. The results of the key source and uncertainty analyses are reported in the annual NIR. The most recent results are described in the NIR2006, attached to this Initial Report.
- performing and documenting recalculations, if any, in accordance with the related procedure. Methods can only be changed after formal approval of the revised methods and Protocols by Steering Committee ER and VROM. If any improvement action/project actually results in methodological or time series changes, these changes will be implemented in the Protocol(s). Recalculations will be implemented, if needed, only after approval of the changes.
- elaborating the CRF and NIR in accordance with the related procedures (see table in previous section). This procedure includes a.o. elaboration of draft version, a subsequent internal check (by the NIE) and peer and public reviews. After preparing the final draft formal approval is needed by VROM.

3.4 Inventory evaluation

The annual inventory evaluation consists of various elements:

- annual 'internal' review of the draft NIR before submission to the UNFCCC. This review is coordinated by the NIE and comprises an internal quality assurance, a basic peer review and a public review. The latter is performed using the national system website, together with notification of potentially interested experts and organisations.
- implementing an annual internal evaluation and improvement cycle, implemented jointly by NIE and ER, comprising two major steps:
 - in May: evaluating the previous cycle. NIE and ER will together prepare an internal evaluation report;

¹⁴ For the ER, approval is given by the Steering Committee ER.



- in September: updating the QA/QC programme and the planning for the next cycle and, if necessary, the protocols.

3.5 Inventory improvement

The improvement programme, an integral part of the QA/QC programme, will be updated as part of the annual cycle. If results, notably those from UN reviews, give rise to urgent improvement actions, additional actions may be decided on. Improvements that influence methods or may induce recalculations require formal approval from SCER and VROM according to the respective procedure. The QA/QC programme also includes audits and further review, which contribute towards evaluation and continuous improvement of the national system.

3.6 Inventory management

The institutional, legal and procedural arrangements, described above, also ensure that appropriate capacity, expertise and staff are involved. A proper mix of expertise and staff is ensured from various expert organisations. This minimizes the risks of depending on too few experts. It also enables mutual checks and a proper system of quality assurance through staff not directly involved in emission estimates. Skills and experience are further strengthened by the fact that Netherlands' experts, involved in the national inventory system, intensively participate in both UN review activities and EU expert discussions, thus resulting in extensive exchange of experiences.

Management of the inventory in the Netherlands also encompasses:

- documenting the relevant information and archiving this in annual project files for each cycle, using an annual catalogue of relevant documents. Key documents of a non-confidential nature are made accessible through the national system website www.greenhousegases.nl. Other non-confidential (internal) documents and memos will be archived and held available centrally for UN reviews. Confidential information will not be centrally archived, but only maintained and archived by the 'owner'. It will be available for UN review as far as legal and procedural arrangements allow;
- facilitating UN reviews and responding to any related requests for clarification under the EU monitoring mechanism and the UNFCCC.

The NIE is responsible for co-ordination of the website, the list of documents, central archiving¹⁵ and access to non-confidential information.

4 QUALITY MANAGEMENT ASPECTS

4.1 Introduction

The National System itself is a key tool in improving the quality and process management of the inventory process, as described in the previous chapter. The various tools and QA/QC activities are further elaborated in the QA/QC programme, described in section 4.2. Over the last few years, various improvement actions have been implemented. Main inputs were the results of internal and external evaluation and review processes. These are described in section 4.3, including their consequences. Section 4.4 describes the process of official consideration and approval of the inventory.

4.2 QA/QC programme

General aspects

The QA/QC programme describes the quality objectives of inventory and national system and the QA/QC plan. This includes a time schedule, tasks and responsibilities. An improvement

¹⁵ Actual responsibilities for each key document are listed in SenterNovem, List of key documents, 2005



programme forms an integral part of this QA/QC programme. The QA/QC programme is basically an internal document¹⁶ that will be held available for UN review. SenterNovem is responsible for co-ordination and implementation of the programme. It is updated, if needed, once a year in September, as part of the annual evaluation and improvement cycle.

In general terms, the QA/QC programme aims at:

- to annually finalise, by 15 March, inventories that are of sufficient¹⁷ quality to meet the requirements under UN and EU;
- to sufficiently measure and control the quality of annual inventories by appropriate quality control procedures;
- to ensure that quality objectives are met and regularly evaluated by implementing appropriate quality assurance and evaluation procedures by staff that is not directly involved;

Additional and/or more specific objectives may be added in the annual update.

These objectives are further elaborated in the programme into more specific quality objectives, related to improving transparency, consistency, comparability, completeness and accuracy (the 'inventory principles').

QA/QC plan

The QA/QC plan consists of four groups of activities:

- quality control;
- quality assurance;
- documentation and archiving;
- evaluation and improvement.

For each group, the main actions are briefly described below.

Quality control

The main activities include:

- maintaining a transparent system through protocols, procedures and QA/QC programme. This step is essential for the planning phase. It defines requirements and outputs;
- regularly reviewing and updating the information on QA/QC of external agencies;
- applying General QC (Tier 1) procedures, as part of the regular working processes, in accordance with IPCC good practice guidance and, where applicable, source-specific QC procedures for selected sources. The main responsibilities for implementation lie with the ER. SenterNovem (NIE) regularly checks whether activities and outputs (still) conform with the guidelines.

Quality assurance

This is primarily done by staff not directly involved in the inventory process, coordinated or implemented by SenterNovem. The main activities:

- peer review process:
 - annual basic peer reviews before submission of NIR/CRF to the UNFCCC;
 - extensive review process: co-ordinating a 5-year cycle of extensive reviews of the various sectors. This includes possible intra-EU collaborative reviews;
- regularly updating practical options for further verification and source-specific QA;
- regular audits.

As part of the elaboration of the monitoring protocols over the last few years, all relevant sources have been submitted to extensive scrutiny.

Documentation and archiving

The main activities are related to the cycle as a whole:

¹⁶ SenterNovem, **QA/QC programme 2005-2006**, 2005b

¹⁷ 'Sufficient' implies that no significant problems are identified by UNFCCC review teams.



- annually updating documentation and archiving. This is part of the normal inventory process. Most documentation on the annual results and outputs is the responsibility of the ER. Planning documents come from ER and NIE, while review reports come mainly from NIE;
- facilitating reviews and responses for clarification. This is a joint responsibility of ER and NIE, the latter being charged with co-ordination.

Evaluation and improvement

The main activities include:

- Implementation of the annual evaluation and improvement cycle, mentioned above.
- Implementing the improvement programme, as annually updated in the QA/QC programme.

A special procedure has been developed to deal with improvement actions that may lead to changes in historical emission data. This aims to strengthen consistency. Improvement actions that do not lead to changes in the reference year will be considered, based on priorities, practicality and cost effectiveness. The Consultative Committee NIE (see section 3.2) may be asked to advise NIE on this matter. The Ministries (VROM, and LNV for LULUCF) ultimately decide.

4.3 Results from internal and external evaluations and reviews

To prepare for the Kyoto Protocol and bring the national system in line with requirements, the Netherlands has implemented a monitoring improvement programme over the last few years¹⁸. The actions taken are/were based on the following major inputs:

- expert workshops made a preliminary assessment (around 1999/2000) of the inventory process, any weak spots and of potential areas for improvement. A longlist of actions was identified. An interdepartmental committee (WEB) prepared a shortlist of prioritised actions, to be included in an improvement programme. In 2001, SenterNovem was asked to assume the practical co-ordination of this programme;
- extensive sectoral reviews and studies, implemented to support the elaboration of monitoring protocols;
- review of cross-cutting issues such as QA/QC and uncertainty analyses, identifying any weak spots and potential improvements for these issues;
- UNFCCC reviews. These provided a crucial input for improvement actions, being the main indicator of 'customer' satisfaction.

The inputs led to shifts and updates in the improvement programme, and often supported each other. The UNFCCC review process, for example, often identified similar areas for improvement as national assessments. This provided for a clear set of priorities. As a result of the improvement programme, the Netherlands' National System under the KP has been (legally) established by the end of 2005.

Some major results and improvement actions are illustrated in the box.

Main results from review processes and (subsequent) improvement actions

Cross-cutting:

- QA/QC: the elaboration of monitoring protocols proved instrumental in improving the transparency of the national system, identifying the weak spots in background information and systematically reviewing relevant sectors. It led to various more detailed assessments of country-specific emission factors and to upgraded and better substantiated methods;
- uncertainties: in 2001/2002, a first attempt was made to apply a Tier 2 uncertainty analysis. This showed that Tier 2 added clear insight into improvement options in the expert process and related background information, although it did not lead to significantly different overall uncertainty estimates as with Tier 1. It

¹⁸ This is in line with Art.10 a) of the Kyoto Protocol. In addition to the national improvement actions, the Netherlands actively participates in EU (expert) workshops and in collaborative mutual review activities, in order to exchange experiences and further improve the inventory. Further cooperation e.g. includes a mission of Dutch experts, funded by UNDP, to cooperate with China in improving inventories.



was decided to improve the process and the background information and to implement Tier 2 updates only after the planned methodological improvements and recalculations had taken place. The Tier 2 analysis has been updated by mid 2006. The conclusion was that annual Tier 1 uncertainty estimates provide sufficiently reliable information, and that update of Tier 2 uncertainty estimates are only necessary after major (methodological) changes. The Netherlands will assess Tier 2 uncertainties at intervals of 5 years or after major changes.

Sectoral improvement projects (examples, not exhaustive):

- agriculture: the monitoring protocols and supporting studies led to better substantiation and upgrading of various emission factors and methods in the agricultural sector;
- energy: the emission factors of various fuels were studied and better substantiated and updated. Furthermore, the variations in quality and transparency of company level data on combustion and process emissions led to adaptation of the methods in the energy sector, in order to improve quality and transparency;
- transport: to comply with IPCC requirements, further studies were conducted into a better distinction between domestic and international emissions from aviation and shipping. This resulted in improved methods for including emissions from fisheries into domestic emissions;
- LULUCF: the methods in this sector were upgraded for forests and complemented for soils, to reflect the recently adopted GPG for LULUCF.

4.4 Official consideration and approval

An official inventory approval process is implemented to further support its quality. The following steps are of importance for formal consideration and approval:

1. the data set that is being used for the CRF is officially approved in writing to the Project leader ER by the institutes involved in the ER.
2. the draft NIR is checked by the NIE. The Ministry of VROM gives formal written approval to ER and NIE for the NIR/CRF to be submitted to the UNFCCC, after consulting the findings of the checks by the NIE and after consulting the Ministry of Agriculture on LULUCF issues.



F. Description of the national registry

This section describes the National Registry of the Netherlands. It follows the outline from the guidelines for the preparation of the information required under Article 7.2. of the KP, as outlined in Decision 15/CMP.1. Since the ITL is still under development, this annex focuses on the experiences so far, notably those for the EU Emissions Trading Scheme. A previous version of this information has been reported to the UNFCCC in the Netherlands' 4th National Communication, that was submitted end of 2005. Information on the Netherlands' national register can also be found at www.emissieautoriteit.nl/english.

(a) The name and contact information of the registry administrator designated by the Party to maintain the national registry

Title	Registry Administrator
Name	Harm van de Wetering
Organisation	Nederlandse Emissieautoriteit
Address	Prinses Beatrixlaan 2, PO Box 91503 [IPC 652], The Hague
Email	Harm.vandewetering@minvrom.nl
Phone	+31(0)70 3394747
Fax	+31(0)70 3391394
Website	www.emissieautoriteit.nl

(b) The names of the other Parties with which the Party co-operates by maintaining their national registries in a consolidated system.

The Dutch National Registry is currently linked to the other operational EU member states' National Registries by way of the European Commission CITL (Community Independent Transaction Log).

(c) A description of the database structure and capacity of the national registry

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

The current architecture in place for the Dutch registry system is described below.

1. The GRETA registry system is implemented using a Microsoft SQL Server relational database management system with a dedicated data model for supporting registry operations.
2. The absolute maximum size of a SQL Server 2000 database is: 1,048,516 Terabytes or 50 Terabytes per single file entry. A Terabyte is equivalent to 10 to the power 12 (10^{12}) bytes.
3. The SQL Server database model is scalable up to 32 processors with 64 gigabytes of memory.
4. The GRETA team has made an estimate of annual database growth based on the current size of the UK database. The total current size of the Dutch database is smaller, so it will fit into the estimate made by GRETA.

Applying a predicted growth of 10% in organisations, users and accounts, with an envisaged 10 transactions per year per Operator Holding Accounts and 100 transactions per year for Person Holding Accounts, with each transaction assumed to involve an average of 5 unit blocks, it is predicted that this would result in an annual growth in database storage of approximately 50 megabytes per year. Based on this information, it is envisaged that it should be well within the capacity of the database system.



Furthermore, where a particular performance issue is identified, a dedicated development team is available to perform any necessary fine-tuning.

*(d) A description of how the national registry conforms to the technical standards for data exchange between registry systems for the purpose of ensuring the accurate, transparent and efficient exchange of data between national registries, the clean development mechanism registry and the transaction log (decision 19/CP.7, paragraph 1)*¹⁹

The Dutch registry has been developed for the EU Emissions Trading Scheme. This scheme requires its Member States' registries to be compliant with the UN Data Exchange Standards (DES) specified for the Kyoto Protocol.

The system contains the functionality to perform issuance, conversion, external transfer, (voluntary) cancellation, retirement and Reconciliation processes using XML messages and web-services as specified in the UN DES 1.0 document.

In addition, it also contains: 24 Hour Clean-up, Transaction Status enquiry, Time Synchronisation, Data Logging requirements (including, Transaction Log, Reconciliation Log, Internal Audit Log and Message Archive) and the different identifier formats as specified in the UN DES document.

The registry development team have been in close contact with the ITL administrator and development team within the UNFCCC secretariat. Discussions have been held regarding the potential implementation timescales for the remaining functions. All functionality that has yet to be developed will be completed in line with the ITL timetable and the UNFCCC will be updated wherever necessary.

(e) A description of the procedures employed in the national registry to minimise discrepancies in the issuance, transfer, acquisition, cancellation and retirement of ERUs, CERs, tCERs, ICERs, AAUs and/or RMUs, and replacement of tCERs and ICERs, and of the steps taken to terminate transactions where a discrepancy is notified and to correct problems in the event of a failure to terminate the transactions

In order to minimise discrepancies between the Registry and the Transaction Log, the following approach has been adopted for the Registry system development for the EU Emissions Trading Scheme. The same approach will be adopted for the development of the remaining Kyoto functionality for the Registry software:

- Communications between the National Registry and the ITL will be via web-services using XML messages – as specified in the UN DES 1.0 document. These web-services, XML message format and the processing sequence will be as per that specified in the UN DES document;
- As far as possible, the Registry shall validate data entries against the list of checks that are performed by the ITL – as documented in Annex E of the UN DES Annexes document – before forwarding the request to the ITL for processing. This will help to minimize sending incorrect information to the ITL for approval;
- All units that are involved in a transaction shall be earmarked internally within the Registry; thereby preventing the units from being involved in another transaction until a response has been received from the ITL and the current transaction has been completed;
- The web-service that sends the message to the ITL for processing will ensure that a message received acknowledgement is received from the ITL before completing the submission of the message. Where no acknowledgement message has been received following a number of retries, the web-service will terminate the submission and roll-back any changes made to the unit blocks that were involved;

¹⁹ See decision 24/CP.8.



- Where a 24 hour clean-up message is received from the ITL, the existing web-service will roll back any pending transactions and the units that were involved, thereby preventing any discrepancies in the unit blocks between the Registry and the ITL; and
- Finally, if an unforeseen failure were to occur, the data discrepancies between our Registry and the ITL can be corrected via a manual intervention function within our registry. Following this, reconciliation will be performed to validate that the data is in sync between the Registry and the ITL.

(f) An overview of security measures employed in the national registry to prevent unauthorised manipulations and to prevent operator errors and of how these measures are kept up to date

The Dutch Registry contains the following security measures:

- Access is via Username and Password, as set out in the EU Registry Regulations;
- Which actions a user can perform is controlled by a permissions system, hence preventing unauthorised access to restricted actions;
- All actions performed are recorded by audit;
- Database manipulations are only carried out by protected, internal stored procedures which are not accessible directly from the user interface and can only be invoked by our internal web-services; and
- Furthermore, where a particular security issue is identified, a dedicated development team is available to address the issue.

In order to prevent operator errors, the Registry software incorporates the following design:

- Validation is performed on all user inputs to ensure that only valid details are submitted for processing;
- Confirmation of user input is displayed to help the user to spot any errors that may have been made; and
- An internal approval process has been implemented for secondary approval for relevant operations before submitting the details to the ITL for processing.

(g) A list of the information publicly accessible by means of the user interface to the national registry

- The user interface to the national registry itself has no publicly accessible information. Users always need to log on to their account first, before they have access to their specifically authorised information.
- The homepage of our website is linked to the CITL, where all information required by the European Regulation on Registries (2216/2004) is displayed.
- The user terms and conditions can be downloaded from our website.

Publicly accessible information required under 5/CMP.1, 13/CMP.1 and 14/CMP.1 will be included in a future release of the software in order to meet with the timetable required for Kyoto. These reports will be made available publicly through the website.

(h) The Internet address of the interface to its national registry

All publicly accessible information is available through the homepage of the registry.

- The public website can be found at <http://www.emissieautoriteit.nl/> and is available in both Dutch and English. The registry can be reached through this website.

(i) A description of measures taken to safeguard, maintain and recover data in order to ensure the integrity of data storage and the recovery of registry services in the event of a disaster



The necessary procedures have been identified according to the method required by the Dutch government for governmental information systems (A&K analysis). This document is available in Dutch.

Physical security

- The physical security of the building and computer rooms is carried out by the Security department of Data Centers & Hosting Services (DC&HS), 24 hours a day, 7 days a week. The department uses technical and procedural means. Visitors are only allowed after invitation by one of the DC&HS employees. Access to the computer rooms is severely restricted and only possible after showing proof of identity. All security rules can be found in the book: 'Beveiligingsregels PinkRocade Infrastructure Services' (in Dutch).
- The back-up and production environments are (geographically) separated. The distance between Apeldoorn and Amsterdam Zuidoost is approximately 100 km.
- In case of calamities, a backup server is available at the location of DC&HS in Amsterdam Zuidoost. According to the Service Level Agreement (SLA – available in Dutch), this back-up server should be operational within 48 hours after it is decided to use this server.
- In case of loss of the production environment, the back-up tape of the day before the 'disaster' will be transferred from Apeldoorn to Amsterdam Zuidoost. The relevant data will be retrieved and installed on the back-up servers. Action will also have to be undertaken to transfer URL's and certificates to this machine.

Technical details regarding back-up scenario

- Electronic medium: dds-4 data cartridge, 40GB.
- Full back-ups (meaning databases as well as applications) will be made on a daily basis (7 days a week).
- Every week, a back-up will be transferred to Apeldoorn.
- The back-up will be kept for 2 weeks.
- Restore time during business hours is no more than 4 hours.
- Physically guarded computer area.

System security

- Standard (continuous) monitoring of the servers making use of the following security components: Intrusion Detection System and Firewalls.
- Both the web server and the database server are dedicated servers for GRETA. A dedicated firewall is also in place. This site is only accessible from the two GRETA websites and CITL. Continuous monitoring by Intrusion Detection Services should prevent unauthorised access to the machines.
- Log files are checked each month with regard to security issues and further analysis in case of peculiarities.
- Annual analysis of security systems. A report will be drawn up giving an overview of the current situation and suggestions for possible improvement.
- Controlled patching of the operating system and system applications concerning security issues.

Disaster recovery

In the event of a disaster, the following recovery procedures have been incorporated in the design of the Registry system:

- Local information in the database is held over a raid-array structure with automatic error detection and recovery.
- Data is archived every hour to an off-site disaster recovery site that can be used to take over as the live registry in case the main site has become inoperable. This will then be followed by reconciliation (with the ITL) and if needed manual intervention processes in order to check and restore data inconsistency that may exist in the Registry.



(j) The results of any test procedures that might be available or developed with the aim of testing the performance, procedures and security measures of the national registry undertaken pursuant to the provisions of decision 19/CP.7 relating to the technical standards for data exchange between registry systems.

A full regression test of the registry was performed by the IT contract supplier in July 2006. Test scripts and results are available on request.

How the registry performs the functions defined in 13/CMP.1

- *Provisions governing t/ICERs.* The required functionality to deal with t/ICERs is currently being developed according to the UN timetable.
- *Publicly accessible information.* Public reports will be built along with the rest of the UN functionality and will be developed according to the UN timetable.

How the registry performs the functions defined in 5/CMP.1

- *Issuance of ERUs, AAUs & RMUs.* Information will be transmitted to the ITL in the format of the messages specified in the UN DES 1.0. Any functionality that has yet to be built will be developed according to the UN timetable.
- *Transfer, acquisition, cancellation, retirement & carry-over.* Information will be transmitted to other registries in the format of the messages specified in the UN DES 1.0 via the ITL. Acknowledgement information will be transmitted to other registries in the format of the messages specified in the UN DES 1.0 via the ITL. Any functionality that has yet to be built will be developed according to the UN timetable.
- *Transaction procedures.* Will be carried out as specified in the UN DES 1.0. Any functionality that has yet to be built will be developed according to the UN timetable.
- *Publicly accessible information.* Publicly available reports will be developed according to the UN timetable.

The Standard Electronic Reporting Format (14/CMP.1)

- The SEF reports will contain the information as set out in Decision 14/CMP.1 and will be built according to the ITL timetable.



Annex: Decision 2002/358/EC

(Council Decision of 25 April 2002 concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Framework Convention on Climate Change and the joint fulfilment of commitments thereunder)