The Netherlands First Biennial Report

under the

United Nations Framework Convention

on Climate Change

Ministry of Infrastructure and the Environment

CONTENTS

1. SUMMARY

Introduction

This report presents the First Biennial Report from the Netherlands, as required under the Climate Change Convention. It describes the information required by defined in the UNFCCC biennial reporting guidelines for developed country Parties[1]. Tabular information as defined in the common tabular format (CTF) are submitted using, the electronic reporting facility provided by the UNFCCC Secretariat[2].
This First Biennial Report has been written parallel to the Sixth National Communication which is also required under the Climate Change Convention. Both reports provide a full coverage of all required information and therefore can be read independently of one another.

Greenhouse gas emissions and trends

In the Netherlands, the total direct greenhouse gas emissions (excluding emissions from Land Use, Land Use Change and Forestry, LULUCF) are estimated to be 194.4 Tg CO_2 eq in 2011. This is 8.8% lower than the 213.2 Tg CO_2 eq reported in the base year (1990; 1995 is the base year for fluorinated gases). Figure 1.1 shows the trends and relative contributions of the various gases to the aggregated national greenhouse gas emissions. Over the 1990-2011 period, emissions of carbon dioxide (CO_2) increased by 5.3% (excluding LULUCF), while emissions of non-CO_2 greenhouse gases decreased by 50% versus base year emissions. Of the non-CO_2 greenhouse gases, methane (CH_4), nitrous oxide (N_2O) and fluorinated gases (F-gases) decreased by 41%, 54% and 70% respectively.

In 2011, total greenhouse gas emissions (including LULUCF) decreased by 14.5 Tg CO_2 eq versus 2010 (197.7 Tg CO_2 eq in 2011).

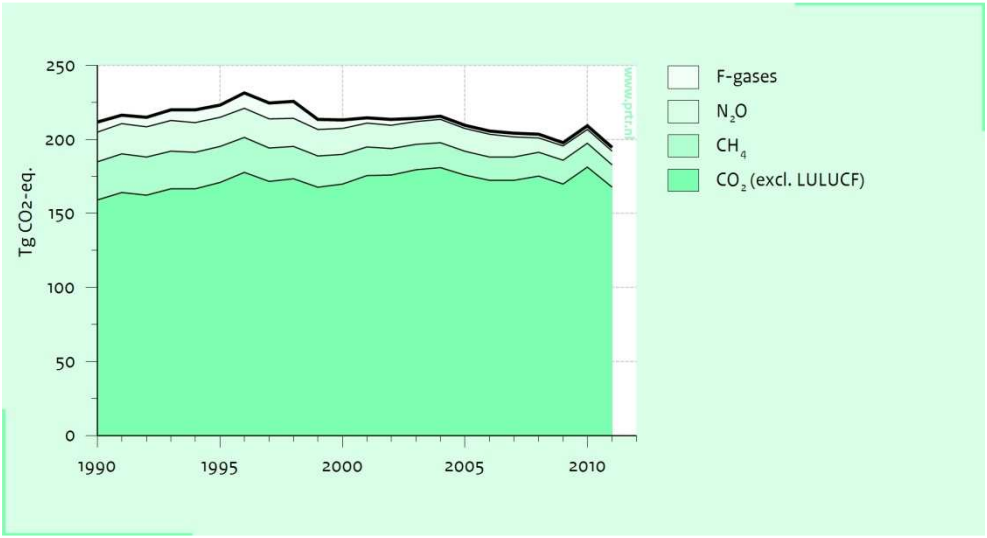

Figure 1.1 Greenhouse gases: trends and emission levels, 1990-2011

[1] Annex I to UNFCCC Decision 2/CP.17
[2] UNFCCC Decision 19/CP.18

Quantified economy-wide emission reduction target

The EU and its Member States communicated an independent quantified economy-wide emission reduction target of a 20 per cent emission reduction by 2020 compared with 1990 levels. The target for the European Union and its Member States, including The Netherlands, is based on the EUs Energy and Climate Package This includes the EU Greenhouse Gas Emissions Trading System (ETS) and the Effort Sharing Decision (ESD)[3], as well as binding targets for increasing the share of renewable energy sources in the energy mix.

Progress in achievement of Quantified economy-wide emission reduction target

The Netherlands ratified the Kyoto Protocol on 31st May 2002. At the time of signing of the Protocol, the EU agreed upon a greenhouse gas reduction percentage of 8% for the Union as a whole. This common target was subsequently divided amongst the EU Member States in the so-called 'Burden Sharing Agreement'. For the Netherlands, this resulted in an emission reduction target of 6% below the emissions level in the base year, for the 2008-2012 period. For emissions of CO_2, CH_4 and N_2O, the base year is 1990, and for the F-gases it is 1995.

The above-mentioned Kyoto target for 2008-2012 was translated into an assigned volume of 1001 Mt over these 5 years. This meant that during this period, emissions should not exceed approximately 200 Mt of CO_2 equivalent per year. Of the assigned amount, 437 Mt has been transferred to Dutch companies participating in the EU Emissions Trading Scheme (ETS), either through auctioning (16 Mt) or through allocation (421 Mt). The companies must compensate excess emissions by purchasing foreign emissions credits. The remaining 564 Mt of CO_2 equivalent is available for the sectors that do not participate in the ETS (such as consumers, agriculture, transport and services). Here, the government needs to compensate excess emissions by purchasing foreign emission credits. With emissions of approximately 594 Mt, the Netherlands will use around 30 Mt of credits in order to comply with its Kyoto target.

The Ministry of Infrastructure and the Environment is the Designated National Authority (DNA) for the Clean Development Mechanism (CDM) and the National Focal Point for Joint Implementation (JI) in the Netherlands. NL Agency has been assigned to undertake public procurements of emission rights under CDM en JI. Voluntary Memoranda of Understanding (MoUs) have been signed with a number of countries for the implementation of CDM and JI projects. The Netherlands has now acquired sufficient credits to comply with the Kyoto target.

Most policies and measures described in the Netherlands' 5th National Communication (NC5) have been continued and therefore reappear in the 6th National Communication and in this 1st Biennial Report. Building upon current measures and the 'Climate Letter 2050' (2011), which sketched the long-term perspective of a (virtually) climate neutral country by 2050, the government published a Climate Agenda in which it announces new goals and measures, in October 2013. The lion's share of these measures results from the SER "Energy Agreement towards Sustainable Growth", in which more than forty parties (including central, regional and local government, employers and unions, nature conservation and environmental organisations, plus other civil society organisations and financial institutions) agreed on a package of additional measures related (mainly) to the built environment, energy and transport. The implementation of these provisions is intended to result in an affordable and clean energy supply, jobs, and opportunities for the Netherlands in the market for clean technologies.

[3] Consolidated version of Directive2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community; Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to
reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020. Comprehensive information on EU climate related legislation may be found: http://ec.europa.eu/clima/policies/g-gas/documentation_en.htm#national_communications

As part of the agreement, parties agreed to install a Committee that monitors the progress in light of the 2020 and longer term goals.

The approximately 375,000 hectares of forest in the Netherlands are managed according to the principles of Sustainable Forest Management (SFM), which also apply to newly planted forests.

Sustainable development is one of the priorities for the Dutch government. The "Green Growth: for a strong, sustainable economy" policy letter, submitted to parliament by the Dutch government in March 2013, contains the outline of the Dutch Sustainability policy. The government aims to strengthen the competitiveness of the Netherlands while reducing the burden on the environment and the dependence on fossil fuels. Green growth is one of the priority themes for the Dutch Government. Combining the innovative strength of industries, knowledge institutes and government is essential to achieve this ambition.

The Netherlands supports a second commitment period of the Kyoto protocol, contributes to the development of the Green Climate Fund, and is committed to providing climate finance to support developing countries in their mitigation and adaptation activities.

Projections and the total effects of policies and measures

The "Geactualiseerde Referentieraming" (2012) are the projections used for the overview presented in chapter 5.

The scenarios underlying the emission projections in the 2012 Reference projection have incorporated new insights with regard to economic and demographic developments, sector developments, fossil fuel prices, the CO2 price and policies when compared with the Reference projection of 2010. Recent statistics were also taken into account. The base year for the model is 2010, as against 2007 for the previous projection. Whereas 2010 emission levels were a projection result in the previous projection, 2010 emission levels now reflect statistics for historical emission levels. The 2012 projection exercise visualises emission levels for greenhouse gases and air pollutants for 2020 and 2030 (similar to the previous projection).

Three policy scenarios were included in the 2012 projection:

- Current policies, that had already been decided upon by February 2012;
- Current and planned policies, also including policies planned up to February 2012;
- Current policies including Lenteakkoord (spring agreement), which includes the same adopted policies as the other scenarios plus the policies agreed upon in the Dutch Parliament in spring 2012.

The 2012 projection did not include a policy scenario 'without measures'. The effects of the SER Energy agreement (2013) have been evaluated by PBL and ECN but are not taken into account in the results presented here, since the documentation for the updated projections was unavailable for this report. The results of the 2012 projection can be viewed in table 5.1.

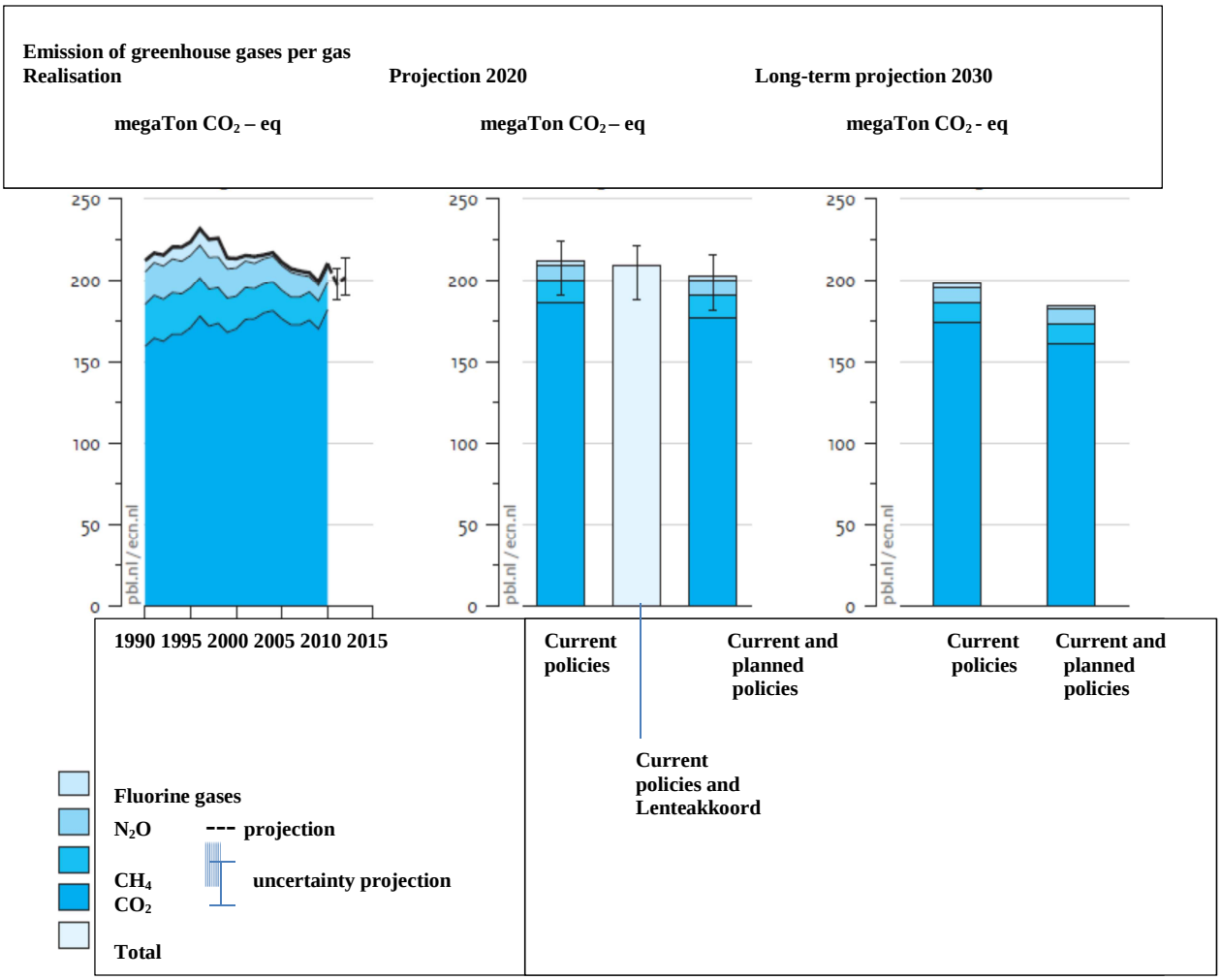

Figure 1.2 Historic and projected emissions of Greenhouse gasses

Financial, technological and capacity-building support to developing countries

Despite the economic crisis, the Netherlands maintained its ODA spending on average 0.7 % above GDP in 2010 – 2012. During the period under review, climate finance has generally been additional to the 0.7 % ODA spending for the MDG's.
The Netherlands committed € 300 million as its contribution towards Fast Start Finance in 2010 - 2012. This pledge was fulfilled at the end of 2012 and consists exclusively of mitigation and adaptation projects that have been allocated the OECD Rio marker 'principal'. Aside from efforts in terms of Fast Start Finance, the number of sector programmes in the Netherlands' development cooperation which are relevant for climate (Rio marker 'significant') also increased.

During 2009-2012, a total of 242 projects were supported, 93 of which were worldwide projects (incl. Caucasus), 19 of which were regional Africa projects, and 3 of which were regional projects in both Asia and Latin America. The remaining 127 were bilateral projects. Direct bilateral support for climate change actions was provided to 29 countries in various regions. This is presented in the pie charts below. Support for 'worldwide' projects also entails support through non-governmental organisations, public-private partnerships, and programmes with research institutes and multilateral organisations.

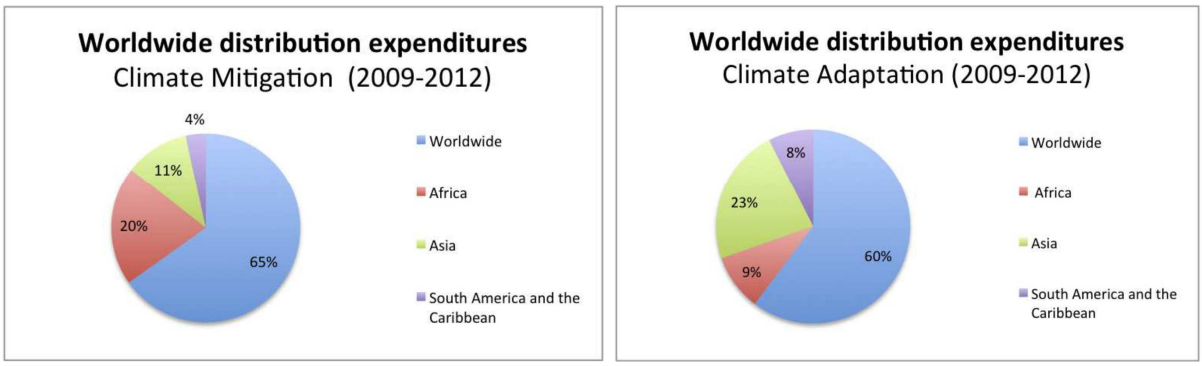

Figure 1.3 Support provided to climate change adaptation and mitigation, worldwide and per continent

The majority of mitigation expenditures (€261 million) relate to the energy sector (see table 7.4) as part of the Dutch renewable energy program. In addition, The Netherlands supports various civil society programmes that have activities in the sectors agriculture, rural development, forestry and environment. In its renewable energy programme (PREP), the Dutch government has opted to work through existing, proven channels. The bulk of the funds is channeled through bilateral projects and programmes executed by multilateral agencies ('worldwide' and 'regional'). The renewable energy programme also works with the private sector.
The Netherlands contributes to a variety of multilateral and intergovernmental institutions – including the Global Environment Facility – that assist developing countries. Between 2009 and 2012, the Global Environment Facility (GEF) received, on average, € 26.6 million (ODA and non-ODA) per year, 32% of which is dedicated to climate change (i.e.an average of € 8.5 million).

The Netherlands promotes the transfer of technology via various channels, e.g. through:
- EU programmes and mechanisms;
- participation in IEA programmes;
- bilateral or multilateral programmes and schemes.

These include regional cooperation, cooperation with developing countries and promotion of private sector involvement. Examples include involvement in the ETS, linked to the CDM/JI markets, the EU's Environmental Technologies Action Plan (ETAP) and the Global Energy Efficiency and Renewable Energy Fund (GEEREF).

Dutch support in relation to the transfer of technology is mostly provided in the form of support programmes relating to the private sector (encompassing hard and soft technologies). As of 2009, the programme is called PSI (Private Sector Investment Programme), supporting innovative investment projects in emerging markets in Africa, Asia, Central and Eastern Europe and Latin America. A PSI project is an investment project, implemented by a Dutch (or foreign) company together with a local company, in one of the eligible developing countries. If this investment meets the criteria, it can be eligible for a PSI grant, which consists of a financial contribution to the costs of the investment.

Capacity building of local partners in non-Annex I countries forms an integral part of almost all worldwide, regional and bilateral programmes. Capacity building and institutional strengthening is an important element of Dutch programmes, e.g. programmes on cooperation and capacity building with developing countries for water management; capacity building activities related to forest (preventing deforestation) and agriculture; training and other professional education programmes offered kby Dutch universities and institutes for foreign students and professionals in climate change, mitigation, and adaptation-related topics; and. cooperation in research and development.

2. INFORMATION ON GHG EMISSIONS AND TRENDS, GHG INVENTORY INCLUDING INFORMATION ON NATIONAL INVENTORY SYSTEM

2.1. Summary information from the national GHG inventory

The Netherlands submitted its most recent greenhouse gas inventory (period 1990-2011) to the UNFCCC in April 2013. The Netherlands resubmitted its CRF tables in October 2013 as a result of the UNFCCC review in September (only a very small increase of emissions in 2010 and 2011). Summary tables of GHG emissions for emission trends by gas and by sector are presented in CRF Tables 1 (a) and 1(b) in the CTF Application. Additional summary tables in the common tabular format including CO_2 equivalent emission trend tables are shown in Annex 3.1 of the 6th National Communication.

2.2. Greenhouse gas emissions and trends

This section summarises the trends in greenhouse gas emissions over the period 1990-2011, by greenhouse gas and by sector, as described in the National Inventory Report 2013. More detailed explanations are provided in the NIR 2013 (Coenen et al, 2013).

2.2.1. Emission trends for aggregated greenhouse gas emissions

Total direct greenhouse gas emissions (excluding emissions from Land Use, Land-Use Change and Forestry, LULUCF) in the Netherlands in 2011 are estimated at 194.4 Tg CO_2 eq. This is 8.8% lower than the 213.2 Tg CO_2 eq reported in the base year (1990; 1995 is the base year for fluorinated gases). Figure 2.1 shows the trends and relative contributions of the different gases to the aggregated national greenhouse gas emissions. Over the period 1990-2011 emissions of carbon dioxide (CO_2) increased by 5.3% (excluding LULUCF), while emissions of non- CO_2 greenhouse gases decreased by 50% compared with base year emissions. Of the non- CO_2 greenhouse gases, methane (CH4), nitrous oxide (N2O) and fluorinated gases (F-gases) decreased by 41%, 54% and 70% respectively.

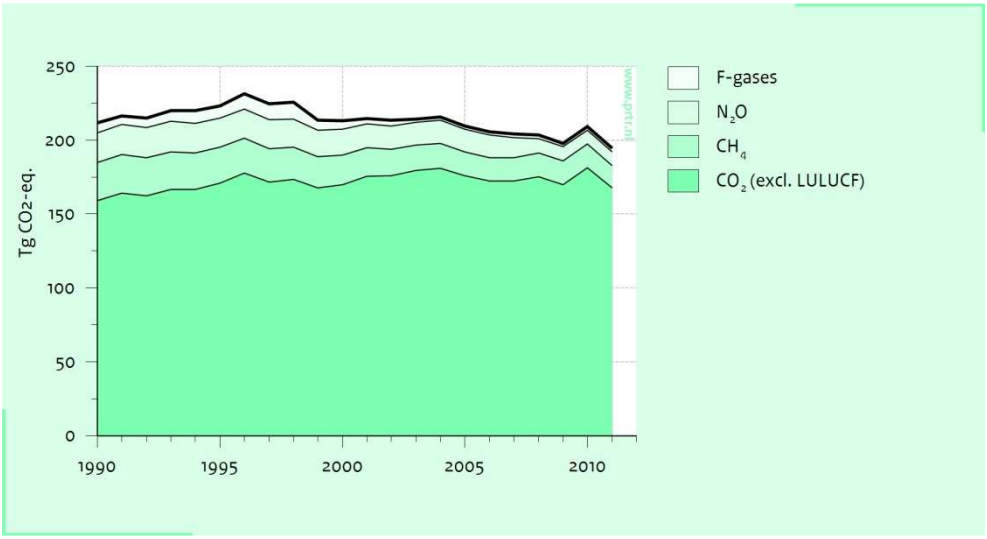

Figure 2.1 Greenhouse gases: trends and emission levels, 1990-2011

In 2011 total greenhouse gas emissions (including LULUCF) decreased by 14.5 Tg CO_2 eq compared to 2010 (197.7 Tg CO_2 eq in 2011).

2.2.2. Emission trends by gas

Carbon dioxide
Figure 2.2 shows the contribution of the most important sectors, as defined by the Intergovernmental Panel on Climate Change (IPCC), to the trend in total national CO_2 emissions (excluding LULUCF). Over the period 1990-2011 national CO_2 emissions increased by 5.2% (from 159.2 to 167.5 Tg). The Energy sector is by far the largest contributor to CO_2 emissions in the Netherlands (96%), with the categories 1A1 Energy industries (39 %), 1A4 Other sectors (23 %) and 1A3 Transport (22 %) as the largest contributors in 2011.

The relatively high level of CO_2 emissions in 1996 is mainly explained by a very cold winter, which increased energy use for space heating in the residential sector. The resulting emissions are included in category 1A4 (Other sectors). The relatively low level of CO_2 emissions in category 1A1 (Energy industries) in 1999 is explained by the marked increase in imported electricity and a shift from the use of coal to residual chemical gas and natural gas in 1999; the share of imported electricity almost doubled. However, this increased import of electricity led to only a temporary decrease in CO_2 emissions. The pre-1999 annual increase in CO_2 emissions from this category (about 1-2 %) was observed again over the period 2000-2004. Imports of electricity decreased in 2008.
CO_2 emissions decreased by 7.4 % in 2011 compared with 2010, mainly due to decreased fuel combustion in the Energy sector.

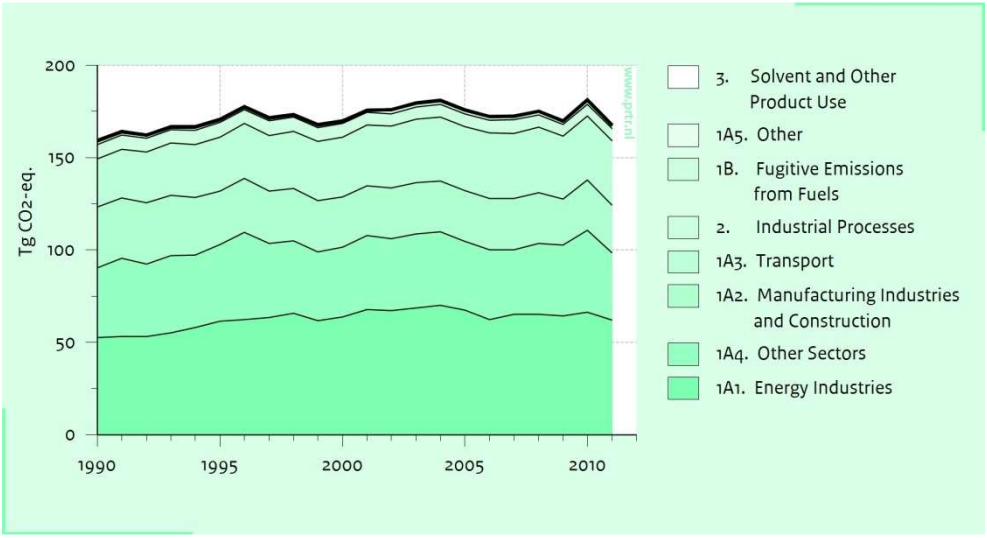

Figure 2.2 CO_2: trend and emission levels of sectors, 1990-2011

Methane
Figure 2.3 shows the contribution of the most important IPCC sectors to the trend in total CH_4 emissions. National CH_4 emissions decreased by 41 %, from 1.22 Tg in 1990 to 0.73 Tg in 2011 (25.7 to 15.3 Tg CO_2 eq). The Agriculture and Waste sectors (60 % and 22 % respectively) were the largest contributors in 2011.
Compared with 2010 national CH_4 emissions decreased by about 4.2 % in 2011 (0.7 Tg CO_2 eq), due to the decrease in CH_4 emissions mainly in categories 4 (Agriculture) and 6A (Solid waste disposal on land).

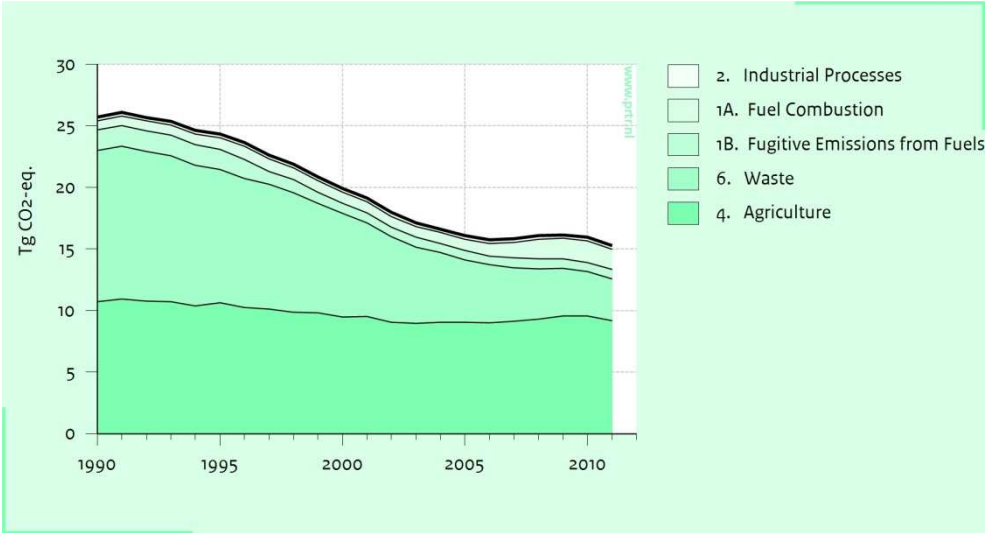

Figure 2.3 CH_4: trend and emission levels of sectors, 1990-2011

Nitrous oxide

Figure 2.4 shows the contribution of the most important IPCC sectors to the trend in national total N_2O emissions. The total national inventory of N_2O emissions decreased by about 54 %, from 64.4 Gg in 1990 to 29.4 Gg in 2011 (20.0 to 9.1 Tg CO_2 eq). The sector contributing the most to this decrease in N_2O emissions is Industrial Processes (whose emissions decreased by more than 84 % compared with the base year). Compared with 2010, total N_2O emissions decreased by 2.1 % in 2011 (-0.20 Tg CO_2 eq), mainly due to decreased emissions from agricultural soils.

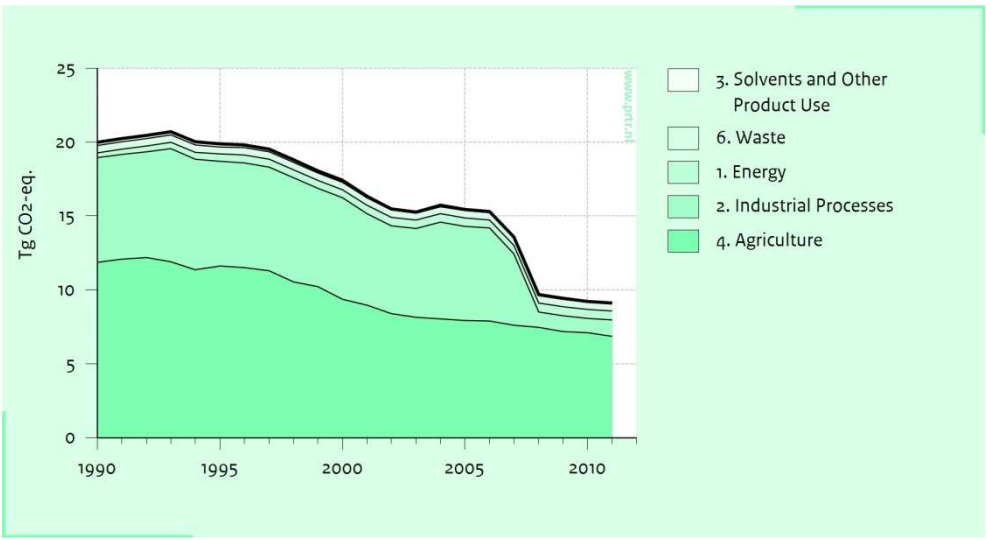

Figure 2.4 N_2O: trend and emission levels of sector %ages, 1990-2011

Fluorinated gases

Figure 2.5 shows the trend in F-gas emissions included in the national greenhouse gas inventory. Total emissions of F-gases decreased by 70 % between 1995 and 2011, from 8.2 Tg CO_2 eq in 1995 (base year for F-gases) to 2.5 Tg CO_2 eq in 2011. Emissions of hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) decreased by approximately 65 % and 91 % respectively during the same period, while sulphur hexafluoride (SF_6) emissions decreased by 49 %.

Emissions between 2010 and 2011 decreased by 5.6 %, 12 % and 20 % respectively for HFCs, PFCs and SF_6. The aggregated emissions of F-gases decreased by 7.2 %.

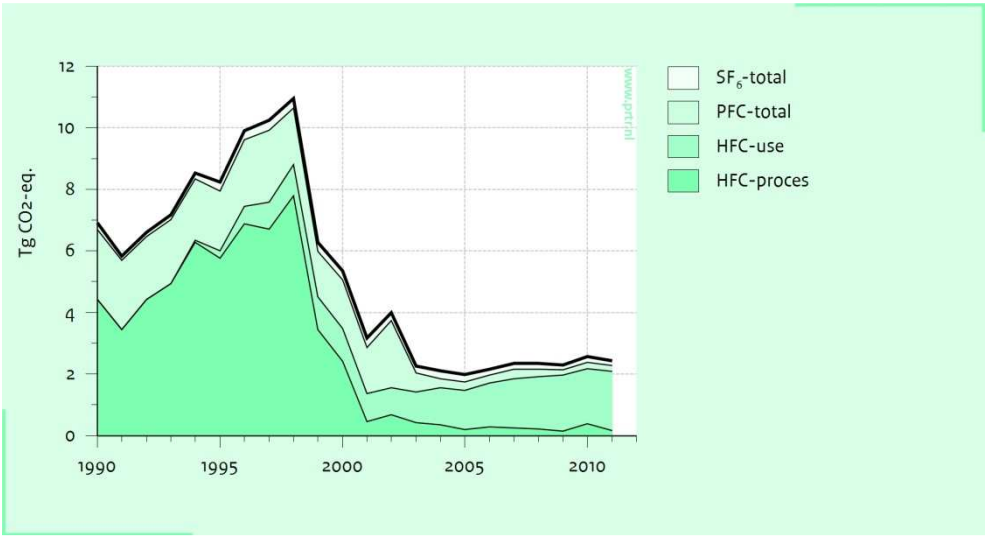

Figure 2.5 Fluorinated gases: trend and emission levels of individual F-gases, 1990-2011

Emission trends specified by source category
Figure 2.6 shows an overview of emissions trends per IPCC sector in Tg CO_2 equivalents.
The IPCC Energy sector is by far the largest contributor to total greenhouse gas emissions in the national inventory (contributing 71 % in the base year and 83 % in 2011; the relative share of the other sectors decreased correspondingly). The emissions level of the Energy sector increased by approximately 6.6 % in the period 1990-2011, and total greenhouse gas emissions from the Waste, Industrial Processes and Agriculture sectors decreased by 71 %, 56 %, and 29 %, respectively, in 2011 compared with the base year.
Compared with 2010, greenhouse gas emissions in the Energy sector decreased by about 14.0 Tg in 2011 as a result of the mild winter in 2011 compared with the cold winter in 2010.

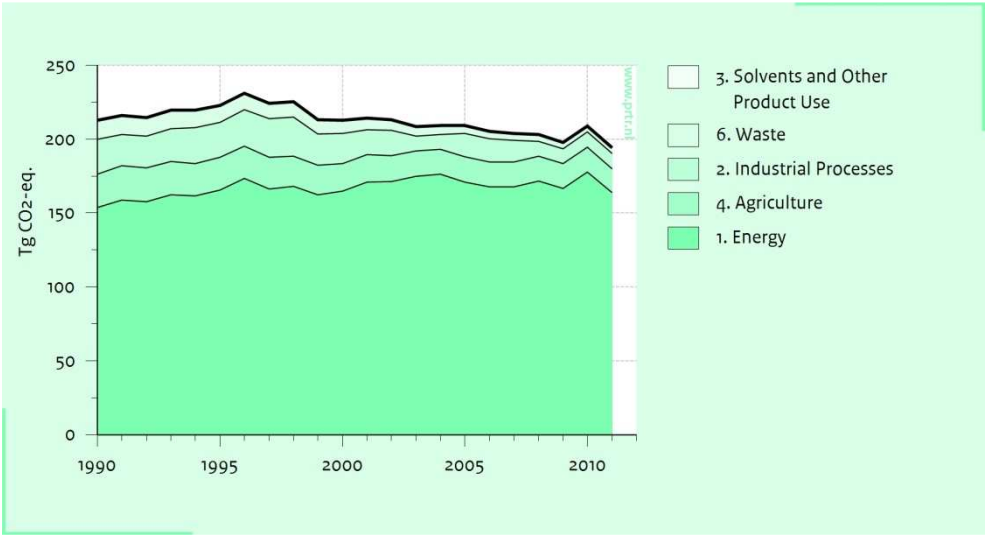

Figure 2.6 Aggregated greenhouse gases: trend and emission levels of sectors, 1990-2011

Emission trends for indirect greenhouse gases and SO_2
Figure 2.7 shows the trends in total emissions of carbon monoxide (CO), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC) and sulphur dioxide (SO_2). Compared with 1990, CO and NMVOC emissions in 2011 were reduced by 61 % and 71 % respectively. For SO_2 the reduction was as much as 83 %; and for NO_x 2011 emissions were 57 % lower than the 1990 level. With the exception of NMVOC, most of the emissions stem from fuel combustion.

Because of the problems identified with annual environmental reporting (see section 1.3.2), emissions of CO from industrial sources are not verified. However, experts have suggested that possible errors will have a minor effect on total emissions levels. Due to lack of data, the time series for 1991-1994 and 1996-1999 were interpolated between 1990 and 1995.

In contrast to direct greenhouse gases, calculations of emissions of precursors from road transport are not based on fuel sales according to the national energy statistics but are directly related to transport statistics on a vehicle-kilometre basis. To some extent this is different from the IPCC approach.

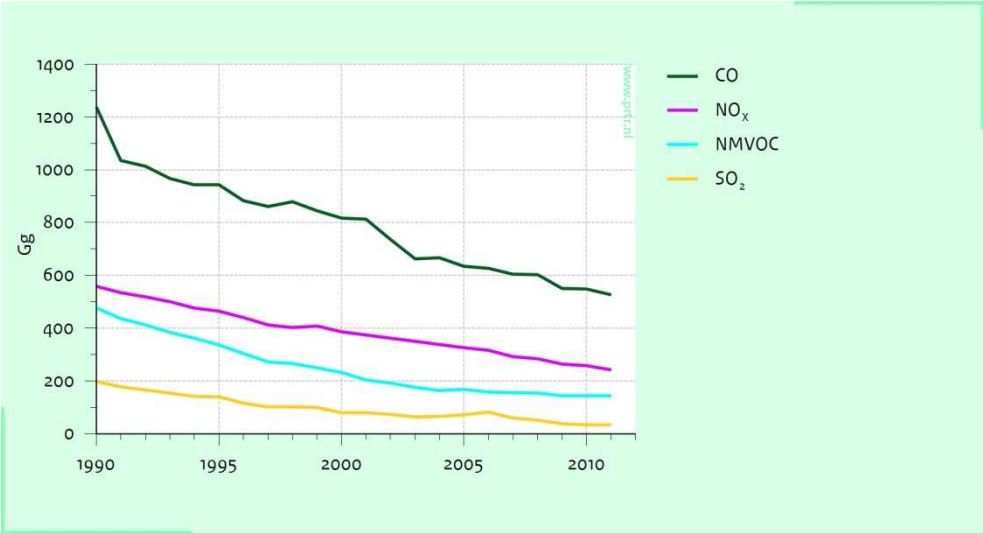

Figure 2.7 Emission levels and trends of NO_x, CO, NMVOC and SO_2 (Units: Gg)

2.3. Description of the national system

2.3.1. Scope and objectives of the National System

Introduction
As a Party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, the Netherlands has in place a National System for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol. The Netherlands established its National System in 2005. During the initial review it was found to comply with all the necessary requirements. Since then the system as such has remained unchanged, with the exception of an organisational change that came into effect as of January 1st 2010. So no other than this organisational change happened since the 5th National Communication. This report summaries details the system as it operates on December 31st 2013, describing how the required functions are performed in the Netherlands.

Objectives of the National System
Under the Kyoto Protocol, a National System[4] 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:

[4] Definitions used in this report are those used in UNFCCC guidelines

- to enable the estimation and reporting of anthropogenic GHG emissions by sources and removals by sinks[5];
- to facilitate meeting the commitments under Articles 3 and 7;
- to facilitate the review of the information submitted;
- to ensure and improve the quality of the inventory.

NL Agency coordinated the establishment of the National System and was subsequently also assigned the role of 'single national entity' (NIE).

2.3.2. Institutional, legal and organisational aspects

Name and contact information for the national entity
The Minister of Infrastructure and the Environment (I&M) has appointed NL Agency by law as the single national entity (NIE).

Contact information of the National Entity: NL Agency, PO Box 8242, 3503 RE Utrecht, The Netherlands.
Designated representative with overall responsibility for the inventory: Harry Vreuls, Harry.Vreuls@agentschapnl.nl , telephone: +31 88 6022258.

Legal arrangements for the National System
The Greenhouse Gas Monitoring Act came into effect at the end of 2005. This Act established a National System for monitoring greenhouse gases and empowered the Minister of Infrastructure and the Environment (I&M) to appoint an authority responsible for the National System and the National Inventory. The Minister has appointed NL Agency as this authority (NIE) [2005, Netherlands Government Gazette (Staatscourant)].

The Act also specifies that the National Inventory must be based on methodologies and processes as laid down in the monitoring protocols. Adjustments to the protocols will require official publication of the new protocols and an announcement of publication in the Netherlands Government Gazette (Staatscourant).

Roles and responsibilities regarding the inventory process
The Ministry of Infrastructure and the Environment (I&M) is the coordinating Ministry in the Netherlands for Climate Change Policy. The Minister of Infrastructure and the Environment has been given, by law, the authority to appoint a single national entity (also known as NIE), as defined in the guidelines under Article 5.1 of the Kyoto Protocol. The Minister has appointed NL Agency as NIE with overall responsibility for the national inventory. NL Agency is responsible - amongst other things - for assembling and providing the annual reports to the UNFCCC, coordinating the QAQC process, operating as focal point for the UNFCCC for the report, including supporting the UN review process. Parts of the annual report are provided by other organisations.

The inventory and reporting process is illustrated in Figure 2.8 and briefly described below in three parts:
- arrangements for data collection;
- arrangements for data processing;
- arrangement for reporting.

[5] As required by Article 5, 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)

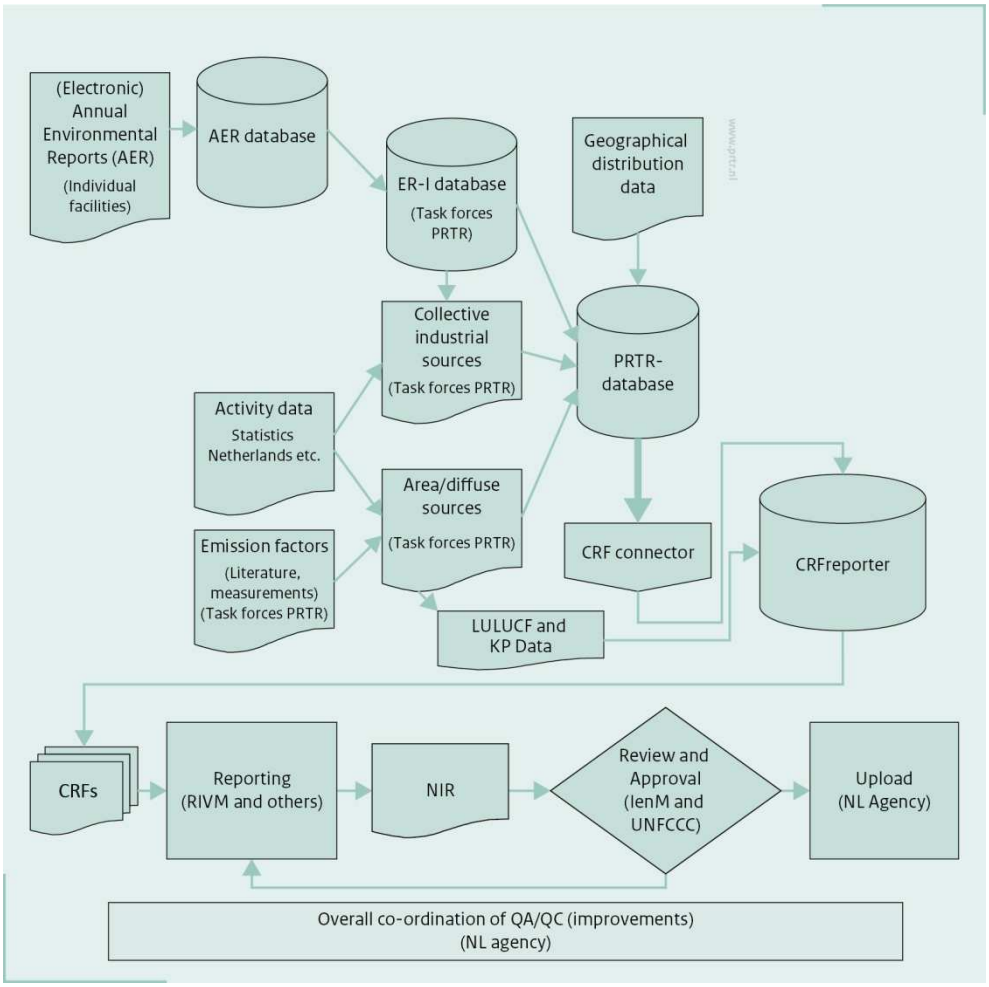

Figure 2.8. Schematic overview of the main steps in the primary process. In practice there are various feedback loops.

The emission data is taken from the national emissions registrations project (ER). This is a collaborative project (started around 1974) involving a series of bodies and ministries in the Netherlands. The objective of the project is to agree on one national dataset for emissions inventories covering some 350 pollutants to air, water and soil; this dataset is used for a variety of international and national applications. Its coordination is assigned to RIVM, an agency under the Ministry of Health, Welfare and Sport (Ministry of VWS).
The data sources, methods and processes used for elaborating the greenhouse gas emission estimates are described in the National System documentation, notably in the form of protocols. These are drafted and maintained by NL Agency (the NIE); this is done in cooperation with the relevant emission experts.
The ER project uses primary data from various data suppliers:

Statistical data is provided under various (not specifically greenhouse gas-related) obligations and legal arrangements. These include national statistics from Statistics Netherlands (CBS) and a number of other sources of data on sinks, water and waste. The provision of relevant data for greenhouse gases is guaranteed through covenants and an Order in Decree, the latter being in preparation by the Ministry of Infrastructure and the Environment. For greenhouse gases, relevant agreements with respect to waste management are in place with CBS and Rijkswaterstaat Environment. An agreement with the Ministry of Agriculture, Nature and Food Quality (LNV, now EZ) and related bodies was established in 2005.

Data from individual companies is provided in the form of electronic annual environmental reports (AER). A large number of companies have a legal obligation to submit an AER that includes - in addition to other pertinent information - emission data validated by the competent authorities (usually provincial and occasionally local authorities that also issue environmental permits to these companies). A number of companies with large combustion plants are also required to report information under the EU emission trading system (ETS) and under the BEES/A regulation. Some companies provide data voluntarily within the context of environmental covenants. The data in these specific AERs is used to verify the CO_2 emissions calculated from energy statistics for industry, the Energy sector and refineries. If reports from major industries contain plant-specific information on activity data and EFs of sufficient quality and transparency, this data is used in the calculation of CO_2 emission estimates for specific sectors. The AERs from individual companies provide essential information for calculating the emissions of substances other than CO_2. The calculations of industrial process emissions of non-CO_2 greenhouse gases (e.g. N_2O, HFC-23 and PFCs released as by-products) are mainly based on information from these AERs, as are the calculated emissions from precursor gases (CO, NO_x, NMVOC and SO_2). Only those AERs with high quality transparent data are used as a basis for calculating total source emissions in the Netherlands.

Additional greenhouse gas-related data is provided by other bodies and consultants that are specifically contracted to provide information on sectors not sufficiently covered by the data sources listed above. For greenhouse gases, contracts and financial arrangements are made (by RIVM) with, for example, various agricultural institutes and TNO. In addition, NL Agency contracts out various tasks to consultants. A number of agricultural institutes have been contracted by the Ministry of Economic Affairs in the field of LULUCF. Under on a written agreement between the Ministry of Economic Affairs and RIVM, these activities are also part of the PRTR.

The calculation of greenhouse gas emissions and sinks is the responsibility of the ER project. Data is collected and processed by five task forces according to predetermined methods described in the Monitoring Protocols. These five task forces are:

- Taskforce on Energy, Industry and Waste Management (ENINA):
  Covers the emissions to air from the sectors Industry, Energy Production, Refineries and Waste Management. ENINA includes emission experts from the following organisations: RIVM, TNO, Statistics Netherlands (CBS), Rijkswaterstaat Environment (Waste Management Department), Deltares and Fugro-Ecoplan.
- Taskforce on Transportation
  Covers the emissions to soil, water and air from the Transportation sector (aviation, shipping, rail and road transport). The following organisations are represented: Netherlands Environmental Assessment Agency (PBL), Statistics Netherlands (CBS), Rijkswaterstaat, Deltares and TNO.
- Taskforce on Agriculture
  Covers the calculation of emissions to soil, water and air. Participating organisations include: RIVM, the Netherlands Environmental Assessment Agency (PBL), LEI, Alterra, Statistics Netherlands (CBS) and Deltares.
- Taskforce on Water - MEWAT
  This Taskforce calculates the emissions from all sectors to water, and includes Rijkswaterstaat, Deltares, Netherlands Environmental Assessment Agency (PBL), RIVM, Statistics Netherlands (CBS) and TNO.
- Taskforce on Consumers and other sources of emissions - WESP
  Covers emissions caused by consumers, trade and services. The members are emission experts from RIVM, TNO and Statistics Netherlands (CBS).

The data is stored in the ER's Central Database system. The CRF is generated automatically from this ER database.
The overall annual report for the UNFCCC is drafted and coordinated by NL Agency (the NIE). To ensure the involvement of the relevant experts from the various bodies (CBS, TNO, PBL, RIVM, etc.) that supplied the relevant emission estimates, this is implemented as an annual project in which each section of the NIR is assigned to one lead author; this lead author usually involves other experts. A co-author is assigned for mutual checks. The NIE is closely involved, but the coordination and fine-tuning of the contents of Part 1 of the NIR is delegated to RIVM to ensure consistency with the ER data. Overall coordination, including the elaboration of Part 2 of the NIR, is carried out by NL Agency/NIE. The elaboration of Part 2 involves various bodies, including the Ministry of Economic Affairs (EZ).
NL Agency/NIE submits the annual report to the UNFCCC after approval by the Ministry of Infrastructure and the Environment. NL Agency has also been assigned overall QA/QC coordination of the inventory, its process and the national system, facilitation of UNFCCC reviews and coordination of requests for clarification.

2.3.3. Methodology and process aspects

Introduction
The 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.

The following sections describe how the required specific functions are performed for each of these steps. The figure 2.9 illustrates the steps and the QA/QC tools used in each step.

Inventory planning
This step comprises the annual planning. QA/QC tools include the set of planning documents, updated annually as part of the evaluation and improvement cycle:

- *Monitoring Protocols* describe the choice of method, activity data and emission factors, as well as specific tasks, responsibilities, working processes and time schedules. The Protocols are officially listed in the Netherlands Government Gazette (Staatscourant) as formalised in a General Administrative Order[6]. The Protocols constitute part of (and are listed in) the annual inventory report and are also published on the National System website[3].
- *Set of procedures* describing other relevant processes, e.g. the preparation of CRF and NIR, documentation and archiving, key source and uncertainty analyses.
- *Set of agreements* on the basic institutional, legal and organisational structure. These have been recorded in contracts, legal arrangements and covenants (see previous section).
- *QA/QC programme,* including the planning of activities and improvement projects.
- *Annual Working Plans* of the ER providing more detail on planning of the ER process, including the working procedures to be used and documentation/registration sheets to be applied.

[6] Staatsblad 2005, 664; www.nlagency.nl/nie

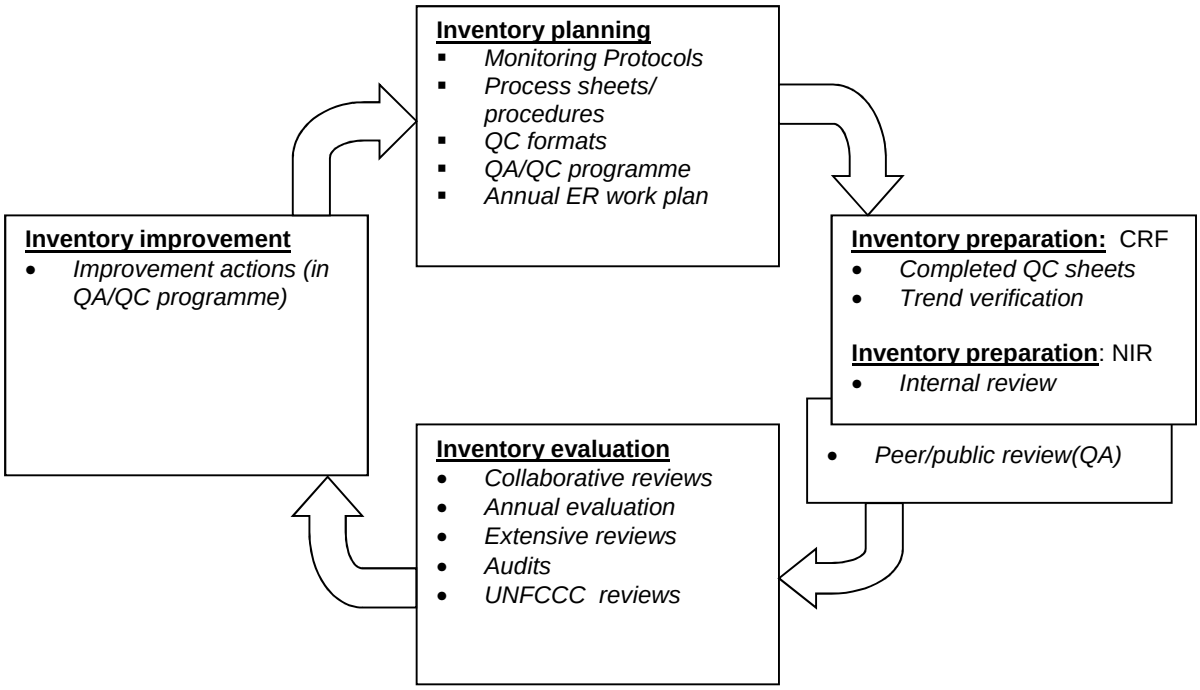

Figure 2.9. Annual cycle

The agreements, protocols, procedures and QA/QC programme are reviewed annually, updated (if necessary) and approved for use in the next cycle. NL Agency is responsible for updating the QA/QC programme, including the improvement cycle. Updates are approved by I&M, in consultation with the Consultative Committee NIE[7]. For LULUCF issues, I&M will seek agreement from the Ministry of Economic Affairs (EZ).

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 involved 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 organisations[8] after consultation.

Inventory preparation
The inventory preparation comprises of the following functions and activities:

- data collection, data processing and emission estimation in accordance with the Monitoring Protocols and the timetable in the Annual Work Plan. The actual process is documented in documentation sheets that include information on data used, any necessary deviations from the agreed methods (including their approval) and any other relevant information needed for a 'paper trail' for the estimates;
- performing the general QC procedures (Tier 1) as detailed in the Annual Work Plans, results and corrections (and approval) are documented;
- elaborating the CRF and NIR in accordance with the related procedures, including Trend verification workshop and internal review.

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 internal quality assurance, a basic peer review and a public

[7] Consisting of representatives of the Ministries (IenM, EZ) and bodies (CBS, ER, NEa, PBL) involved.
[8] For the ER, approval is given by the ER Steering Committee.

review. The latter is performed using the National System website, together with notification to experts and organisations with a potential interest.

- implementing an annual internal evaluation and improvement cycle, implemented jointly by NIE and ER, comprising two major steps:
    - around June: evaluating the previous cycle and updating the QA/QC programme;
    - around October: updating Planning and Protocols, if needed, for the next cycle.

Inventory improvement
The annual list of improvement actions is an integral part of the QA/QC programme. If results, particularly those from UN reviews, give rise to urgent improvement actions, additional actions may be adopted. Improvements that influence methods or may cause recalculations require formal approval in accordance with the relevant procedure. Proposals for methodological changes are sent by the ER to the NIE, which adds a recommendation about the proposals and sends them to the NIE Advisory Board for approval (see also text above at e). The QA/QC programme also includes non-annual review and audit activities which contribute towards evaluation and continuous improvement of the National System

Inventory management
Management of the inventory in the Netherlands encompasses:

- documenting and archiving the relevant information for each cycle, using an annual file of relevant documents. The Netherlands' archiving system is centrally accessible for the NIE, with the exception of confidential information. Confidential information is not archived centrally, but is only maintained and archived by the work package leader. The confidential information can also be accessed by the project leader, the project secretary and the work package leader's deputy. It is available on request for UN review in line with the CP decision and the code of practice. Non-confidential key documents are made accessible through the National System website as far as possible.[3]
- facilitating UN reviews and responding to any related requests for clarification under the EU monitoring mechanism and the UNFCCC. This task is performed by the NL Agency as the NIE.

2.3.4. Quality management aspects

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. Various improvements have been implemented in recent years. The main inputs have been the results of internal and external evaluation and review processes.

QAQC programme
The QA/QC programme describes the quality objectives of the inventory, National System and the QA/QC plan, and is based on previous experiences with the inventory process, including relevant information and results from internal and external evaluation and review processes as well as the results of recent UN reviews. The QA/QC programme includes a timetable, tasks and responsibilities. The QA/QC programme is essentially an internal document that is available for UN review. NL Agency is responsible for the coordination and implementation of the programme. It will be updated, where necessary, about once a year, usually in the autumn as part of the planning cycle.

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

The QA/QC plan consists of four groups of activities. In selecting activities, it takes into account general considerations, such as practicality, acceptability, cost-effectiveness and existing experience. The activities are grouped as follows:

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

Generally the main actions include:

Quality control
- 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 standard working processes, in accordance with the IPCC Good Practice Guidance and, where applicable, source-specific QC procedures for selected sources. The main responsibility for implementation lies with the ER. The NIE regularly checks whether activities and outputs (still) comply with the guidelines.
- Updating Tier 1 uncertainty analysis (annually) and Tier 2 uncertainty analysis (every 5 years).

Quality assurance
This is primarily implemented by staff not directly involved in the inventory process which is coordinated or implemented by NL Agency. The main activities include:
- Basic (peer) review process of CRF/NIR before submission to the UNFCCC: internal review, public review and peer reviews
- extensive review process: coordinating a long-term process aimed at the implementation of the 2006 IPCC Guidelines after 2014;
- annual audit on selected part(s) of the National System;
- outside agencies archive the reports of internal audits as far as GHG activities are involved.

Documentation and archiving
The main activities relate to the cycle as a whole:
- Document and archive relevant information about inventory, QA/QC programme, QA/QC activities, reviews and (planned) improvements;
- facilitating reviews and responses for clarification. The NIE coordinates this process.

Evaluation and improvement
The main activities include:
- implementation of the annual evaluation and improvement cycle, as mentioned above; activities are determined annually in the QAQC programme, based on experiences from reviews and QAQC actions.

Results from internal and external evaluations and reviews
Various actions are taken to improve and maintain the quality of the National System. These actions include:
- Annual UNFCCC reviews of the functioning of the National System. In 2007, the National System was reviewed during the initial review. The review team concluded that The Netherlands' National System had been established in accordance with the guidelines for national systems under article 5, section 1 of the Kyoto Protocol (decision 19/CMP.1) and that it met the requirements for implementation of the general functions of a national system as well the specific functions of inventory planning, inventory preparation and inventory management. In the annual review reports the expert review teams report that the National Systems continues to fulfil the requirements and did not provide any recommendation.
- Follow-up of the annual recommendations of the UNFCCC reviews. In recent National Inventory Reports (NIRs) a more detailed overview on the recommendations and actions is incorporated in chapter 10 of each NIR..

- Annually the European Commission conducts a check on the Dutch draft data for greenhouse gas emissions, the elaborations in the draft National Inventory Report and changes compared to previous years. Results from these checks are used in finalising the reporting to the UNFCCC.
- In 2012 the European Commission conducted an in-depth technical review of Dutch greenhouse gas emission inventory. The EU technical expert review team identified a small number of recommendations for improvements. These recommendations were taken into consideration during the preparation of the next greenhouse gas emission estimates.
- Annual QA activities by NL Agency in its role as NIE: internal reviews on the entire NIR, audits on part of the NIR and a peer review on a part of the NIR, outsourced to an external expert. These activities have led to separate recommendations on the improvements of quality of the NIR and methodology descriptions in the protocols.

Official consideration and approval
The Ministry of Infrastructure and the Environment gives approval for the NIR/CRF to be submitted by the NIE to the UNFCCC after consulting the results of the checks by the NIE and, if needed, after consulting with the Ministry of Economic Affairs on LULUCF issues.

3. QUANTIFIED ECONOMY-WIDE EMISSION REDUCTION TARGET

The EU and its Member States communicated an independent quantified economy-wide emission reduction target of a 20 per cent emission reduction by 2020 compared with 1990 levels
The use of carbon credits from international market-based mechanisms is explained in the EU submission from 2012. With regard to the role of Land Use, Land-Use Change and Forestry (LULUCF), the EU pledge does not include emissions/removals from LULUCF.
More detailed information on the target is given in CTF Table 2.

The EU and its Member States are committed to an independent quantified economy-wide emissions reduction target of 20 per cent emission reduction by 2020, compared to 1990 levels[9]. This is documented in the UNFCCC document FCCC/SB/2011/INF.1/Rev.1 of 7 June 2011. In the EU submission to the UNFCCC from 20 March 2012 (FCCC/AWGLCA/2012/MISC.1) the EU target is explained further.

The EU's 20% target is unconditional and implemented through binding legislation. The target for the European Union and its Member States is based on the EUs Energy and Climate Package This includes the EU Greenhouse Gas Emissions Trading System (ETS) and the Effort Sharing Decision (ESD)[10], as well as binding targets for increasing the share of renewable energy sources in the energy mix, strict emission performance standards for new passenger cars and light commercial vehicles, and obligations on fuel suppliers to produce 'cleaner' fuels and rules for introduction of vehicles and machinery that pollute less. Sectors included in the Climate and Energy package target are energy (incl. fuel combustion activities, fugitive emissions from fuels, and CO_2 transport and storage), industrial processes and product use, agriculture, waste and aviation emissions.

Emissions not covered under EU pledge are those resulting from land use, land-use change and forestry. The legislative package regulates emissions of CO_2, CH_4, N2O, HFCs, PFCs and SF_6 using global Warming Potentials from the 2nd Assessment Report of the Intergovernmental Panel of Climate Change (IPCC AR2) to aggregate EU GHG emissions up to 2020.

The target is based on the understanding that it will be fulfilled jointly with the European Union and its Member States, in accordance with article 3 of the Kyoto Protocol. Legally binding target trajectories for the period 2013-2020 are enshrined in both the EU-ETS and the ESD. These legally binding trajectories not only result in a 20% GHG reduction in 2020 compared to 1990, but also define the EU's target pathway to reduce EU GHG emissions from 2013 to 2020 (see information on Coverage of sectors below). For the sectors covered under the ETS it also defines a reduction trajectory after 2020.
Emissions covered under the EU-ETS are those from stationary installations, such as emissions from energy, industrial processes and product use, as well as aviation under the scope defined by the EU-ETS. The regulation of the emissions of the stationary sources entered into force on 1 January 2005

[9] Whereas the base year of the EU and its Member States is 1990 for the purposes of the target as reflected in FCCC/SB/2011/INF.1/Rev.1, the information on QELROs by the EU and its Member States will reflect the flexibilities to set individual base years provided under the Kyoto Protocol. With respect to the first commitment period under the Kyoto Protocol, for EU-15 (including The Netherlands) the base year for carbon dioxide, methane and nitrous oxide is 1990; for the fluorinated gases 12 Member States have selected 1995 as the base year, whereas Austria, France and Italy have chosen 1990. The base year for carbon dioxide, methane and nitrous oxide for Bulgaria is 1988, for Hungary is the average of 1985-1987, for Slovenia 1986, for Poland 1988, for Romania 1989; for the fluorinated gases Slovakia has chosen 1990 as the base year and Romania 1989 all other central and eastern European Member States (including The Netherlands have selected 1995.

[10] Consolidated version of Directive2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community; Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to
reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020. Comprehensive information on EU climate related legislation may be found: http://ec.europa.eu/clima/policies/g-gas/documentation_en.htm#national_communications

and the new periods started in 2013 based on yearly reduction equal to 1.74% of the average allocation in the period 2008-2012, extrapolated starting in 2010 and leading to a - 21% GHG reduction compared to 2005 in 2020.
Emissions of sectors not covered by the EU-ETS, such as transport, buildings, services, agriculture and waste are regulated by Member State specific targets starting in 2013 based on average emissions 2008 to 2010 and lead to a collective reduction of around -10% compared to 2005 in 2020. Under the EDS the specific target for Netherlands is set at -16%.

4. PROGRESS IN ACHIEVEMENT OF QUANTIFIED ECONMY-WIDE EMISSION REDUCTION TARGETS AND RELEVANT INFORMATION

4.1. Introduction

This section describes policies and measures implemented since 1990 that have had, or are expected to have, a significant impact on greenhouse gas emissions in the Netherlands, even if the primary objective of the policy is (or was) not directly related to climate change. It also describes cross-sectoral policies and measures. The scope of the section is limited to domestic and EU policies and measures implemented or planned in the Netherlands. The policies and measures described are those that were known on 6th September 2013, which was when the SER Energy Agreement was signed.

The section below is organised by sector, using the sectoral definitions requested by the UNFCCC guidelines (Energy, Transport, Industry, Agriculture, Forestry and Waste). Due to the model used for emissions projections, in this report these sectors are defined based on economic activities within sectors and not, as is the case in the IPCC source categories, based on the processes that cause greenhouse gas emissions[11]. Policies and measures regarding forestry are described under Agriculture.

Each section describes the groups of policies and measures organised for each greenhouse gas; only the most important measures are described in detail. The projected effects have been estimated based on the background of the reference scenario as described in Chapter 5. At the end of sections the estimated impacts of the (packages of) the main policies and measures are presented in Table 4.3. Please note that average yearly mitigation impacts, as presented in this table are given for three periods (2005-2010; 2005-2015; 2005-2020) and cumulative for the period 2005-2020. These numbers should not be confused with the actual emission reductions in the years 2010, 2015, 2020. Those will in most cases be higher than the averages presented here, for policies generally have more effect in later years: e.g. because norms are tightened or subsidies increased yearly, or because measures were put in place after 2005. Please be also aware of the fact that some level of double counting can not be avoided as the policies and measures are not implemented in isolation, but in combination with others. For the ETS in the energy and industry the average annual data are presented for the period 2008-2010 and for 2008-2012, to ensure consistency with the data published by the Netherlands Emission Authority for the ETS period 2008-2012. For the whole period 2005-2020, as well as the average annual reported for this period, the data are based on a fifteen years period.

Complementing the descriptions of policies and measures in the respective sectoral sections, quantifications of the policies and measures (PaMs') impacts on GHG emission reduction are summarised in CTF table 3 in the CTF application.

The effects are presented for groups of policies and measures affecting the different sectors rather than for individual measures. In analyses performed at a fairly high level of aggregation, it is often neither possible nor meaningful to separate out the impacts of individual instruments and programmes that focus on the same emissions source or activity.

The policy descriptions in the main text include the actual and expected interactions with other relevant policies and measures, and with Common and Coordinated Policies and Measures of the European Union (CCPMs).

[11] Table 4.3 in the 6th National Communication provides an overview of how the sectors in this report can be transposed to the IPCC source categories. Some additional sector differences occur because all mobile sources are clustered in the transport sector, and emissions from flue gas desulphurisation are allocated to the energy sector. IPCC category 5 is not included in the emissions projections.

Impacts other than emission reductions (including economic impacts to the extent of feasibility, costs, non-greenhouse gas mitigation benefits and interactions with other policies and measures) are included in the text where possible, but are not shown in the summary tables.

At the request of the Dutch Ministry of Infrastructure and the Environment and the Ministry of Economic Affairs, the Energy research Centre of the Netherlands (ECN) and the Netherlands Environmental Assessment Agency (PBL) periodically update the so-called "Options Document for Energy and Emissions (Optiedocument Energie en Emissies)". The next update is scheduled in early 2014. The options for additional domestic reductions in greenhouse gas emissions can be assessed based on the data of this Options Document. In addition, ECN and SEO made a thorough analysis of the societal cost and benefits of several climate change mitigation options in their 2012 report "Kosten en baten van CO2-emissiereductie maatregelen". In the Climate Agenda it was announced that there will be a follow-up study in 2014 on the cost-effective effort sharing of a 2030 target across the sectors. It will be accompanied by proposals for new measures based on criteria such as technical potential, cost effectiveness and feasibility.

4.2. Cross-Sectoral Policies

Existing instruments that are basically cross sectoral include: Energy Investment Tax Deduction (EIA), Reduction Programme for Non-CO_2 Gases (ROB), Energy Tax, Sustainable Energy Production (SDE+), Long-Term Agreements, Benchmark Covenant, CO_2 Emissions Trading, and the Local Climate Agenda. The policies are described in the sections where their impacts are greatest, except for the Reduction Programme for Non-CO_2 Gases and CO_2 Emissions Trading, which are described in this section.

In the paragraphs below a clear distinction is made between 'existing measures' (WEM), 'additional measures' (WAM), or both (WEM+WAM).
The most recent measures as included in the Energy agreement of 2013 are not taken into account, On 6th September 2013, the government entered into an agreement with other social partners regarding (additional) energy policies up to 2020 (the so-called 'SER Energieakkoord')[12]. The effects of this agreement have been evaluated by PBL and ECN (2013) but are not taken into account in the results that are presented in this chapter. [13]

4.2.1. CO_2 Emissions Trading

As prescribed by Directive 2003/87/EC, a trading system for CO_2 emissions started within the EU on 1st January 2005, focusing on CO_2 emissions from large industrial emitters. It is a 'cap and trade' system, where participants are assigned a set amount of allowances upfront and are required to annually submit allowances that are equal to their actual emissions. Companies are allowed to use credits from Kyoto mechanisms to comply with their obligations (see also Section 4.5). The EU ETS covers more than 11,000 power stations and industrial plants in 31 countries, as well as airlines. It covers around 45% of the EU's greenhouse gas emissions.

The EU ETS is now in its third phase, running from 2013 to 2020. A major revision (Directive 2009/29/EC) in 2009 to reinforce the system means the third phase is significantly different from the first two phases and is based on rules that are far more harmonised than was previously the case. One of the changes is a single, EU-wide cap on emissions instead of the previous system of national caps. Auctioning is now the default method for allocating allowances. For those allowances that are still

[12] www.energieakkoordser.nl/~/media/files/energieakkoord/overzicht-belangrijkste-maatregelen-energieakkoord.ashx
[13] www.pbl.nl/sites/default/files/cms/publicaties/pbl-2013-uitgangspunten-referentiepad-evaluatie-SER-energieakkoord-1214.pdf

free, harmonised allocation rules apply that are based on ambitious EU-wide benchmarks for emissions performance. The ETS now also includes more sectors (i.e. aviation) and gases (nitrous oxide, PFCs). The EU also aims to link the EU ETS with compatible systems around the world (Switzerland, Australia).

The cap of the ETS will be reduced over time in order to reduce total emissions. In 2020, emissions from sectors covered by the EU ETS will be 21% lower than in 2005. Despite the stringent cap, the carbon price has dropped. This is due to a growing surplus of allowances, largely because of the economic crisis, which has depressed emissions more than anticipated.

4.2.2. Reduction Programme for Non-CO_2 Gases (WEM+WAM)

This Programme (Dutch acronym: ROB) was set up in 1998 and focuses on the reduction of Dutch emissions of non-CO_2 greenhouse gases. The target is a reduction of 8-10 Mt CO_2 eq. in 2020, working towards the desired level of 25-27 Mt CO_2 eq. This would mean a reduction of 50% in these gases compared to the reference year (1990). In 2012, a reduction of about 50% (relative to 1990) was already achieved based on reductions in, for example, the nitric acid industry (through admission into the EU Emissions Trading System, ETS), the aluminium industry, HCFH222 production, the waste disposal industry and agriculture. A potential additional annual reduction of 2 to 4 Mt CO_2 eq. has been assessed for the future.

Over the period 1998 - 2009, ROB subsidised the development and implementation of innovative reduction technologies (demonstration projects and market introductions) and supported research and communication projects. This was done in close cooperation with private companies, research institutions, universities, and provincial and municipal authorities.

From 2009 on, ROB has been focusing on targeting the most significant sources: cooling (fluorinated gases), industry (semiconductor industry, caprolactam production), sewage treatment facilities (methane and nitrous oxide), agriculture (methane and nitrous oxide), CHP engines (methane) and the monitoring of sources of non-CO_2 greenhouse gases. Subsidies have stopped, as they are not considered to be as effective anymore. The focus of the reduction policy is on research, communication and cooperation and deals with the sectors and stakeholders. The reduction of fluorinated gases is mainly based on the national implementation of EU-legislations regarding ozone and F-gases. The revision of the F-gases regulation that was carried out based on a proposal of the European Commission may provide opportunities for the implementation and a new impulse to further reduce F-gas emissions in the Netherlands.

Where emission reductions in agriculture (the major source of non-CO_2 greenhouse gas emissions in the Netherlands) are concerned, the Ministry of Economic Affairs is now primarily responsible (see paragraph 4.4.5). Based on a voluntary agreement between the government and the sector, which was signed in 2008, projects are carried out aiming for an emission reduction of 30% in 2020 (relative to 1990).

4.2.3. Energy tax

The objective of this policy is to boost energy savings by putting an incentive on reducing the consumption of gas and electricity, which should direct consumers toward more energy efficient behaviour. The Regulatory Energy Tax (REB) was introduced in 1996, changing its name to Energy Tax in 2004. Taxing energy use makes energy saving (by changing behaviour or investing in energy-saving measures) more attractive. The energy tax is levied on electricity and natural gas, and the level of the Energy Tax depends on 1) the energy consumption of a customer – the higher the consumption, the lower the energy tax levied (degressive tariff structure) –, and 2) specific agreements between different sectors and the government.

For small (residential) consumers the Energy Tax accounted for approximately ~40% of the natural gas and ~30% of electricity price in 2012. Industrial consumers pay a much lower tariff because of their larger consumption. In addition, there is a specific clause in the Environmental Taxes Act (Article 36q), which exempts companies that enter into a Long Term Agreement with the government from paying energy taxes on electricity consumption that goes over 10 million kWh per year and from taxes on fuel for non-energy use (feedstocks). The Energy Tax also has a separate lower gas tariff for the horticulture sector (fixed up to 2013). This means that these companies are taxed in the same way as the energy-intensive large-scale consumers. In return, the sector has entered into voluntary agreements on energy efficiency with the government.

4.2.4. Local Climate Agenda

The Local Climate Agenda is a joint initiative bringing together local authorities (provinces, municipalities and regional water authorities) and central government. They exchange knowledge on best practices and report and address obstacles in legislation, aimed at realising more successful initiatives

4.3. Energy

Besides the EU ETS, CO_2 policies relating to the energy sector have traditionally fallen into two general categories, i.e. those aimed at encouraging the use of renewable energy, and those that encourage energy efficiency (see industry). Some of the important policy instruments currently in effect are described below.

20% of the primary energy consumption in the EU must come from renewable sources (RES) by 2020. This objective has been translated into specific targets for each member state. For the Netherlands, the target is 14% by 2020. The present share of renewables is about 4% (10% RES share in electricity). As a result of the Energy Agreement, the Dutch Government's commitment is to extend the ambitions for RES in the Netherlands and to reach a 16% share of renewables by 2023. According to the forecasts, significant additional contributions of various RES sources will be necessary to achieve this target by 2020.

In the 2020 context, it appears that the CO_2 price is not enough to bring effective support for RES deployment to the energy market. In the Netherlands, subsidy schemes are the main means of achieving this target.

4.3.1. Boosting Renewable Energy Production

In 2011, the feed-in premium scheme for renewables was transformed into the so-called SDE+, a floating feed-in premium system, fully financed by a surcharge on the energy tax paid by the end-consumers of natural gas and electricity. The SDE+ takes an innovative tender approach based on a selection of projects proposed by the private sector along cost-effectiveness criteria with regard to the expected cost of the various available technologies. The premium is to be paid once the facility is in operation based on the power production for a period of up to 10 or 15 years. The SDE+ takes a technology-neutral approach; all renewable energy technologies are eligible (renewable electricity, gas and heat). Payments within the context of the previous feed-in premium schemes, MEP and SDE, are still ongoing as the subsidies run for 10 to 15 years. Payments for MEP and SDE are financed through the government budget.

4.3.2. Intergovernmental Wind Energy Agreement (BLOW)

The BLOW target of 1500 MW of onshore wind power in 2010 was reached in 2007. Today, about 2150 MW has been realised, which translates to a mitigation of about 2.8 Mt CO_2 eq. annually. The perspective for the longer term amounts to a total of 6000 MW capacity of onshore wind in 2020. To achieve this, implementation agreements have been entered into with the provinces that are responsible for spatial planning. In March 2009, the Government Coordination Rule was introduced for onshore wind projects above 100 MW. This means that, for these projects, the Minister of Economic Affairs is responsible for spatial planning and coordinates the attribution of environmental and other permits.

4.3.3. CCS

The CCS directive was implemented in 2012. Newly built coal-fired plants must be 'capture ready'. The large-scale CCS demonstration project ROAD has been ongoing since 2010. The central government will produce a long-term strategy regarding the role of CC (U)S in the transition to an entirely sustainable energy system. The aim is to publish this strategy by mid-/ end-2014.

4.3.4. Smart metering (dissemination of smart meters)

The smart meter rollout will take place in two stages. A small-scale rollout will be in place for experience purposes from 2012 to 2014. During the small-scale rollout, up to 500,000 smart meters for electricity and gas will be installed during regular meter replacements (e.g. depreciation), in newly built houses, during large scale renovations and by customer request. Based on these experiences, the rollout will continue on a larger scale from 2014, ultimately offering every household (and small business) a smart meter. The aim is to have a smart meter fitted in at least 80% of households and small businesses by 2020, as mandated through the third Energy Package of the EU.

4.3.5. CH_4

"Emission regulation CH_4 emission gas engines" (Besluit Emissie-eisen Stookinstallaties (BEMS))
Gas engines are widely applied to simultaneously produce heat and electricity (CHP) in the horticulture sector in the Netherlands and in the service sector to a lesser extent. Part of the natural gas in gas engines remains unburned and is emitted as methane. This is called 'methane slip'. Through the Emission Requirements Combustion Installation Decree (BEMS), the government has set maximum emission levels for methane (hydrocarbons). The BEMs was evaluated in 2013. Due to anticipated regulations from the EC, new maximum emission levels have not yet been considered.

4.4. Industry

Besides the EU ETS, policies affecting CO_2 emissions in industry are generally aimed at improving industrial energy efficiency. These include the Long-Term Agreements (LTA) with industrial sectors backed up by environmental permits based on the Environmental Management Act, and the Energy Investment Tax Deduction regime within the corporate tax system (known as EIA).

4.4.1. Long-Term Agreement Energy Efficiency ETS enterprises (LEE) for ETS enterprises

The Benchmarking covenant described in NC5 was followed in 2009 by the Long-term Agreement Energy Efficiency ETS enterprises (LEE) for ETS enterprises. This voluntary long-term agreement focuses on the promotion of energy savings in the Netherlands. LEE was signed by four government ministers (Economic Affairs, Agriculture, Nature and Food Quality, Housing, Spatial Planning and the

Environment, and the State Secretary of Finance), the Confederation of Netherlands Industry and Employers (VNO-NCW), the participating ETS enterprises and relevant trade associations and commodity boards. This agreement has the following objectives:

- Each ETS enterprise draws up an Energy Efficiency Plan (EEP) and implements it. It must at least contain an overview of:
    - possibilities for adopting profitable measures at existing facilities at the time of joining and the result of those measures, expressed in the percentage of energy efficiency improvement per year and the related amount of avoided CO_2 emissions.
    - the target for the energy efficiency improvements and the avoided CO_2 emissions related to the period over which the Energy Efficiency Plan applies, including an indication of which measures are to be taken at which time.
    - profitable measures are taken to mean measures that have a positive net cash value at an internal interest rate of 15 percent. Alternatively, a cost recovery period of 5 years may be applied.
- Each ETS enterprise will bring its Energy Efficiency Plan for the period 2013-2016 up to date by 1st October 2012 at the latest, and the plan for 2017-2020 by 1st October 2016 at the latest.

4.4.2. Long-Term Agreements on Energy Efficiency

The year 2001 saw the first series of Long-Term Agreements (LTA / MJA1). In 2007, there were three different categories of LTAs: for companies and organisations in the tertiary sector (services sector), for companies in the agricultural sector, and for industrial companies with an energy consumption up to 0.5 PJ/year. Companies with a higher energy consumption can join the Energy Efficiency Benchmarking Covenant, unless they can prove that joining an LTA makes more sense.

Negotiations between the government and less energy-intensive industries have resulted in a second and third generation of Long-Term Agreements on energy efficiency (MJA3). The government supports these agreements with fiscal incentives such as the EIA (see below) and enforces them with environmental permits. Companies not participating in MJA3 are required (in their permits) to implement all energy-saving measures with an internal rate of return of at least 15% after taxes. Since 2001, the national government has designated € 14 million to enabling permit authorities to step up their activities to reinforce the role of energy measures in environmental permits.
Furthermore, the different economic sectors have recently prepared strategic visions for 50% energy savings in 2030 as a continuation of the work that is still to be completed by 2020 (WAM).

Within the scope of the Energy Agreement for Sustainable Growth, large energy-intensive companies – the ones that are covered by the ETS – will join the government in endeavouring to supplement the Long-Term Voluntary Agreement on Energy Efficiency [*MEE*-covenant] with a framework of company-specific (i.e. one-to-one) agreements. These will focus on improving the energy efficiency and competitiveness of the companies concerned. There will also be an EPA (Energy Performance Assessment) pilot project (with evaluation) for other companies (i.e. non-MEE companies). An independent centre of expertise will be set up to assist businesses and funding bodies in identifying the most effective measures regarding energy efficiency in industry (and agriculture as well). The impending disappearance of combined heat and power (CHP) will not help in this regard. However, apart from the generic measures mentioned here, the government chooses not to interfere in the market economy process through financial or fiscal favouring of specific – mature – technologies such as CHP. Support for CHP under the SDE / SDE+ scheme ceased in 2010.

4.4.3. Energy Investment Tax Deduction

The Energy Investment Allowance (EIA) is a tax relief programme. It gives a direct financial advantage to companies in the Netherlands that invest in energy-saving equipment and sustainable energy. Entrepreneurs may deduct 41.5% of the investment costs for such equipment from their

company's fiscal profits, over the calendar year in which the equipment was purchased. Investment costs of up to a maximum of € 118 million may be reported per calendar year.

4.4.4. Green Deal

The Dutch government has set up the Green Deal with a society programme to encourage, amongst other things, energy saving and the local generation of renewable energy. Exploiting opportunities related to saving energy and local sustainable energy generation is not only a matter of finance. In practice, there are often other difficulties, which mean that not enough is invested in improving energy efficiency and in the local generation of renewable energy. With the Green Deal instrument, the government helps individuals, companies and local governments to set up actual projects.

4.4.5. General policy for non-CO_2 green house gases in industry

Around 2000 substantial reductions in non-CO_2 greenhouse gases were achieved through:

- Environmental permit requirements for the producers of HCFC-222 and aluminium to limit emissions of fluoride and other pollutants, resulting in a reduction in HFC emissions achieved through the implementation of an after burner system and a reduction in PFC emissions.
- Voluntary agreements with the oil and gas and the aluminium industry to improve their energy efficiency, resulting in reductions of CH_4 and PFC emissions.
- Withdrawing regulations to reduce emissions of methane from landfill sites, which were introduced to reduce local safety hazards due to the potential build up and explosion of methane as well as cutting down on odours associated with landfill sites.

From 2008, significant N_2O reductions were achieved in nitric acid production. Emissions in 2007 were 4.4 Mt CO_2 eq., and after the introduction of reduction techniques in 2008 they had fallen to 0.6 Mt CO_2 eq. and 0.2 Mt CO_2 eq. by 2011.

Reduction policies after 2009 resulted in lower reductions than in the period before 2009, because the most cost-effective techniques had already been implemented. After 2009, the focus was put on reducing N_2O emission in caprolactam production, and implementing mitigation agreements with the semi conductor industry.

4.4.6. N_2O

The Climate Commission of the European member states ratified the European Commission proposal to incorporate the nitrous-oxide emissions (N_2O) into the European Emissions Trading System (ETS) for greenhouse gases. In the Netherlands, two nitric acid production facilities – DSM and Yara – were affected by this decision with a permits emissions ceiling of 1.2 Mt CO_2 eq. in 2010 and 1.0 Mt CO_2 eq. in 2020.

The opportunities for N_2O reduction in caprolactam production are being studied together with other European countries. This may lead to the implementation of reduction technology in the Dutch industry. An ETS opt-in may be an option.

4.4.7. PFC and SF_6

Low PFC, SF_6 semiconductor industry (WEM)
PFC and SF_6 are used for cleaning processing chambers and in the etching process in the semiconductor industry. SF_6 is also used in the power current sector and in the production of double-

glazing and electron microscopes. Total Dutch emissions of SF_6 (as reported under IPCC sector 2F8) contribute less than 0.5%.

There is only one producer of semiconductors in the Netherlands, with a single production location. Due to production growth and the increased complexity of the production processes, absolute emissions increased with 0.1 Mt CO_2 eq. over the last decade. Thanks to several PFC-reduction measures, the producer realised a high relative emission reduction. With a new Global Semiconductors Industry Voluntary Agreement (2010 -2020), the semiconductor industry aims to achieve a 30% relative reduction of F-gases in 2020 compared to 2010.

4.5. Transport

Mobility and Transport is one of the areas within the SER Energy Agreement for which a common target and working programme has been agreed. There is broad agreement on an emission target of 25 Mt Co_2 eq. for 2030, which entails an additional 6 Mt reduction based on existing policy. Ambitious European measures regarding cleaner (and more economical) cars and fuels play a crucial role in this, but a working program will also be set into force under the Agreement. Measures include the continuation of fiscal measures to boost the production of cleaner vehicles, pilots for zero-emission distribution into cities, and stimulating working plans for large companies in order to achieve a 20% reduction in Co_2 emissions in the mobility department.

4.5.1. CO_2

Biofuels (WEM+WAM)
The European Directive 2009/28/EG on renewable energy has been implemented into Dutch legislation. This Directive states that Member States should ensure that in 2020 a minimum of 10% of all energy consumption in transport must come from renewable sources. In practice, this target is mainly fulfilled with biofuels. Due to the incentive of the double counting of advanced biofuels, their share was more than 50% of the target in 2012. Dutch policy is aimed at maximising the share of advanced biofuels that are not produced from food/feed crops.

	2011	2012	2013	2014
Target share	4.25	4.50	5.00	5.50
Petrol (minimum share)	3.50	3.50	3.50	0
Diesel (minimum share)	3.50	3.50	3.50	0

Table 4.1 The minimum share of biofuel in fuels for road transport (percentage)

Because blending biofuels is obligatory, there are no additional tax incentives or subsidy programmes. There are some initiatives in order to stimulate cars with alternative fuels at local and regional level.

There was a national subsidy programme for Innovative Biofuels for Transport some time ago. € 60 million in total was set aside for the production of innovative biofuels in the Netherlands. The first tender had a budget of €19.4 million and four projects were supported. This program helped build biodiesel plants that can produce biodiesel from waste and residues.

Filling Stations for Alternative/Biofuels (WAM)
A subsidy programme for filling stations for alternative fuels was launched some time ago. This resulted in the construction of around 100 filling stations for biogas and 35 for high blend bio-ethanol (E85). A new project was launched in order to boost hydrogen filling stations. A proposal for the new directive on the deployment of alternative fuels infrastructure will be negotiated soon, which will be implemented over time once it has been established.

Het Nieuwe Rijden/Eco Driving
The Dutch Eco Driving programme was started in 1999 and is based on a long-term strategy. From 2010 onwards, the implementation of the program was designated to the Institute for Sustainable Mobility (IVDM) for a period of four years in order to achieve a transfer of the program to the market. IVDM has set a target to achieve 1 Megaton of CO_2 savings for the end of 2014. To this end, IVDM finances projects that have demonstrated the ability to save CO_2 and provides information about saving CO_2. For further information[14]

Kilometre charge - road pricing
The current Dutch government in 2012 decided not to implement a road-pricing scheme in this cabinet term, nor will this administration undertake any action in this respect.

Sustainable Transport (Lean and Green)
Lean and Green is a programme that facilitates primarily transport companies to move to a higher level of sustainability by taking concrete measures that not only reduce the CO_2 footprint but also save money. The programme started in 2008 with subsidies from the Ministry of Infrastructure and the Environment; by now, more than 300 companies have earned this award, which encourages them to reduce CO_2 emissions by 20% within 5 years.

CO_2 emission performance standards EU
In 2009, the legislation on CO_2 emissions from passenger cars was officially published in the shape of Regulation (EC) No. 443/2009 of the European Parliament and the Council (23rd April 2009), which set emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles. The fleet average to be achieved by all cars registered in the EU is 130 grams per kilometre (g/km). A so-called 'limit value curve' implies that heavier cars are allowed to produce higher emissions than lighter cars while preserving the overall fleet average. In 2012, 65% of each manufacturer's newly registered cars must comply (on average) with the limit value curve set by the legislation. This will rise to 75% in 2013, 80% in 2014, and 100% from 2015 onwards. A target of 95g/km is specified for the year 2020. An official decision in the shape of a regulation regarding the modalities for reaching this target and the aspects of its implementation, including the excess emissions premium, is expected in the last quarter of 2013.

In 2011, the legislation on CO_2 emissions for light-commercial vehicles was officially published in the shape of Regulation (EU) No. 510/2011 of the European Parliament and the Council (11th May 2011) which set emission performance standards for new light-commercial vehicles as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles. The fleet average to be achieved by all cars registered in the EU is 175 grams per kilometre (g/km). A so-called 'limit value curve' implies that heavier cars are allowed to produce higher emissions than lighter cars, while preserving the overall fleet average. In 2014, 70% of each manufacturer's newly registered light-commercial vehicles must comply (on average) with the limit value curve set by the legislation. This will rise to 75% in 2015, 80% in 2016, and 100% from 2017 onwards. A target of 147g/km is specified for the year 2020. An official decision in the shape of a regulation on the modalities for reaching this target and the aspects of its implementation, including the excess emissions premium, is expected in the last quarter of 2013.

Car tax
The Netherlands has a favourable fiscal regime for the purchase of business cars with low CO_2 emissions. As a result, average CO_2 emissions of the Dutch fleet has dropped sharply, and they are now well below the European average (see table 4.2).

[14] www.hetnieuwerijden.nl

Ontwikkeling CO_2							
	2005	2009	2010	2011	2012	2015	2020
EU	164.4	145.7	140.3	n.v.t.	n.v.t.	130	95
Nederland	169.9	146.9	135.8	126.2	118,5		

Bron: European Environment Agency; zie pagina 19 van publicatie Monitoring CO_2 emissions for new passenger cars in the EU: summary of data for 2012, EEA 30 april 2013.

Table 4.2: Development CO_2 emissions of Dutch fleet

Due to the fiscal policy, sales of electric cars and especially dual fuel cars have risen sharply over the past two years.

Truck of the future
In the demonstration programme 'truck of the future', various measures are examined that allow companies from the transport sector to save fuel, thus reducing CO_2 emissions. Through the program, for which the government has provided subsidies, an insight is obtained into fuel-saving measures and the extent to which these measures are commercially interesting. Over the next few years we want to work towards the broadest possible roll out of these measures.

Increase of maximum speed
The maximum speed on motorways was raised from 100 or 120 to 130 km/h in 2012 on those stretches where this was deemed acceptable in terms of safety, noise, nature and air quality. This lead to around 0.35 Mt of extra CO_2 emissions a year.

4.5.2. N_2O

The Netherlands has no policies aimed specifically at N_2O emissions from the traffic sector. NOx policies have led to more petrol-driven passenger cars being equipped with catalytic converters, resulting in higher N_2O emissions per kilometre. Since the percentage of petrol-driven cars with catalytic converters has increased substantially since 1990, the average N_2O emission factor also rose dramatically during the period 1990-1999 (from 9 to 15 mg/km), slightly dropping to 12 mg/km in 2003. The total impact stabilised over the last few years and was 0.4 Mt CO_2 eq. in 2012.

4.6. Agriculture

The government's ambition for the agricultural and horticultural sector is a reduction of CO_2 emissions to a level of 5-6 Mt in 2020, which is an emissions decrease of 1-2 Mt CO_2 in comparison to 'business as usual'. The government's ambition for the other greenhouse gases is to reduce emissions to a level of 25-27 Mt CO_2 eq. in 2020, of which 16 to 17 Mt is the level to be achieved within the agricultural and horticultural sector.

The Clean and Efficient programme distinguishes three separate main areas of concern regarding policy measures pertaining to the reduction of CO_2 emissions in agriculture:

- The agricultural processing industry (mainly Long-Term Agreements and innovation). Designated to the Ministry of Agriculture, Nature and Food Quality, whereas the resulting CO_2 emission reductions fall within the 'Industry' sector.
- Greenhouse horticulture: focuses on energy savings and sustainable production of the remaining energy demand (electricity and heat).
- Other agricultural activities (primary sectors etc.): focus on energy saving and co-fermentation, the production of biomass to generate energy and increased use of precision soil cultivation.

The Clean and Efficient policies pertaining to other greenhouse gases focus particularly on limiting the emissions of nitrous acid (N_2O) in industry, methane (CH_4) and nitrous acid (N_2O) in agriculture and methane-slip in CHP motors.

4.6.1. CO_2

Based on the Clean and Efficient Working Programme a covenant was reached, known as the Covenant Clean and Efficient Agricultural Sectors (Schone en Zuinige Agrosectoren).
The main aims of this Covenant are:

- CO_2 emissions: a reduction of 3.5 to 4.5 Mt in 2020 compared to 1990.
- Other greenhouse gases: reduction of 4.0 to 6.0 Mt CO_2 equivalents in 2020 compared to 1990.
- Energy saving: an average annual energy efficiency improvement of 2% over the period 2011-2020.
- Approximately 150 PJ of sustainable energy in 2020, including approximately 12 PJ of wind energy.

Secondary aims relate to:

- Contributing to making the agricultural sector generally more sustainable through a 'green growth strategy'.
- Presenting the agricultural sector as a producer of sustainable energy, increasing fossil fuel independence .

An annual plan will be drawn up for each sector that covers the coming year. These plans describe specific projects that, in the given year, must contribute to the realisation of the final policy target. This policy programme will be evaluated and redesigned in 2013/2014, taking into account the ambitions and the results achieved so far.

4.6.2. CH_4 and N_2O

Until 2020, no sectoral reduction targets will be imposed on agriculture. The sector is expected to take cost-effective measures that contribute to emission reductions of greenhouse gases on a voluntary basis. There are three categories of measures that can contribute to reducing emissions:

- Developing Best Management Practices for reducing N_2O emissions. The emissions are reduced by reducing nitrogen flows on farms.
- Taking measures related to cattle feed to reduce CH_4 emissions. The composition of feed can affect the production of methane via the cattle's digestive systems. In general: the better the digestibility, the lower the methane emissions.
- Taking measures concerning manure storage to reduce emissions of CH_4. Manure fermentation is the main option for reducing methane emissions from manure.

An important legislation for restricting the amount of CH_4 emissions is found in the (EU) milk quota, which limits the number of dairy herds held in the NL. The number of dairy herds in NL is still uncertain after 2015 when the milk quota system will have ended.

From 2013 onwards, new environmental policies on manure use will apply. They will have a significant (positive) effect on the climate, as they promise to increase CH_4 production for renewable energy.

4.6.3. N_2O

Research indicates that precision soil cultivation in agriculture using GPS can considerably reduce N_2O emissions. By implementing this method, N_2O emissions can be reduced by around 169 tons of N_2O-N per year. The effects are most significant on clay soil.

4.7. Forestry (CO_2) and LULUCF

Over the past decades, forest policy in the Netherlands has been integrated into the nature policy. The development of a nature network is a central theme of the nature (and forest) policy. The nature network is a cohesive network of high-quality nature wetland and terrestrial reserves. 560,000 ha of this network was completed by 2011. The aim is to have converted an additional 80,000 ha into nature reserves by 2027. Part of this will be achieved through afforestation and reforestation. Combating climate change is just one of the benefits of the ecological network.

Estimates for emission reductions and removals in the land use, land use change and forestry (LULUCF) sector are given according to accounting rules under the UNFCCC and under the Kyoto Protocol respectively.

The CTF Table 1 show emissions/removals from LULUCF. Also the tables in Annex 1 present the emissions/removals from LULUCF. While for the EU-15 the LULUCF sector offsets about 5 % of the total emissions ("without LULUCF") in 2011, offsetting is 1.3 % of total emissions in Netherlands.,

As The Netherlands has not elected any activities to include under Article 3, paragraph 4 of the Kyoto Protocol, reporting is only for activities under article 3.3 (Afforestation and reforestation). CTF Table 4(a)ii shows the net emissions/removals from activities under 3.3 of the Kyoto Protocol and the related accounting quantities for the years 2008-2011.

4.8. Waste (CH_4)

According to the Environmental Management Act (Wet Milieubeheer), the Minister of Infrastructure and the Environment (I&M) must issue a Waste Management Plan once every six years. The National Waste Management Plan 2002-2012 (Landelijk Afvalbeheerplan 2002-2012) was the first in line. It was replaced in 2009 by a new plan for the period 2009-2021.

The policy aims to minimise the production of waste, to maximise recycling and other recovery and to minimise the amount of waste that remains for disposal, especially landfill. An important target of the waste policy is, among other things, to increase overall recycling from 79% (in 2008) to 83% (in 2015). In order to achieve this target, the focus is on the separate collection of household waste, because almost 50% of this waste flow is still incinerated.
Non-recyclable waste is incinerated in energy-efficient incinerators, which are all designated as installations for other recovery in accordance with the Waste Framework Directive.
Optimisation of waste management makes an important contribution to the mitigation of the greenhouse effect. Landfill of organic waste, for example, generates substantial methane emissions. This is one of the reasons why the waste policy focuses on maximising waste recycling and limiting waste disposal.

In 2010 around 2% of wasted produced in the Netherlands was landfilled. This waste could not be recycled or burned.

4.9. Buildings Sector (households and services)

The building stock is considered to be an important sector in which significant CO_2 emission reduction and energy efficiency improvements can be achieved for both new and existing buildings. The policies developed by the Dutch government for building stock (from 2005 to August 2020) can be divided into three main categories:

- New Buildings
- Existing Buildings
- Appliances (Eco design)

Besides the further development and introduction of a broad package of policy instruments at national level, several EU Directives were implemented during this period. The relevant EU Directives in this context are the Energy Performance of Buildings Directive (EPBD) and the Eco design Directive.
In order to achieve policy targets in the building sector, the government, actors on the housing market, social housing associations, private homeowners and residents must work closely together. The Dutch government explicitly opted for a stakeholder-oriented approach by working via agreements, for instance. These agreements or covenants were renewed in 2012 and brought together in one broad covenant called the Koepel covenant, which has as main target to achieve energy savings, and restrict the energy use to 540 PJ by 2015, in order meet the related emission level of 22.5 Mt in 2020.

4.9.1. New Buildings (WAM)

The government has announced that, from 2011 onwards, the requirements for improving the energy efficiency of new residential buildings will be tightened by 25% and, from 2015 onwards, by 50% compared to the current standard. Furthermore, the government is aiming at the construction of completely energy neutral (new) buildings in 2020. The government has also stated that, as of 2015, new non-residential buildings must be 50% more energy efficient compared to the standard (in 2007). Therefore, the Energy Performance Requirement for commercial buildings will be tightened.

In April 2008 an agreement was signed with several builders' associations to underline the following aspects: tightening of energy efficiency requirements for new buildings, recasting of the calculating methodology, and the introduction of 10 areas of excellence in which extremely low-energy houses will be constructed. This agreement, called the Lenteakkoord, was renewed in 2012 under the Koepel covenant and aims at a 50% energy reduction in new buildings over the period 2012-2015.

The Built Environment Innovation Agenda describes the route along which energy innovations in the Built Environment can be encouraged and implemented on a large scale. The Agenda includes both technical and process innovations in new and existing buildings. Special attention is paid to accelerating the application of sustainable energy concepts.

4.9.2. Existing Buildings

A wide variety of policy instruments were set up between 2005 and 2012 in order to encourage the retrofitting of existing buildings.

Agreements

- *Covenant 'More with Less' for existing buildings (WAM):* an overall agreement with building contractors, energy suppliers and the installation industry was signed in January 2008 to ensure that 500,000 existing buildings will be 30% more efficient in 2011. This covenant was renewed in 2012. Starting in 2011, 300,000 buildings must be sufficiently improved every year. The main

target for existing buildings is to realise a reduction in energy consumption of at least 30% in 2.4 million buildings by 2020.

- *Covenant with social housing organisations (WAM):* in October 2008 an agreement was drawn up between the Dutch government and the interest group for social housing associations, plus the interest group for tenants. The main target of this agreement is to achieve additional energy savings of 24 PJ. This covenant was renewed in 2012.

Financial instruments

- Energy Investment Deduction (WAM): the scope of the Energy Investment Deduction was broadened in January 2009. By significantly improving the energy performance of a commercial building (to level B of the Energy Performance Certificate range, which runs from G to A), or increasing the assessment by two levels – for example from G to E – owners can qualify for a tax reduction. In 2009 and 2010, as part of the economic and financial crisis package, social housing organisations could also qualify for an Energy Investment Deduction. This means that social housing corporations were allowed to use this allowance in relation to profit tax. Improvements in the energy efficiency of houses became eligible for a tax deduction on 1st July 2009. These Energy Investment Deductions for social housing organisations ended in December 2010. Furthermore, several instruments have been deployed that financially reward private homeowners for improving the energy efficiency of their homes.
- Subsidy scheme for customised energy advice (WAM): a subsidy scheme was introduced in July 2009 to finance 'customised energy advice' to promote improvements to the energy performance of dwellings. This subsidy scheme applies to private homeowners. The subsidy was maximised at € 200 per household. This subsidy scheme ended at the end of 2010.
- Several other financial instruments were also in place, such as a subsidy scheme for insulating glazing, lowering VAT on insulating glazing, and green financing (WEM).
- There was a subsidy scheme for solar PV for homeowners from July 2012 to August 2013. Total budget was € 50 million. This scheme ended when the budget ran out.
- In February 2013, the Dutch government announced a Revolving Fund for Energy Savings. The first part of this Revolving Fund will start in December 2013 and is meant for private homeowners. The second part of this revolving Fund is meant for landlords and housing associations and is expected to start mid-2014.

Regulating instruments (WEM/WAM)

- Implementation of EU law:
  With the implementation of the EPBD Directive, the mandatory Energy Performance Certificate was introduced in January 2008. It is continually being improved and the new model was re-launched in October 2009. With a mix of standards – introduced with the European Eco design Directive – plus other encouraging measures, the Dutch government will promote the broad application of more energy-efficient appliances.
- Public buildings:
  One of the ambitions of the 'Clean and Efficient' policy programme is to set a standard in sustainability for the privately owned sector. New government buildings must be 25% more energy efficient than the official requirements at that time.The Long-Term Agreements on energy efficiency (LTAs) are agreements between the Dutch government and companies and institutions that focus on the more effective and efficient use of energy. From the perspective of the buildings sector, the LTAs with universities, higher professional education buildings, and university hospitals are most relevant with regard to improving energy efficiency in buildings.
- Energy performance of new buildings (households and buildings: improving the energy performance standard and tightened energy performance coefficient, EPC (WEM+WAM):
  The EPN for non-residential buildings varies according to the type of building and has been tightened three times since its introduction in 1995. The government has announced that, as of 2017, new non-residential buildings will have to be 50% more energy efficient compared to the standard in 2005.
- Encouraging Local Climate Initiatives (WAM):
  This new remittance scheme (Stimulering Lokale en Regionale Klimaatinitiatieven: SLOK)

began in July 2008 and ended in 2011. The scheme was meant to be an extra contribution by the national administration to realising the 'Clean and Efficient' climate policy targets of 2% energy savings per year, 20% renewable energy in 2020 and a 30% reduction in the emission of greenhouse gases in 2020. The SLOK scheme focused on reducing emissions of CO_2, CH_4 and N_2O at local level.

- In addition to the Koepel covenant, the Dutch Government agreed to a set of additional goals in a agreement called the Nationale Energieakkoord in 2013. This Agreement for the period 2014 to 2020 has the following goals: a 1.5% energy saving in the national final use, resulting in final savings of 100 Petajoules in 2020. A higher share of renewable energy, now 4.4%, increasing to 14% in 2020 and 16% in 2023, creating at least 15,000 extra jobs. The calculated outcome of the policy could result in 100 Petajoules extra energy savings, of which 12 to 43 Petajoules belong to the built environment. In order to meet these goals in the built environment the government will invest in a revolving fund for homeowners (see financial instruments) and grant a subsidy to the corporation sector to make their (rental) housing stock more energy efficient, and municipalities and provinces will check if companies fulfil their obligation based on existing environmental law, to apply energy savings measures that have a payback period of less than 5 years.

GHG affected	Name of Policy / Cluster of policies	Objective and/or activity affected	Type of instrument	Estimate of average annual mitigation impact per year (since 2005) Mt CO2 eq. 2010	2015	2020	Estimate of cumulative mitigation impact Mt CO2 eq. 2005-2020
			Energy				
CO_2	CO_2Emission Trading System (ETS)	Cost-optimisation of CO_2 reduction efforts	Regulatory	0,7[1)]	0,8[2)]	0,6	9,4
CO_2	SDE+ and other financial incentives of renewables [Green investment, EIA/VAMIL, MEP, Coal covenant, BLOW covenant, energy tax]	Stimulate the production of energy with renewable energy sources by subsidizing the as-yet unprofitable components of application	Economic, Fiscal, Voluntary/ negotiated agreement	1,9	3	4,3	64,6
			Industry				
CO_2	CO_2 Emission Trading System & Long-term Agreement on Energy Efficiency for ETS enterprises (MEE)*	Cost-optimisation of CO_2 reduction efforts	Regulatory/ Economic	0.4[1)]	1.4[2)]	0.5	7.1
CO_2	Long-term Agreement on Energy Efficiency for non-ETS enterprises [MJA] & Fiscal measures for energy and other green investments [EIA, MIA, VAMIL]	Improving energy efficiency and reduce CO_2 emissions	Economic, Fiscal, Voluntary/ negotiated agreement, Regulatory	0.2	0.3	0.4	4.4
N_2O	N2O Nitric acid production	Reduction Programme Non- CO_2 gases	Economic	1.1	0.6	0.4	5.6
			Transport				
CO_2	Decision biofuels as renewable energy for transport	To curb the CO_2 emissions from transport by setting obligation for a mandatory share of biofuels that needs to be blended with fossil sources of transport fuels	Regulatory	0.0	0.1	0.2	2.3
CO_2 CH_4 N_2O	Efficient Driving Campaign & Trucks for future	Increase the energy efficiency of driving by training and awareness	Information, Education	0.1	0.1	0.0	0.4
CO_2	EU CO_2 emission standards for cars & Fiscal policy on car efficiency	To curb the CO_2 emissions of transport by setting CO_2 standards for cars within the European Union & stimulating the purchase of passenger cars with low CO_2 emission through fiscal incentives	Regulatory/ Fiscal	0.0	0.0	0.1	0.9
			Agriculture				
CO_2 CH_4 N_2O	Convenant Clean & efficient Agrosectors	Reduce GHG emissions up to 10.5 Mton in 2020 compared to 1990; Increase energy efficiency of 2% per year in the	Economic, Fiscal, Voluntary/ negotiated agreement,	0.1	0.1	0.2	1.9

GHG affected	Name of Policy / Cluster of policies	Objective and/or activity affected	Type of instrument	Estimate of average annual mitigation impact per year (since 2005) Mt CO2 eq. 2010	2015	2020	Estimate of cumulative mitigation impact Mt CO2 eq. 2005-2020
		period 2011-2020; approximately 150 PJ of sustainable energy in 2020	Regulatory, Research				
CO_2	EU ETS & Sectoral emission trading system horticulture	ETS and a national sectoral trading system	Regulatory, Voluntary agreement	0.0	0.1	0.1	1.2
CH_4	Emission regulation CH4 emission gas engines" [Besluit Emissie-eisen Stookinstallaties (BEMS)]	A regulation to curb the emission of CH_4 from gas engines.	Regulatory	0.0	0.0	0.1	0.9
CH_4	Size of cattle stock and manure management	Milk quota, livestock reduction; ended in 2015	Regulatory/Voluntary	0.0	0.0	0.0	0.4
N_2O	Ammonia and manure policy	Reduce emissions through manure and ammonia management	Regulatory	0.2	0.1	0.1	1.1
		Waste					
CH_4	Landfill policy	Reduction in amount of landfilled waste, reduction of CH_4 emissions from landfill sites	Voluntary/ negotiated agreement, Regulatory	0.1	0.2	0.2	2.8
		Built environment					
CO_2	Energy performance standards (EPN) (new buildings) & Ecodesign directive)	To stimulate energy savings in new building by setting minimum energy performance standards. To limit the environmental impact of energy-using and energy-related products by setting standards for the design of products	Regulatory	0.0	0.0	0.0	0.1
CO_2	Covenant energy efficiency in the built environment (More with Less; Koepel convenant)	To stimulate energy savings in existing residential buildings through a package of instruments	Voluntary/ negotiated agreement	0.0	0.3	0.4	2.7
CO_2	"Block-by-block incentive scheme" [Blok-voor-blok programma] & Innovation programme built environment	Facilitating investments in the improvement of the energy quality of homes and to speed up application of renewable energy concepts in built environment through innovation	Voluntary/ negotiated agreement	0.0	0.0	0.0	0.0

Table 4.3 Main (packages of) policies and measures by sector
(* = policies and measures are included in the 'current and planned policies' (see chapter 5); [1)] 2008-2010; [2)]2008-2012)

4.10. How policies and measures affect longer-term trends in greenhouse gas emissions

Several measures that focus on short-term green house gas reductions also have an impact on longer-term emissions, most notably on CO_2 standards for cars and eco design labelling. Under the ETS, the cap of maximum allowed emissions will also continue to be lowered after 2020.

The Netherlands is aware of the importance of setting long-term goals and actively trying to achieve them. Acting now reduces the effort needed later on, while also showing that an impact on green house gases can be made. In the view of the government, the involvement of all relevant social partners is key to the transition to a low carbon economy. It is for that reason that we have engaged in the SER energy agreement towards sustainable growth. As follow-up to this agreement, a Committee will be formed to evaluate the progress towards our short-term and long-term mitigation goals. In addition, as a follow-up to its 2013 Climate Agenda, the Ministry for Infrastructure and Environment will draw up an agenda for renewing our mitigation policies in the light of the significant further reductions required between 2020 and 2030.

4.11. Policies and measures in accordance with Article 2 of the Kyoto Protocol

Article 2 of the Kyoto Protocol asks to specifically address:

- policies and measures to promote sustainable development.
- the steps taken to promote and/or implement decisions by ICAO and IMO to limit or reduce associated emissions.
- how it strives to implement policies and measures in such a way as to minimise adverse effects.

This information is provided in the following paragraph.

4.11.1. Promoting sustainable development

The EU published the renewed EU sustainable development strategy in 2006, and it was reviewed in 2009. The strategy sets goals for member states and the EU regarding climate, energy, transport, consumption and production, natural resources, public health, social inclusion, demographic development, migration and poverty. It underlines that in recent years the EU has mainstreamed sustainable development into a broad range of its policies. In particular, the EU has taken the lead in the fight against climate change and the promotion of a low-carbon economy. At the same time, unsustainable trends persist in many areas and the efforts need to be intensified. The review takes stock of EU policy measures in the areas covered by the EU SDS and launches a reflection on the future of the EU SDS and its relation to the Lisbon strategy. In 2011, the EU launched a communication focusing on promoting a Resource-Efficient Europe, outlining how we can transform Europe's economy into a sustainable one by 2050.
The OECD will review the Environmental Performance Policy of the Netherlands in 2015 with regard to the domestic and international commitments.

The Dutch National Strategy for Sustainability was 'peer reviewed' by Finland, Germany and South Africa in the spring of 2007. The recommendations are included in the final report "A new Sustainable Development Strategy: an opportunity not to be missed", which was published by the Advisory Council for Research on Spatial Planning, Nature and the Environment (RMNO).

The policy letter “Green Growth: for a strong, sustainable economy”, sent to parliament by the Dutch government in March 2013 contains the outline of the Dutch Sustainability policy. The government aims to strengthen the competitiveness of the Netherlands while reducing the burden on the environment en the dependence on fossil energy. Green growth is one of the priority themes for the Dutch Government. Combining the innovative strength of industries, knowledge institutes and government is essential to achieve this ambition.

Sustainability policy focuses on 8 areas: Climate, Energy, Water, Building, Food, Bio-based Economy, from Waste to Resources and Mobility. It promotes the uses of 4 instruments to achieve green growth: smart use of market incentives, revision of laws and regulations, innovation and the government acting as a network partner. An international approach and joint EU actions are essential to achieve the objectives and to secure a level international playing field

4.11.2. Steps relating to greenhouse gas emissions from aviation and marine bunker fuels

In accordance with Article 2.2 of the Kyoto Protocol, the Netherlands is still committed to achieving a limitation or reduction of greenhouse gas emissions not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organisation (ICAO) and the International Maritime Organisation (IMO) respectively.

ICAO
The Netherlands is fully committed to and involved in the challenges caused by climate change and is working towards resource-efficient, competitive and sustainable aviation. A comprehensive approach is considered the best way to reduce aviation emissions, and a number of policy initiatives related to sustainability and climate change are key in Dutch civil aviation policy. Measures apply to all of the four pillars of the so-called ‘4-pillar strategy’ for sustainable aviation, comprising innovative technology, ATM measures, market-based measures and the use of sustainable biofuels.

With respect to an international sector such as aviation, the Netherlands prefers a global system for CO_2 reduction, which is why it supports the EU in trying to achieve an agreement at the ICAO Assembly in October 2013 to work on the development of a proposal for a global system to be decided upon in 2016. Implementation would follow in 2020. In the mean time, the EU ETS would continue in one way or another depending on the decision taken at the Assembly on a framework for regional reduction systems. Over the past decade, the Netherlands has been involved in the development and application of measures at European level aiming at the reduction of CO_2 emissions, such as the EU ETS and SES on Air Traffic Management:

EU ETS
After the EU Council decided on including aviation in the EU ETS Directive in late 2008, implementation took several years to prepare for the first trading year (2012). All Dutch airlines have complied with the directive and the associated obligations on monitoring, reporting and verification. In the light of the developments within ICAO regarding the development of a global reduction system, the EU has decided to temporarily deviate from the ETS directive. This means that all flights between the EU and third countries will be temporarily exempt from compliance with the monitoring, reporting and verification obligation associated with the EU ETS. For all intra-EU flights, the ETS applies unchanged. The EU will decide whether the deviation will be continued depending on the outcome of the international process.

Air traffic management
The Netherlands is strongly committed to the ICAO environmental and sustainability goals for air traffic management. For the larger part, this is organised in a joint European effort – the single European sky –, which is expected to reduce CO_2 emissions by up to 10% by 2020. Examples of measures in this project are the simplification and optimisation of the airspace and procedures for its use. A strategy has been laid down in the Dutch Airspace Vision, accompanied by a performance-based navigation roadmap and an aeronautical information management roadmap. Implementation over the next years will ensure an optimised flow of air traffic, which will contribute to the internationally agreed sustainability goals. The Netherlands is deeply involved in the deployment of sustainable *biofuels* for aviation both at the European and national level. Through initiatives of one of the national air carrier and associated companies, the Netherlands is at the forefront of the implementation of bio-kerosene. With essential elements for a bio-kerosene infrastructure already in existence, the Netherlands is working on the further development of a bio-kerosene market, adapting its national implementation of the EU Renewable Energy Directive accordingly and making public/private arrangements to secure its commitment and future involvement.

IMO
According to decisions of the Marine Environment Protection Committee (MEPC), the IMO focuses on developing technical, operational and market-based measures for reducing CO_2 emissions from shipping. At its 62nd meeting, the MEPC decided on the Energy Efficiency Design Index (EEDI) for new ships and the Ship Energy Efficiency Management Plan (SEEMP) for all ships, which will be in force as of this year. For its deliberations on these matters, the Committee makes use of the Second IMO Study on GHG emissions from ships, which estimated emissions of carbon dioxide (CO_2) from international shipping based on activity data and international fuel statistics. The resulting consensus estimate for 2007 was that CO_2 emissions from international shipping amounts to 843 million tonnes, or 2.7% of global CO_2 emissions compared to the 1.8% estimate in the 2000 IMO study. In the absence of future regulations on CO_2 emissions from ships, in the base scenario these emissions were predicted to increase by a factor of 2.4 to 3.0 by 2050. MEPC has agreed on a GHG Update Study that will become available in 2014.

In June 2013, the European Commission presented a strategy for the inclusion in its climate policy of measures to reduce the maritime GHG emissions, consisting of a step-by-step approach that starts with a proposal for the monitoring, reporting and verification (MRV) of maritime CO_2 emissions, followed by setting the emissions targets and the development of market-based measures. The first step, MRV, is under discussion between the EU member states and the European Commission.
Nationally, the Netherlands is monitoring a voluntary agreement between ship owners, ship operators, the logistic sector, hydraulic engineers, the shipbuilding industry, and the Ministry of Infrastructure and the Environment concerning the reduction of GHG emissions by the maritime sector.

4.12. Policies and measures no longer in place

The following policies have been repealed or have expired since the Netherlands' 5th National Communication.

- The SDE feed-in premium scheme was replaced with the more cost-effective SDE+ scheme. There are still payments taking place for projects with an SDE grant, as subsidies in the SDE typically run for 12 to 15 years. However, no new projects are granted subsidies under the SDE scheme.

- Predecessor of the SDE was the MEP (Environmentally Friendly Electricity Production Programme). It was repealed on 18th August 2006 and was replaced with the SDE scheme. Because the subsidy for sustainable electricity was granted for 10 years, most producers of renewable electricity with MEP still receive MEP subsidies, many of them until 2017.
- Support for CHP under the SDE / SDE+ scheme was repealed in 2010, as the government prefers generic measures over financial or fiscal favouring of specific – mature – technologies such as CHP.
- The remittance scheme SLOK (Stimuleringsregeling Lokale Klimaatinitiatieven) was repealed in 2012, at the end of the climate agreement period (2007-2011) between central and local governments. The focus was switched from subsidising to encouraging (through communication and knowledge exchange) those initiatives that are profitable without subsidies (through the Local Climate Agenda). The evaluation of the climate agreement 2007-2011 shows that the SLOK scheme did contribute to the continuity of climate policy by municipalities, but this has not been quantified.

4.13. Monitoring and evaluation of progress relating to climate change measures

The overall development of greenhouse gas emissions is being monitored through the emission inventory system (described in Chapter 2). Emissions under the EU-ETS are being monitored through annual reporting in accordance with EU-ETS. The Environmental Assessment Agency (PBL) biennially publishes "The Assessment of the human environment", which is a report on the current status and future trends in the Dutch environment in relation to government policies and societal trends.

Existing and planned policy measures are regularly being assessed and compared with an updated reference scenario "Geactualiseerde Referentieraming" (Verdonk and Wetzels, 2012, see chapter 5). Our latest projections show that the Netherlands should be able to comply with its Kyoto target (see below) and is also on track to achieve its 2020 target for greenhouse gases that do not fall under the EU ETS. Taking into account the implemented policies, 2020 emissions in the range of 93 – 108 Mt CO_2 equivalents have been projected, compared to the target of 105 Mt. This does not even take into account measures taken after February 2012, including the SER Energy Agreement, which will lead to more reductions. An analysis has been made of the presumed effects of the measures under the SER Energy Agreement, which will be evaluated in 2016.

Kyoto target
The above-mentioned Kyoto target over 2008-2012 was translated into an assigned amount of 1001 Mt over these 5 years. This meant that during this period, emissions should not exceed approximately 200 Mt of CO_2 equivalent per year. Of these Assigned Amount Units, 437 Mt have been transferred to Dutch companies participating in the EU Emissions Trading Scheme (ETS), either through auctioning (16 Mt) or through allocation (421 Mt). The companies have to compensate for excess emissions by purchasing foreign emissions credits. The remaining 564 Mt of CO_2 equivalent were available for the sectors that do not participate in the ETS (such as consumers, agriculture, transport and services). Here, the government needs to compensate for excess emissions by purchasing foreign emission credits. With emissions of approximately 594 Mt, the Netherlands will use around 30 Mt of credits in order to comply with its Kyoto target (see 4.3.4)

4.14. Domestic and regional programmes and/or legislative arrangements, as well as enforcement and administrative procedures

4.14.1. Arrangements and procedures: European policy context

As an EU Member State, the Netherlands is also subject to EU climate policy and thus it applies EU Common and Coordinated Policies and Measures (CCPMs) relevant to climate change. These include, amongst others, the European Council Decision 2002/358/CE on the burden sharing of the EU's emission-reduction target for the Kyoto Protocol, and Decision 280/2004/EC on the so-called Monitoring Mechanism, which ensures that EU progress towards meeting the Kyoto target is assessed annually and that Member States provide sufficient information to the European Commission to achieve this aim. Also included are Directive 2003/87/EC, which introduced the European system for CO_2 emissions trading, and the Effort Sharing Decision 406/2009/EC. Other CCPMs encourage combined heat and power production, the introduction of biofuels for transport and the reduction of CH_4 emissions from landfill waste sites.

4.14.2. Arrangements and procedures: national policy context

Apart from the institutional arrangements that explicitly respond to the Netherlands' signing of the Kyoto Protocol, which are described in Section 2.3, there are more general legislative arrangements and enforcement and also administrative procedures in place to ensure compliance with environmental rules and regulations. These arrangements pre-date the ratification by the Netherlands of the Kyoto Protocol.

The Environmental Management Act provides the legal basis for most environmental regulations that effect emissions of greenhouse gases (for example regarding waste prevention and landfill policy, environmental permits and CO_2 emissions trading). The Act also provides the framework for enforcing commitments undertaken in Long-Term Agreements and the Benchmarking Covenant by companies that do not participate in emissions trading.

Chapter 18 of the Environmental Management Act regulates enforcement of the legal measures. It denotes which authorities are responsible for enforcement and requires them to designate officials to be charged with monitoring compliance. In the event of violations, authorities have several means to impose sanctions. For example, they may order that the situation be brought into compliance at the expense of the violator, or impose a pecuniary penalty or withdraw a licence. Another option is criminal sanctions. Public prosecutors may bring cases against offenders in criminal court, which could result in high financial penalties or even imprisonment (maximum of six years).

The Housing Act provides the legal basis for the energy performance standards (EPN and EPC) that apply to new buildings. With the EPN it is possible to calculate the EPC (energy performance indicator). The standards are laid down in the Buildings Decree pursuant to the Housing Act. The Buildings Decree also sets a maximum EPC level to limit the energy consumption of a building. Furthermore, the Buildings Decree empowers municipal authorities to grant building permits. In the event of violations of building permits, municipal authorities have recourse to administrative sanctions based on Article 25 of the Municipalities Act and to criminal sanctions based on Article 108 of the Housing Act.

4.14.3. Provisions to make arrangements and procedures publicly accessible

After adoption, all laws and underlying legislative arrangements in the Netherlands are published in one of several official government bulletins and/or directly on the website [15] as indicated in Section 2.1. The Freedom of Information Act and the Environmental Management Act also provide for public access to information regarding the enforcement of environmental rules and regulations. Under the Act of 22nd December 2005, the Freedom of Information Act was extended with a provision for the reuse of official government information, in accordance with Directive 2003/98/EG of the European Parliament and the European Council of November 17, 2003.

4.14.4. Arrangements and procedures relating to participation in the mechanisms under Articles 6, 12, and 17 of the Kyoto Protocol

The Ministry of Infrastructure and the Environment is the Designated National Authority (DNA) for the Clean Development Mechanism (CDM) and (as of 2013) the National Focal Point for Joint Implementation (JI) in the Netherlands. The government use of the project-based mechanisms (Clean Development Mechanism and Joint Implementation) to comply with the Kyoto target of 1001 Mt CO_2 eq. in the commitment period 2008-2012 (an average of 200 Mt per year) will be approx. 30 Mt (see 4.2.3). As presented in paragraph 7.3.3, the Netherlands has acquired sufficient credits to do so.

Clean Development Mechanism
Various types of instruments are deployed by the government in order to acquire Certified Emission Reductions (CERs). For the selection of CDM projects and the purchase of CERs that meet the quality specifications of the government, various intermediary organisations have been contracted along four tracks:

1. governmental agency NL Agency conduct a public procurement procedure called CERUPT
2. facilities with multilateral and regional financial institutions: the International Bank for Reconstruction and Development (IBRD), the International Finance Corporation (IFC) and the Corporación Andina de Fomento (CAF)
3. a facility with a private international bank: the Rabobank
4. participation in carbon funds: the Prototype Carbon Fund (PCF) and the Community Development Carbon Fund (CDCF)

In order to encourage the implementation of CDM projects, voluntary and non-legally binding Memoranda of Understanding (MoUs) have been signed with Argentina, Bolivia, Brazil, Colombia, Costa Rica Ecuador, El Salvador, Guatemala, Honduras, Indonesia, Mexico, Nicaragua, Panama and Uruguay.

The Netherlands has decided not to use CERs from HFK23 projects to comply with the Kyoto target 2008-2012 and the ESD target for 2020.

Joint Implementation
The government has developed three instruments for obtaining Emission Reduction Units (ERUs) from JI projects:

1. governmental agency NLAgency conducted several public procurement procedures called ERUPT
2. facilities with the World Bank (a cooperative arrangement between the IBRD and the IFC) and the European Bank for Reconstruction and Development (EBRD)
3. participation in a carbon fund: the Prototype Carbon Fund (PCF)

[15] www.rijksoverheid.nl,

Voluntary and non-legally binding MoUs on the implementation of JI projects have been agreed with Bulgaria, Czech Republic, Croatia, Estonia, Hungary, New Zealand, Romania, Slovakia and the Ukraine.

"Greened" Assigned Amount Units
The government signed an agreement with Latvia to purchase Assigned Amount Units in 2009. The financial revenues will be and have been used for climate-change-related activities in Latvia.

Instrument	**Clean Development Mechanism**		**Joint Implementation**		**International Emission Trading**	**Total**
	Organisation	*Mt delivered*	*Organisation*	*Mt delivered*	*Mt delivered*	*Mt Expected*
Tenders	NL Agency	1.0	NL Agency	8.3	-	
Multilateral and regional financial institutions	CAF, IBRD, IFC	27.8	EBRD, IBRD, IFC	4.2	-	
Private financial institutions	Rabobank	2.4		-	-	
Participation in Carbon Funds	CDCF, PCF	0.2		1.2	-	
Bilateral agreements		---		-	3.0	
Total delivered		28.2		13.7	3.0	44.9

Table 4.4: Situation as of 31st July 2013 with regard to the Kyoto target.

4.14.5. Arrangements and procedures related to implementation of Articles 3.3 and 3.4 of the Kyoto Protocol

The approximately 375,000 hectares of forest in the Netherlands, which cover about 10% of the total surface of the country, have a number of functions, including recreation, nature, landscape, CO_2 sequestration and wood production. Dutch forests produce around 8% of the wood consumed. Because the production from the inland woods is large enough to increase the domestic wood production, the national administration is trying to encourage the harvest of wood.

Most of the forest area in the Netherlands is managed according to the principles of sustainable forest management, which also apply to newly planted forests. The Forest Act and the Flora and Fauna Act ensure the sustainable management of forests. The Forest Act contains the obligation to report felling activities and to replant within three years of felling, while the Flora and Fauna Act ensures that the negative consequences of (management) activities on biodiversity are minimised. The sustainable forest management principles and the three aforementioned Acts ensure that the implementation of activities complying with article 3.3 and 3.4 (Forest Management) contribute to the conservation of biodiversity and sustainable use of natural resources.

4.15. Use of units from the market-based mechanisms and land use, land-use change and forestry activities

The use of units from market-based mechanisms and land use, land-use change and forest activities (LULUCF) from 2008 to 2012 count towards achievement of the Kyoto Protocol targets for the first commitment period (CP1).
Final CP1 compliance actions will take place when reviewed inventory data will be available for the complete period, in the "true-up" period in 2015. As a result, data on the final use of flexible mechanisms and sinks is not available for this 1st BR.

The Netherlands has not elected any activities to include under Article 3, paragraph 4 of the Kyoto Protocol. So LULUCF under the Kyoto Protocol is only for activities under article 3.3 (Afforestation and reforestation).

CTF Table 4(a)ii shows the net emissions/removals from activities under 3.3 of the Kyoto Protocol and the related accounting quantities for the years 2008-2011.

CTF Table 4(b) shows the Kyoto Protocol units net emissions/removals from activities under 3.3 of the Kyoto Protocol for the years 2008-2011.

5. PROJECTIONS

5.1. Introduction

The previous National Communication (5)[16] described the projections made in 2010, also known as the Referentieraming (Daniëls en Kruitwagen, 2010)[17]. Due to changes in prices, policies and other relevant developments, this projection was updated in 2012 and became the Geactualiseerde Referentieraming (Verdonk and Wetzels, 2012)[18], on which the overview in this chapter is based.

Section 5.2 presents the main results for the years 2020 and 2030. Emission projections for precursor gases are described in Section 5.3, while Section 5.4 is dedicated to uncertainty and sensitivity analyses. The use of credits from project-based emission reductions outside of the Netherlands is discussed in Section 5.5. The methodologies and assumptions underlying the projections are described in more detail in Section 5.6 and Annex 5.1.

5.2. Projections

Scenarios used, and major changes relative to the previous National Communication
The scenarios underlying the emission projections in the 2012 'Referentieraming' have incorporated new insights with regard to economic and demographic developments, sectoral developments, fossil fuel prices, the CO_2 price and policies compared to the Referentieraming of 2010. Recent statistics were also taken into account. The base year for the model is 2010, compared to 2007 for the previous projection. Whereas 2010 emission levels were a projection result in the previous projection, 2010 emission levels now reflect statistics on historical emission levels. The 2012 projection exercise projects emission levels for greenhouse gases and air pollutants for 2020 and 2030 (similar to the previous projection).

The 2012 projection exercise must however be viewed as an update of the 2010 projection, as the underlying methods (models, basic assumptions etcetera) where similar. The main parameters used in the 2010 and 2012 projections are presented in Annex 5.1. The following policy scenarios were included in the 2012 projection:

Policy scenario 'current policies'
This scenario only includes policies that had already been decided upon by February 2012, including instrumentation and financing. A major difference when compared to the 2010 projection is the change in the feed-in premium scheme for boosting the use of renewable energy.

Policy scenario 'current and planned policies'
This scenario includes the same current policies as the former scenario, plus policies that were being planned (also up to February 2012). The effects of the planned policies are less certain, since policies may still be subject to change. Planned policies that are included are, for example, raising the maximum speed limit on motorways (which has since been implemented), compulsory co-combustion of biomass, more stringent energy performance standards for residential buildings by 2015 and more stringent (2020) CO_2 emission standards for new cars and light duty trucks. In addition, particular policies that were previously included as planned are no longer included in the 2012 projection. These mainly include various small subsidy schemes, sectoral programmes and road pricing.

[16] NC-5
[17] www.rivm.nl/bibliotheek/digitaaldepot/E10004.pdf
[18] www.ecn.nl/docs/library/report/2012/e12039.pdf

Policy scenario 'current policies including Lenteakkoord[19]
This scenario includes the same adopted policies as the other scenarios, plus the effects of the policies that were agreed upon in the spring of 2012 by political parties in the Dutch House of Representatives during the governmental budget for 2013. This political agreement is also referred to as the 'Lenteakkoord'. Policies included in this scenario are, amongst other things, higher energy taxation for the use of gas, a tax on the use of coal by power plants, fewer fiscal benefits for mobility, and a fund that should boost investments in sustainability and renewable energy. Effects were only determined for greenhouse gases in 2020. Some of these policies were indeed incorporated, while others, such as the proposed reduction of fiscal benefits for work-related travel, were eventually decided against.

The 2012 projection did not include a policy scenario 'without measures'. See Annex 5.1 for an overview of which policies are included in the different policy scenarios and for a comparison with the 2010 projection. For a description of these policies and measures, see chapter 4.4 and , table 4.3.

Energy agreement of 2013 not taken into account
In 2013, the government entered into an agreement with other social partners regarding energy policies up to 2020 (the so-called 'SER Energieakkoord')[20]. The effects of this agreement have been evaluated by PBL and ECN (2013) but are not taken into account in the results that are presented in this chapter. For that purpose, the 2012 projection was slightly updated with regard to energy prices, the CO_2-price and policy (the tax on coal use was included) (Koelemeijer et al., 2013)[21]. The documentation for the updated projections was unavailable for this report.

5.3. Projections results

5.3.1. General trends

From a national perspective, the emission of greenhouse gases in the Netherlands increased significantly between 1990 and 1995 (see figure 5.2.1). Between 1995 and 2010, general emission levels tended to decrease as a whole. The trend after 1995 can be explained by a sharp decrease of non-CO_2 emissions since 1990, especially with regard to the emission of fluorinated gases and nitrous oxide. The emissions of CO_2 on the other hand have been increasing up until 2010.
For 2020, the emission levels are expected reach levels similar to those of 1990. Although emissions from transport, buildings and agriculture are generally in decline, this decline is more or less cancelled out by increasing emissions from industry and the energy sector. Emissions from industry and the energy sector are expected to start decreasing between 2020 and 2030. These trends will result in national emissions below 1990 levels by 2030.
The sectoral trends are discussed below.

[19] www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2012/05/25/voorjaarsnota-2012.html
[20] www.energieakkoordser.nl/~/media/files/energieakkoord/overzicht-belangrijkste-maatregelen-energieakkoord.ashx
[21] www.pbl.nl/sites/default/files/cms/publicaties/pbl-2013-uitgangspunten-referentiepad-evaluatie-SER-energieakkoord-1214.pdf

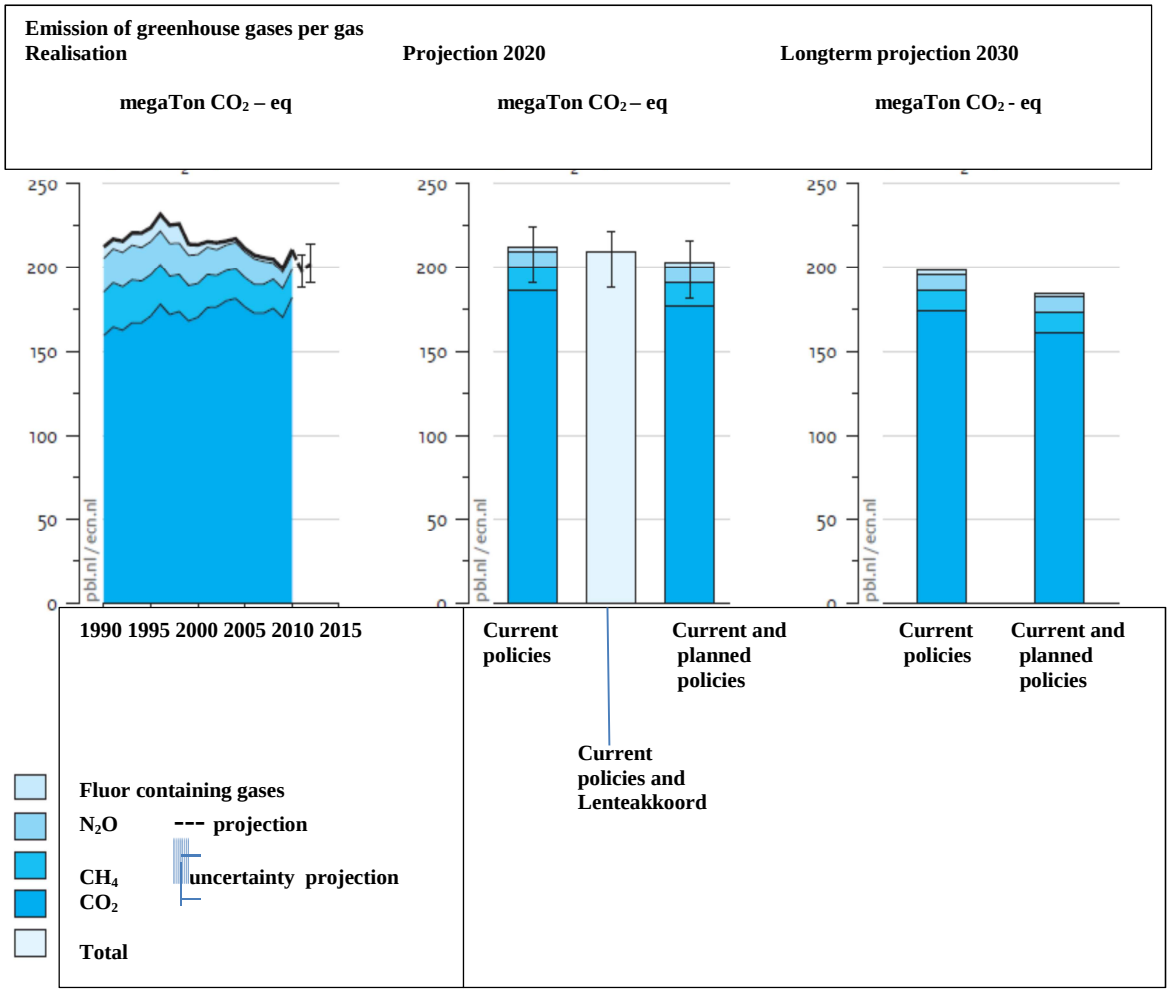

Figure 5.1 Emission of greenhouse gases per gas

5.3.2. Energy and industry

Emissions from the energy and industry sector are expected to increase significantly until 2020. With the current policies, emissions will increase from 100 Mt CO_2 to 118 Mt CO_2. This can be explained by the increasing net capacity of power production and higher energy demands from industrial sectors and refineries. Policies that encourage the use of renewable energy mitigate the increase of emissions from these sectors to a certain extent. The renewable energy share will have increased from 4% in 2010 to 8% (with an uncertainty range of 7% to 10%) by 2020. After 2020, emissions will decrease to 109 Mt CO_2 by 2030 as older power plants are taken offline and the share of renewable energy continues to increase to 13%.

Including planned policies, the emissions from these sectors will increase to 111 Mt CO_2 due to the increased use of renewable energy (more wind energy on land and biomass combustion). The share of renewable energy use will increase to 11% (range: 9% to 12%). After 2020, emissions should have decreased to 101 Mt CO_2 by 2030 as older power plants are taken offline and the share of renewable energy continues to increase to 16%.

The effects of the 'Lenteakkoord' policies for these sectors are limited. The most significant effect on emissions is expected to be produced by the taxation of coal use by power plants, leading to an additional emissions reduction of around 1.5 Mt CO_2 by 2020.

Emissions from these sectors are largely covered by the European Emission Trading System (ETS).

5.3.3. Buildings

This sector includes residential and utility buildings and the commercial, trade and governmental sectors. The general trend is a decline in energy consumption due to energy savings. Emissions will decrease from 28.4 Mt CO_2 in 2010 to 25.9 Mt CO_2 by 2020 with current policies and 25.5 Mt CO_2 including planned policies. The 'Lenteakkoord' policies lead to 0.2 Mt CO_2 fewer emissions due to additional investments in energy savings. After 2020, emissions will decrease even further. On a sub-sectoral level, emissions from utility buildings, especially in the non-profit sector, will increase. This can be explained through demographic developments (leading to more emissions from hospitals) and more employment in offices. Emissions from residential buildings are expected to decrease as a result of improved energy efficiency and the increased use of renewable energy technologies such as sun boilers. Electricity demand will decline due to the effects of the European Eco Design directive.
This sector falls almost entirely outside of the scope of the EU ETS.

5.3.4. Transport

CO_2 emissions from the transport sector (excluding international aviation and maritime bunker fuel use, but including mobile machinery from agriculture and the construction sector, fisheries and military aviation and navigation) are projected to decrease from 37.5 Mt CO_2 in 2010 to 34.5 Mt CO_2 by 2020 with the current policies in place. This decrease can mainly be attributed to the effects of the European CO_2 emission standards for new passenger cars and light duty trucks and the increasing use of biofuels in transport. When the planned policies, such as (more stringent) CO_2 emission standards for passenger cars and light duty trucks in 2020, are taken into account emissions from this sector will have decreased to 33.8 Mt CO_2 eq. by 2020. It should be noted though that the projections assume that the gap between the type-approval and the real-world fuel efficiency of passenger cars and light duty trucks does not increase further compared to 2010 levels.
The policies of the 'Lenteakkoord' will lead to an emission reduction of about 0.6 Mt CO_2 by 2020 compared to the planned policy scenario[22]. After 2020, emissions will decrease further to 34.1 and 30.8 Mt CO_2 by 2030 in the scenarios when including current and current + planned policies respectively.
This sector is not covered by the EU ETS.

5.3.5. Agriculture

CO_2 emissions from the agricultural sector (excluding mobile machinery) will decline from 10.4 Mt CO2 in 2010 to 7.1 Mt CO_2 by 2020 with planned policies. Although the area of horticulture increases, the use of renewable energy and energy efficiency also increases. Including planned policies, emissions will further decline to around 6.9 Mt CO_2 by 2020. After 2020, emissions will further decline due to the increasing use of renewable energy, such as geothermal heat use and the improvement of energy efficiency.

5.3.6. Non-CO_2 (agriculture and other sectors)

Non-CO_2 emissions are expected to decline from nearly 29 Mt CO_2 eq. in 2010 to about 24 Mt CO_2 eq. by 2030. In the agricultural sector, methane emissions from manure storage due to increased digestion of manure can be used to produce renewable energy, encouraged through the feed-in premiums for biogas. Nitrous oxide emissions will decrease through t

[22] As stated earlier, the proposed reduction of fiscal benefits for work-related travel were eventually decided against in the House of Representatives.

he use of less fertilizer and keeping cattle in stables for longer (instead of in the field). Non-CO_2 emissions from other sectors as a whole will decline too due to declining methane emissions from landfills, reduction measures implemented by fertilizer producers and the lower use of fluorinated gases in products. On the other hand, methane emissions produced through co-generation will increase due to higher production.

5.3.7. Forestry sector (not included in national totals presented elsewhere)

Projections for the forestry sector are not included in the Geactualiseerde Referentieraming. Given the age class structure of the Dutch forests, there is a slow decrease of removals from forest land remaining forest land. As yet, no significant changes have been assumed for the projections for land converted to forest land. Table 5.1 shows the emissions and sinks for the forestry sector based on the forest management reference level submission of the Netherlands (submitted in 2011) and the NIR 2013.

[Mt CO_2]	2010	2015	2020
Forest Land remaining Forest Land	-1.6	-1.3	-1.1
Land converted to Forest Land	-0.5	-0.5	-0.5

Table 5.1 Projected developments for the forestry sector

5.3.8. International bunkers

The Netherlands did not update the projection for the emissions from international navigation and aviation. The latest projections were reported in the National Communication 5 and are shown in Figure 5.2.

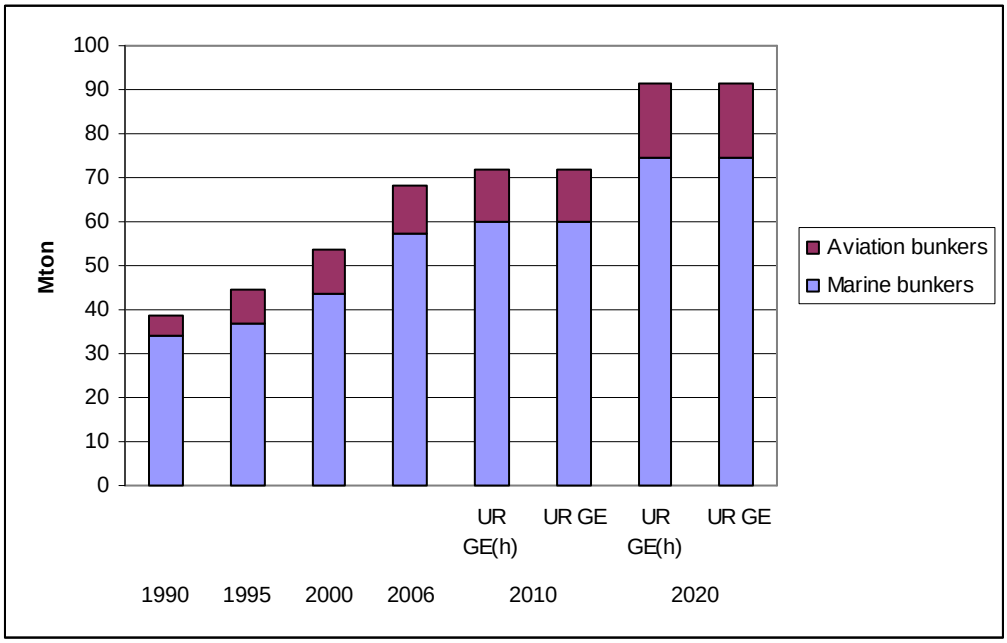

Figure 5.2 Emissions from international aviation and navigation (Daniëls et al., 2009)

5.3.9. Emissions of NOx, NMVOC and SO_2

The emissions from the precursor gases NOx, NMVOC and SO_2 are expected to decline. These emissions have been declining since 1990, which can be explained through the implementation of various air quality policies that restrict the emissions from industrial installations, power plants, agricultural activities and vehicles. The historical and projected developments for the emissions of the precursor gases are illustrated in the figures 5.3-5.5 below.

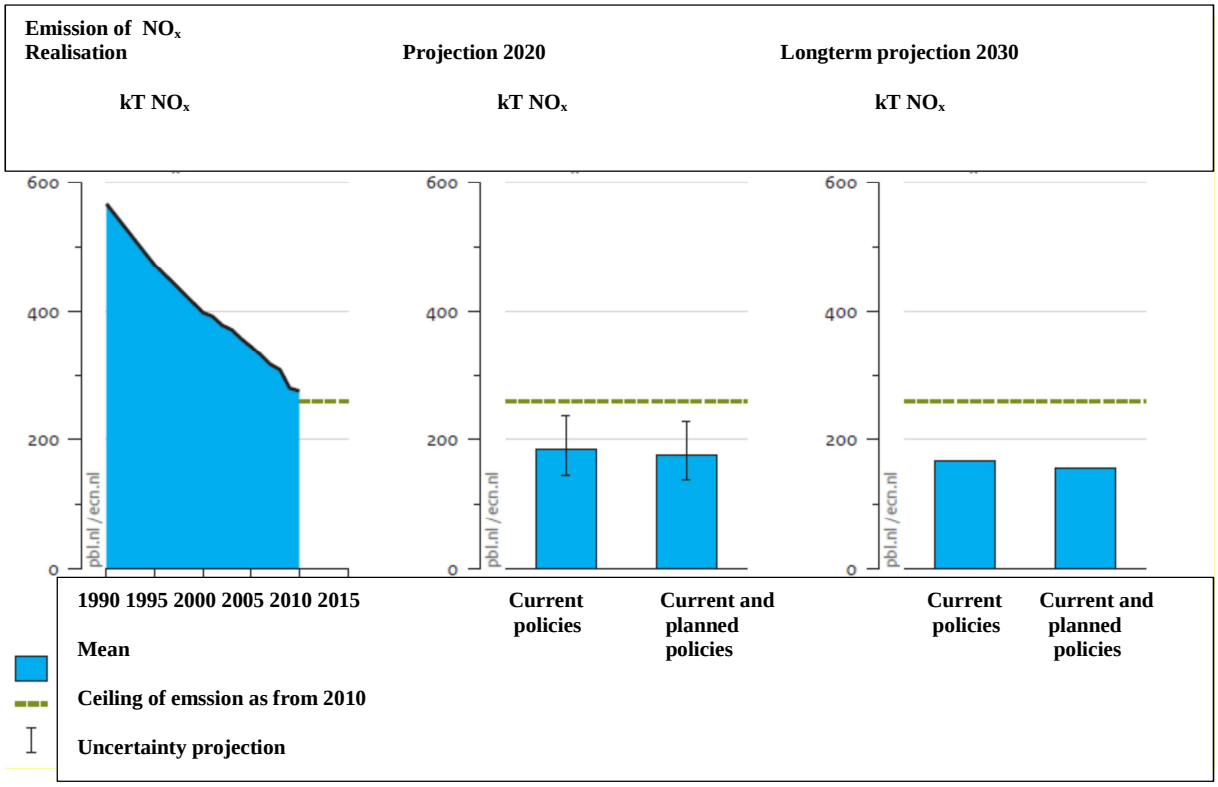

Figure 5.3.Emission of NO_x

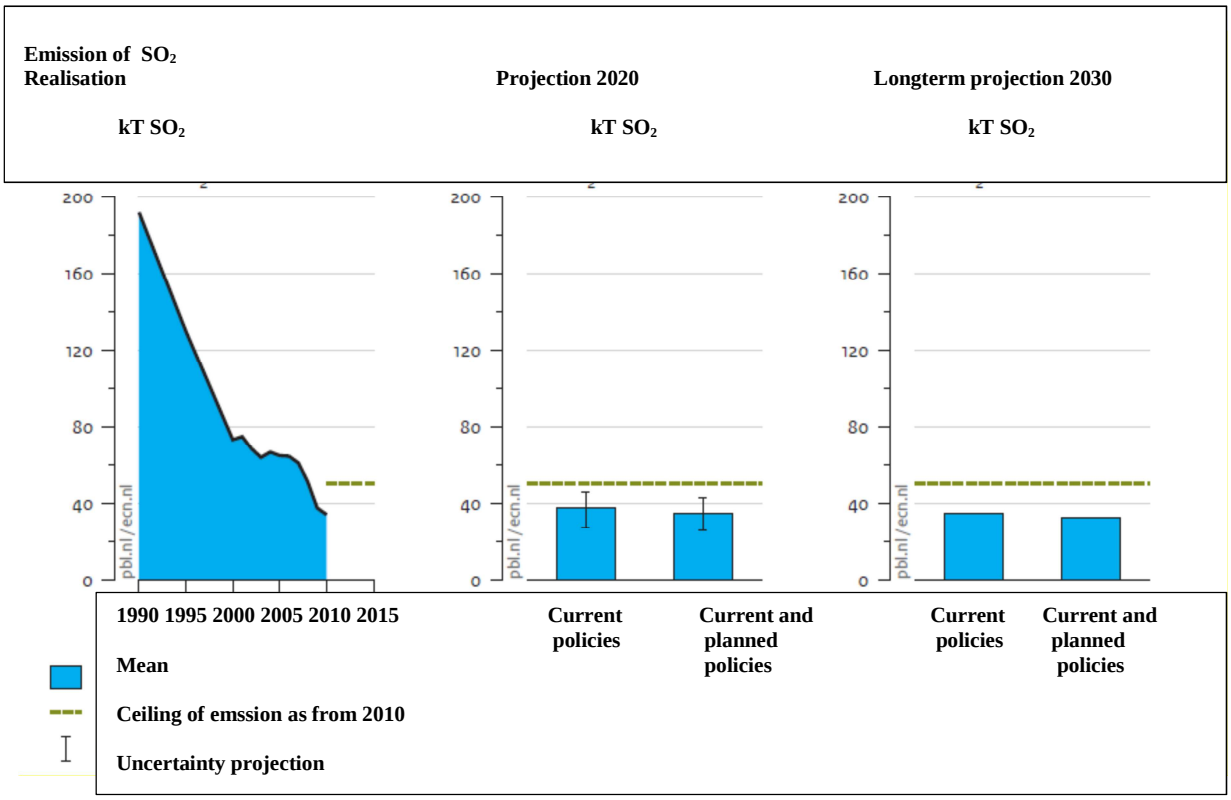

Figure 5.4 Emission of SO_2

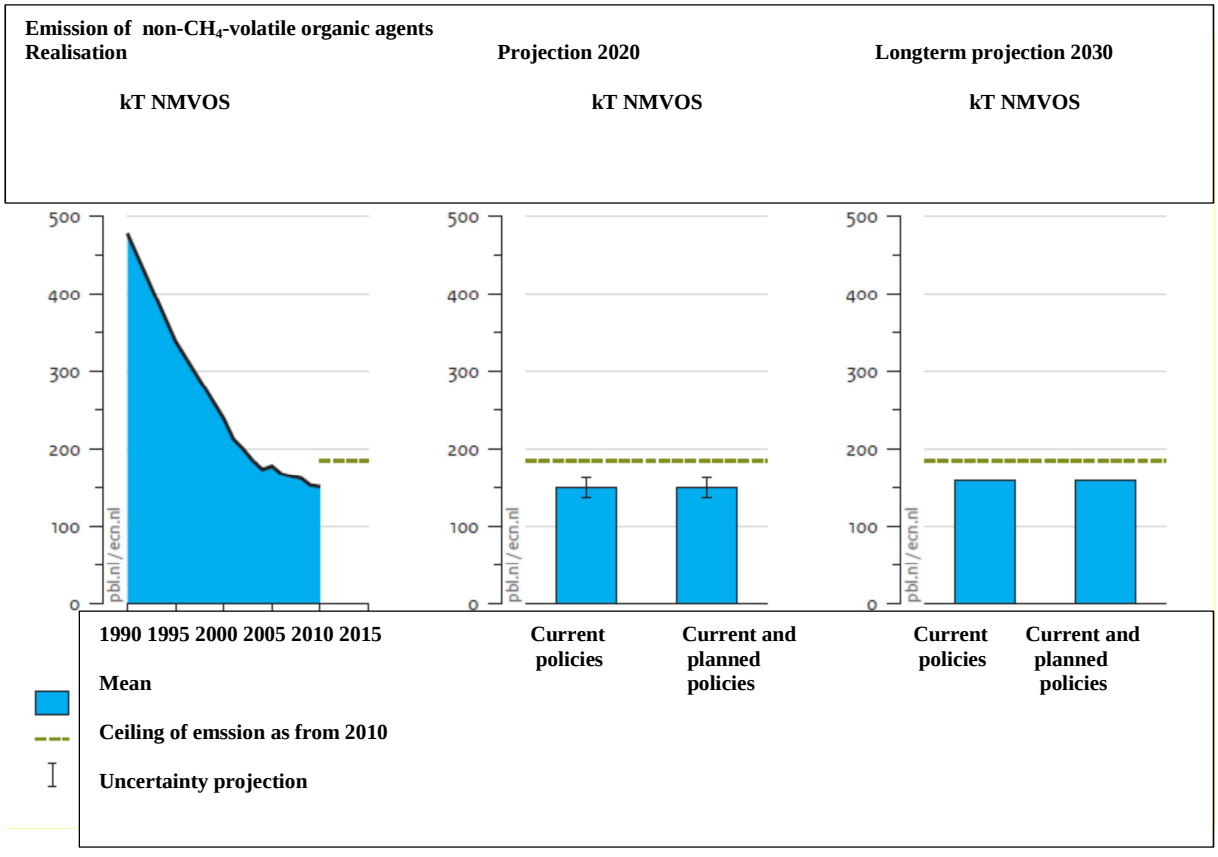

Figure 5.5 Emission of non-CH_4-volatile organic agents

5.4. Assessment of the aggregate effects of policies and measures

5.4.1. Effects on emissions of greenhouse gases

For 2020, the emission levels are expected reach levels similar to those of 1990. Although emissions from transport, buildings and agriculture are generally in decline, this decline is more or less cancelled out by increasing emissions from industry and the energy sector. Emissions from industry and the energy sector are expected to start decreasing between 2020 and 2030. These trends will result in national emissions below 1990 levels by 2030.

As an EU Member State, the Netherlands is also subject to EU climate policy and thus it applies EU Common and Coordinated Policies and Measures (CCPMs) relevant to climate change. With the introduction of the EU Emission Trading Scheme (see par. 4.4.1), a large part of European emissions were capped under an EU-wide maximum cap. For the emissions covered by the EU ETS, under an EU-wide cap, the goal is to reduce emissions of greenhouse gases by 21% in 2020 compared to 2005 levels . For emissions not covered by the ETS, the target is to reduce emissions to 104 Mt, with non-ETS base year emissions in the Netherlands being 127 Mt following Decision 2013/162/EU. In the projections with current and planned policies the emissions level by 2020 is 103.2 Mton CO_2-equivalent for the ETS and 99.4 CO_2-equivalent for the non-ETS.

5.4.2. Sensitivity analysis and uncertainty

In the 2010 projection, the relevant experts established uncertainty margins based on a combination of extra sensitivity analyses and expert judgement. These estimations have been used as the basis for the uncertainty margin that was calculated for the 2012 projection. During this process, methods were used that are also applied by the IPCC (see IPCC (2000) 'Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories')[23]. An uncertainty propagation analysis was used, resulting in a range for the projections scenario containing the emissions with a very high level of certainty (90% chance/confidence interval). This results in a range for emissions of 191 Mt CO_2 eq. to 224 Mt CO_2 eq. by 2020 for the policy scenario with current policies. For the policy scenario that includes planned policies, the range is 181 to 215 Mt CO_2 eq. Ranges have also been calculated for the use of renewable energy (see sections above). No range has been calculated for 2030.

5.5. Supplementarity relating to mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol.

Both companies and the government acquired credits as defined in articles 6 and 12 in order to meet their reduction commitments for the Kyoto Protocol in the period 2008-2012. Companies also acquired such credits because European member states like the Netherlands have implemented a European emission trading system, which covers the activities of mostly large, industrialised companies (about 40% of total European emissions). The EU ETS requires these companies to compensate for their emissions through sufficient emission allowances and/or credits[24]. For the emissions that fall outside the scope of ETS, not so-called non-ETS emissions, the government was responsible for acquiring enough emission allowances and/or credits.

[23] www.wbcsdcement.org/pdf/tf1/Table_of_contents.pdf

[24] The use of credits has been limited to about 10% of the 2008-2012 allocation. www.pbl.nl/publicaties/nederland-voldoet-aan-de-kyoto-verplichting-uitstoot-broeikasgassen

The government acquired 45 million credits[25] in order to meet their obligations under the Kyoto Protocol. Based on preliminary emission statistics up to 2012, only 30 million credits were actually required[26],[27]. Although companies that fell within the scope of ETS received more free allowances than necessary to compensate for their emissions, they also surrendered 29 million credits to the government. This is 6.8% of their 2008-2012 allocation of allowances. These companies are allowed to surrender no more than 10% of their 2008-2012 allocation in the period up to 2020. It is not known how many credits where acquired by ETS companies in the Netherlands.

5.6. Description of methodology.

5.6.1. Models and methods used

Autonomous social developments are reflected in growth series of activity data (industrial production, passenger km, tonne km, livestock numbers, etc.). In turn, these developments result in a demand for energy, including the non-energy use of fuels (e.g. feedstock). Investments in energy technologies and efficiency improvements are modelled using input regarding technological progress, policies and developments of energy prices and investment costs. Subsequently, the energy supply is modelled based on similar input parameters. The final step is the calculation of emissions. Energy use and emissions are calculated using a combination of models.

Macroeconomic projections for the mid-term are derived from modelling exercises performed by the Netherlands' Bureau for Economic Policy Analysis (CPB). The PBL Netherlands Environmental Assessment Agency determines the macroeconomic trends up to 2030, based on the ranges of long-term projections made by CPB and PBL. The macroeconomic trend is then used as input for the sectoral economic projections, calculated by PBL using the DIMITRI model (Wilting et al., 2001)[11.] This model determines economic growth in approximately 20 different sectors. Information on the international demand for products and prices is based on calculations carried out using the Worldscan general equilibrium model (Lejour et al., 2006)[28] and is used as input for DIMTRI.

The economic growth output of the DIMITRI model is further differentiated into about 110 subsectors that influence emissions, and together with information on developments in the physical production capacity, they are used as input for the SAVE models by the Netherlands' Energy Research Center (ECN) (Boonekamp, 1994)[29.] SAVE was originally designed to project energy use and energy efficiency improvements, with key economic parameters and structural developments as input.

The SAVE models used include households, services and the industry/CHP/agriculture model. These models simulate final energy use based on extensive information about

[25] The Dutch government expects to acquire 48 million credits by the end of July 2013.
[26] http://www.iioa.org/conferences/intermediate-2004/pdf/wilting.pdf
[27] http://www.google.nl/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CDEQFjAA&url=http%3A%2F%2Fwww.cpb.nl%2Fsites%2Fdefault%2Ffiles%2Fpublicaties%2Fdownload%2Fworldscan-model-international-economic-policy-analysis.pdf&ei=8e-
[28] www.ecn.nl/docs/library/report/1995/95005.pdf
[29] www.ecn.nl/publicaties/author/41901

technologies. The SAVE models also take the effect of environmental and energy policies into account. The development of energy demand can be broken down into a volume, a structural, a climate, and an energy-saving effect.

ECN uses several models for energy supply (see Volkers, 2006)[30]. Simulation models comparable to SAVE are used to project renewable energy, production of natural gas, and growth in combined heat and power. Projections for passenger transport by road and rail were derived from the Dutch National Model System (LMS). Freight transport in the Netherlands by road, rail and water was modelled using TRANS-TOOLS, a European transport network model. The future composition of the car fleet and the inland shipping fleet was modelled by PBL using dedicated models, including Dynamo (passenger cars) and EMS (inland shipping). The projections for transport volumes and fleet composition were subsequently converted into projected energy use and resulting emissions of greenhouse gases and air polluting substances by the transport sector.
ECN uses the linear programming model SERUM to calculate production streams in the petroleum-refining sector. The POWERS model, developed by ECN in cooperation with Erasmus University of Rotterdam [Rijkers, 2001][31]**,** generates equilibrium in the electricity market based on final demand for electricity and determines electricity supply and prices simultaneously. POWERS is a multi-actor adaptive model of the Dutch electricity market. This means that the decisions regarding production volume, allocation of the plants, and price setting made by each market player are based on information from the previous period. Finally, the linear programming model SELPE is used to generate physical equilibriums for all energy streams.

The outputs from SELPE, fuel combustion and the non-energy use of fuels per sector are used to calculate the energy-related CO_2 emissions per sector. Based on sectoral figures from CPB, ECN and PBL (transport), PBL also calculates the non-CO_2 greenhouse gas emissions per sector. This calculation takes into account climate policy, technology and structural economic aspects affecting non-CO_2 greenhouse gas emissions.

5.6.2. Key variables and assumptions

The key variables used in the projections are listed in Table 5.2 below. More detailed information about parameters and the assumptions that have been used is provided in Annex 5.1

[30] www.ecn.nl/publicaties/author/41901
[31] www.ecn.nl/publicaties/author/41901

	Units reported	Historic values			projected values (current policies)		projected values (current + planned policies)	
		2000	2005	2010	2020	2030	2020	2030
General economic parameters				Historic / Projected				
1a. Gross Domestic Product	Millions of Euro2000	417,960	446,282	480,470	560,965	646,185	560,965	646,185
1b. Gross domestic product growth rate		3.9%	2.0%	1.6%	2.1%	1.5%	2.1%	1.5%
2a. Population	x1000	15.864	16.306	16.575	17.229	17.688	17.229	17.688
2b. Population growth rate and base year value		0.8%	0.2%	0.5%	0.3%	0.2%	0.3%	0.2%
3. International coal import prices	Euro2000/ GJ	2.39	2.10	2.22	2.59	2.75	2.59	2.75
4. International oil import prices	Euro2000/ GJ	5.30	6.75	8.60	12.49	14.23	12.49	14.23
5. International gas import prices	Euro2000/ GJ	3.67	4.07	4.74	7.09	8.12	7.09	8.12
Carbon price (EU ETS)	Euro2010/ton	0	12.25	15.92	12.00	36.00	12.00	36.00

Table 5.2 Key variables used in the projections (see also annex 5.1)

6. PROVISION OF PUBLIC FINANCIAL SUPPORT, TECHNOLOGICAL AND CAPACITY-BUILDING SUPPORT TO DEVELOPING COUNTRY PARTIES

6.1. Summary information on public financial support

Despite the economic crisis, the Netherlands maintained its ODA spending on average 0.7 % above GDP in 2010 – 2012. During the period under review, climate finance has generally been additional to the 0.7 % ODA spending for the MDG's.

The Netherlands committed € 300 million as its contribution towards Fast Start Finance in 2010 - 2012. This pledge was fulfilled at the end of 2012 and consists exclusively of mitigation and adaptation projects that have been allocated the OECD Rio marker 'principal'. Fast Start Finance (activities marked 'principal') are indicated in the table below as this is the expenditure that the Netherlands considers to be its share in international climate finance during the years 2010 – 2012.

Aside from efforts in terms of Fast Start Finance, the number of sector programmes in the Netherlands' development cooperation which are relevant for climate (Rio marker 'significant') also increased. Both principal and significant marker expenditures are presented in the NC6 and included in the table below.

	ODA Expenditures (€ x 1,000)			
	2009	**2010**	**2011**	**2012**
Financial Resources The Netherlands				
ODA percentage of GNI	0.81%	0.81%	0.75%	0.70%
ODA environment total (x1,000)	618,540	573,580	749,781	429,254
ODA Environment % of GNI	0.11%	0.097%	0.122%	
Fast Start Finance[32]				
Principal (bilateral and multilateral prog.)		44,900	118,100	144,600
National Communication 6				
Programmes Principal (bilateral and multilateral)	54,313	47,478	115,145	127,197
Multilateral Principal (LDCF)		-	-	25,000
Multilateral core support (attribution excl. LDCF)	32,415	44,031	58,431	51,952
Programmes Significant (attribution)	55,928	49,365	54,939	45,519
Civil Society Alliances (attribution)	-	-	59,133	104,096

Table 6.1 Official Development Assistance expenditures and climate-relevant expenditures.
Source: HGIS (Homogeneous Budget for International Cooperation), 2011 (p21, p28) and 2012 (p29, p31) and Netherlands' database.

[32] *Note: The FSF only includes activities whose primary objective is to contribute to climate mitigation and/or adaptation, including bilateral, regional and multilateral programmes (marked 'principal'). The National Communication 6 separates multilateral programmes in countries and regions from support provided to multilateral organisations. Some small differences may occur between FSF and NC6 as FSF includes contributions for regional and bilateral programmes that form part of a wider multilateral portfolio, and the FSF includes a contribution to the REDD+ mechanism and, in 2012, support to LDCF (€ 25m), both of which are part of the multilateral contributions under NC6.*

6.1.1. Meeting developing country needs

The specification on Climate expenditures 2010 – 2012 includes both the FSF-related projects (principal) and climate relevant projects in other programmes (significant).

In the reporting period 2011 -2012, there were 170 projects with climate-relevant expenditures on climate change mitigation and/or adaptation (principal and significant). Projects were conducted in over 30 countries (including regional and multilateral programmes). The focus of these programmes is often Sub-Saharan Africa.

To ensure that the resources provided effectively address the needs of non-Annex I Parties in addressing climate change mitigation and adaptation, projects correspond to a partner country's needs and policy framework and address national priorities. The bilateral projects support a country-driven approach to aid delivery and national ownership. More and more projects entail public-private partnerships, including cooperation with and between government partners, local non-governmental organisations and companies, in order to deliver climate-related projects.

6.1.2. Methodology

Members of the OECD Development Assistance Committee (DAC) – including the Netherlands - report whether or not their aid activities support the objectives of the Rio Conventions: Climate Change, Biodiversity and Desertification. The Netherlands also uses this system to track budget allocations and expenditures related to its own policy objectives. The OECD/DAC uses agreed definitions and eligibility criteria for climate change mitigation and adaptation (OECD Handbook Climate Markers, Sept 2011). Each activity to be supported is registered in a computerised system and classified according to the CRS sector code, activity code, channel code, and markers, including climate change. Any activity could be classified as climate-change-related. In line with the DAC marker system, activities then receive a 'principal' score (score '2 '), where climate change is one of the principal objectives and fundamental to its design, or a 'significant' score (score '1') where climate change mitigation is an important, but not principal, objective.

The marker data does not enable the exact quantification of financial support targeting Climate Change. It provides an indication of the policy objectives of aid (best estimate). Activities marked as 'principal' can be considered as contributing to the climate objective in full. Activities marked as 'significant' target the climate objective but cannot be counted in full; only a proportion may actually target Climate Change. The Netherlands uses several internationally agreed percentages (see table 7a) and 40% for projects scoring '1' ('significant') in its bilateral project portfolio.

The Ministry of Foreign Affairs uses an annually established corporate currency exchange rate. For the years 2011 and 2012 this was 0.80 and 0.70 US$ per euro respectively

In the tables, cross-cutting refers to country programmes that include both mitigation and adaptation activities.

Allocation channels	*Domestic currency (euros x 1,000)*					*USD x 1,000*				
	core / general	***climate specific***				***core / general***	***climate specific***			
		mitigation	*adaptation*	*cross-cutting*	**sub-total**		*mitigation*	*adaptation*	*cross-cutting*	**sub-total**
Total contribution through multilateral channels:										
Multilateral climate change funds	69,306			39,355		99,009			56,221	
Multilateral financial institutions, including regional development banks	735,420			32,787		1,050,600			46,839	
Specialized United Nations bodies	181,390			5,105	*77,246*	259,129			7,292	*110,352*
Total contributions through bilateral, regional and other channels										
	-	77,152	41,119	54,444	*172,716*	-	110,218	58,742	*77,778*	246,737
TOTAL	**986,116**	*77,152*	*41,119*	*131,691*	***249,962***	**1,408,737**	*110,218*	*58,742*	*188,130*	***357,089***

*Table 6.2 Provision of public financial support: summary information in 2012, * Exchange rate 1 € / USD 1.43*

Allocation channels	*Domestic currency (euros x 1,000)*					*USD x 1,000*				
	core / general	***climate specific***				***core / general***	***climate specific***			
		mitigation	*adaptation*	*cross-cutting*	**sub-total**		*mitigation*	*adaptation*	*cross-cutting*	**sub-total**
Total contribution through multilateral channels:										
Multilateral climate change funds	43,401			14,082		54,251			17,603	
Multilateral financial institutions, including regional development banks	941,666			39,395		1,177,083			49,244	
Specialised United Nations bodies	197,262			5,197	*58,675*	246,578			6,497	*73,343*
Total contributions through bilateral, regional and other channels										
	-	101,749	12,755	55,581	*170,084*	-	127,186	15,943	69,476	*212,605*
TOTAL	**1,182,329**	*101,749*	*12,755*	*114,256*	***228,759***	**1,477,911**	*127,186*	*15,943*	*142,819*	***285,948***

** Exchange rate 1 € / USD 1.25*

Table 6.3 Provision of public financial support: summary information in 2011,

6.1.3. Financial support provided to non-Annex I Parties

The contributions to multilateral organisations presented in tables 6.1 and 6.2 are counted here as part of the bilateral and regional channels.

6.1.4. Multilateral climate change-related funds

The Netherlands supported the Least Developed Countries Fund through the World Bank with 25 million euro in 2012. Support was also provided to the World Bank for the set-up of the Green Climate Fund with 200,000 euro in 2012. The Montreal Protocol received financial contributions directly (2011) and through UNEP (2012).

In 2011 and 2012 the Global Environment Facility received 40 and 39 million euros, part of which was used for climate-related activities.

6.1.5. New and additional

Documentation box 1: Each Party shall provide an indication of what new and additional financial resources they have provided, and clarify how they have determined that such resources are new and additional. Please provide this information in relation to table 6.2 and table 6.3.
For the Fast Start Finance 2010-2012 period, The Netherlands financed climate projects on average 0.7% above ODA commitment. 'New and additional' during this period is determined at the budget/input level. In 2010, Climate change policy, together with other ODA for support to environmental activities in developing countries, was funded on top of the 0.7 % GNI commitment, raising the Dutch ODA level to 0.8% of GDP. In addition, in the context of the Copenhagen Accord, The Netherlands provided €300 million for Fast Start Finance in support of climate adaptation and mitigation in developing countries. This was in addition to the 0.8 % budget for 2010. In 2011 and 2012 the overall ODA budget decreased to 0.75 % in 2011 and 0.7 % in 2010, including climate financing. On average total spending in 2010 – 2012 still exceeds the 0.7 %. The Fast Start Finance period has triggered a renewed focus on climate in all ODA programming. Apart from the FSF budget that was additional to the budget for the MDG's, other projects were started with the primary objective of contributing to climate objectives. Also sector-oriented projects were supported, which contribute significantly to climate-objectives such as access to renewable energy, agriculture, integrated water resource management and sustainable forest management projects. The biannual report encompasses both fast finance and projects that were relevant for climate (marked principal and significant).

6.2. Contribution through multilateral channels

Remarks:
Status includes provided, committed or pledged.
Funding source includes ODA = Official Development Assistance or OOF = Other Official Flows
Financial instruments include Grant, Concessional loans, Non-concessional loan, Equity, Other
Type of support includes Mitigation, Adaptation, Cross-cutting (Mitigation and Adaptation), Other.
Sectors include Energy, Transport, Industry, Agriculture, Forestry, Water & Sanitation, Cross-cutting, Other, Not Applicable.

Table 6.4(a): Provision of public financial support: contribution through multilateral channels in 2012

Donor funding	**Attribution**	***Total amount (x1,000)***				***Status***	***Funding source***	***Financial instrument***	***Type of support***	***Sector***
		Core / general		***Climate specific***						
		Euros	*USD*	*Euros*	*USD*					
Multilateral climate change funds										
GEF (prj #15112, 23360)										
GEF (prj #15112, 23360) - ODA	32%	38,815	55,450	12,421	17,744	provided	ODA	grant	cross-cutting	Environment
non-ODA	32%	3,282	4,689	1,050	1,500	provided	OOF	grant	cross-cutting	Environment
LDCF (#24566)	100%	25,000	35,714	25,000	35,714	provided	ODA	grant	cross-cutting	Environment
Special Climate Change Fund		-	-	-	-					
Adaptation Fund		-	-	-	-					
Green Climate Fund		-	-	-	-					
UNFCCC Trust Fund for Supplementary Activities		-	-	-	-					
Other multilateral climate change funds		-	-	-	-					
Montreal Protocol (#23914, #21429)	40%	2,209	3,156	884	1,262	provided	ODA	grant	Mitigation	Environment

Donor funding	Attribution	*Total amount (x1,000)*				*Status*	*Funding source*	*Financial instrument*	*Type of support*	*Sector*
		Core / general		*Climate specific*						
		Euros	*USD*	*Euros*	*USD*					
Subtotal		***69,306***	***99,009***	***39,355***	***56,221***					
Multilateral financial institutions including regional development banks (core)										
World Bank Group (44000)	0.0%	-	-	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
IDA (44003)	3.6%	158,230	226,043	5,696	8,138	provided	ODA	grant	cross-cutting	Other (multi-sector)
IBRD (44001)	0.0%	-	-	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
IFC (44004)	0.0%	7,671	10,959	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
Regional Dev. Bank Group (46000)	3.6%	93,019	132,884	3,349	4,784	provided	ODA	grant	cross-cutting	Other (multi-sector)
AfrDB (46002)	3.6%	5,313	7,590	191	273	provided	ODA	grant	cross-cutting	Other (multi-sector)
AsDB (46004)	3.6%	-	-	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
EBRD (46015, 46016, 46019)	3.6%	600	857	22	31	provided	ODA	grant	cross-cutting	Other (multi-sector)
IDB (46012)	3.6%	-	-	-	-					
EDF Association	5%	140,720	201,029	7,036	10,051	provided	ODA	grant	cross-cutting	Other (multi-sector)
ODA Budget European Union	5%	329,867	471,239	16,493	23,562	provided	ODA	grant	cross-cutting	Other (multi-sector)
Subtotal		***735,420***	***1,050,600***	***32,787***	***46,839***					
Specialized United Nations bodies (core and programmes)										
UNDP (41114)	5%	63,990	91,414	3,200	4,570.71	provided	ODA	grant	cross-cutting	Other (multi-sector)
Specific programmes		61,180				provided	ODA	grant	cross-cutting	Other (multi-sector)
UNEP (41116)	20%	7,142	10,203	1,428	2,041	provided	ODA	grant	cross-cutting	Other

Donor funding	Attribution	*Total amount (x1,000)*				*Status*	*Funding source*	*Financial instrument*	*Type of support*	*Sector*
		Core / general		*Climate specific*						
		Euros	*USD*	*Euros*	*USD*					
										(environment)
Specific programmes		-				provided	ODA	grant	cross-cutting	Other (environment)
FAO (41301)	10%	2,500	3,571.43	250	357.14	provided	ODA	grant	cross-cutting	Agriculture
Specific programmes		5,615				provided	ODA	grant	cross-cutting	Agriculture
IFAD (41108)	0%	17,500	25,000	-	-	provided	ODA	grant	mitigation	Water
Specific programmes		21,530				provided	ODA	grant	mitigation	Water
UN Habitat (41120)	10%	-	-	-	-	provided	ODA	grant	mitigation	Water
Specific programmes		800				provided	ODA	grant	mitigation	Water
UNCCD (prj #21178)	20%	133	-	27	-	provided	ODA	grant	mitigation	Water
Specific programmes		-				provided	ODA	grant	mitigation	Water
UN ISDR (prj #20799)	20%	1,000	-	200	-	provided	ODA	grant	mitigation	Water
Specific programmes		-				provided	ODA	grant	mitigation	Water
Subtotal		***181,390***	***130,189***	***5,105***	***6,968***					
TOTAL		**986,116**	**1,279,797**	**77,246**	**110,028**					

** Exchange rate 1 Euro/ USD:* *1.43*

Table 6.4(a): Provision of public financial support: contribution through multilateral channels in 2011

Donor funding	**Attribution**	***Total amount (x1,000)***				***Status***	***Funding source***	***Financial instrument***	***Type of support***	***Sector***
		Core / general		***Climate specific***						
		Euros	*USD*	*Euros*	*USD*					
Multilateral climate change funds										
GEF (prj #15112, 23360)										
GEF (prj #15112, 23360) - ODA	32%	40,160	50,200	12,851	16,064	provided	ODA	grant	cross-cutting	Environment
non-ODA	32%	816	1,020	261	326	provided	OOF	grant	cross-cutting	Environment
LDCF (#24566)	100%	-	-	-	-	provided	ODA	grant	cross-cutting	Environment
Special Climate Change Fund		-	-	-	-					
Adaptation Fund		-	-	-	-					
Green Climate Fund		-	-	-	-					
UNFCCC Trust Fund for Supplementary Activities		-	-	-	-					
Other multilateral climate change funds		-	-	-	-					
Montreal Protocol (#23914, #21429)	40%	2,425	3,031	970	1,213	provided	ODA	grant	Mitigation	Environment
Subtotal		***43,401***	***54,251***	***14,082***	***17,603***					
Multilateral financial institutions including regional development banks (core)										
World Bank Group (44000)	0.0%	1,040	1,300	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
IDA (44003)	3.6%	337,210	-	12,140	-	provided	ODA	grant	cross-cutting	Other (multi-sector)

Donor funding	Attribution	Total amount (x1,000)				Status	Funding source	Financial instrument	Type of support	Sector
		Core / general		Climate specific						
		Euros	USD	Euros	USD					
IBRD (44001)	0.0%	19,324	24,155	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
IFC (44001)	0.0%	18,752	23,440	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
Regional Dev. Bank Group (46000)	3.6%	63,647	79,559	2,291	2,864	provided	ODA	grant	cross-cutting	Other (multi-sector)
AfrDB (46002)	3.6%	5,396	6,745	194	243	provided	ODA	grant	cross-cutting	Other (multi-sector)
AsDB (46004)	3.6%	-	-	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
EBRD (46015, 46016, 46019)	3.6%	3,200	4,000	115	144	provided	ODA	grant	cross-cutting	Other (multi-sector)
IDB (46012)	3.6%	-	-	-	-					
EDF Association	5%	163,230	204,038	8,162	10,202	provided	ODA	grant	cross-cutting	Other (multi-sector)
ODA Budget European Union	5%	329,867	412,334	16,493	20,617	provided	ODA	grant	cross-cutting	Other (multi-sector)
Subtotal		***941,666***	***755,570***	***39,395***	***34,069***					
Specialised United Nations bodies (core and programmes)										
UNDP (41114)	5%	66,300	82,875	3,315	4,144	provided	ODA	grant	cross-cutting	Other (multi-sector)
Specific programmes		92,024	115,030	-	-	provided	ODA	grant	cross-cutting	Other (multi-sector)
UNEP (41116)	20%	7,142	8,928	1,428	1,786	provided	ODA	grant	cross-cutting	Other (environment)
Specific programmes		607	759	-	-	provide	ODA	grant	cross-	Other

Donor funding	Attribution	*Total amount (x1,000)*				*Status*	*Funding source*	*Financial instrument*	*Type of support*	*Sector*
		Core / general		*Climate specific*						
		Euros	*USD*	*Euros*	*USD*					
						d			cutting	(environment)
FAO (41301)	10%	2,500	3,125	250	313	provided	ODA	grant	cross-cutting	Agriculture
Specific programmes		3,982	4,978	-	-	provided	ODA	grant	cross-cutting	Agriculture
IFAD (41108)	0%	20,000	25,000	-	-	provided	ODA	grant	mitigation	Water
Specific programmes		2,328	2,910	-	-	provided	ODA	grant	mitigation	Water
UN Habitat (41120)	10%	-	-	-	-	provided	ODA	grant	mitigation	Water
Specific programmes		1,360	1,700	-	-	provided	ODA	grant	mitigation	Water
UNCCD (prj #21178)	20%	139	174	28	35	provided	ODA	grant	mitigation	Water
Specific programmes		-	-	-	-	provided	ODA	grant	mitigation	Water
UN ISDR (prj #20799)	20%	880	1,100	176	220	provided	ODA	grant	mitigation	Water
Specific programmes		-	-	-	-	provided	ODA	grant	mitigation	Water
Subtotal		*197,262*	*246,578*	*5,197*	*6,497*					
TOTAL		**1,182,329**	**1,056,399**	**58,675**	**58,169**					

** Exchange rate 1 Euro/ USD:* *1.25*

6.3. Provision of public financial support: contribution through bilateral, regional and other channels

The financial contribution through bilateral and regional channels also includes the financial contribution with multilateral organisations when provided to countries and regions in specific programmes (e.g. through embassies in non-Annex I countries).

Remarks:
Status includes provided, committed or pledged.
Funding source includes ODA = Official Development Assistance or OOF = Other Official Flows
Financial instruments include Grant, Concessional loans, Non-concessional loan, Equity, Other
Type of support includes Mitigation, Adaptation, Cross-cutting (Mitigation and Adaptation), Other.
Sectors include Energy, Transport, Industry, Agriculture, Forestry, Water & Sanitation, Cross-cutting, Other, Not Applicable.

Table 6.5): Provision of public financial support: contribution through bilateral, regional and other channels in 2012

	Total amount		***Status***	***Funding source***	***Financial instrument***	***Type of support***	***Sector***
	Climate specific						
Region, country	*Euros*	*USD*					
Worldwide							
Adaptation	41,119,163	58,741,662	provided	ODA	grant	Adaptation	
Mitigation	74,613,475	106,590,678	provided	ODA	grant	Mitigation	
Subtotal	*115,732,638*	*165,332,340*					
Africa							
Burundi	1,279,640	1,828,057	provided	ODA	grant	Cross-cutting	Energy, Agriculture
Benin	70,614	100,877	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Water
Egypt	-	-	provided	ODA	grant	Mitigation	Water
Ethiopia	4,418,101	6,311,572	provided	ODA	grant	Cross-cutting	Agriculture, Forestry, Environment
Ghana	2,827,031	4,038,616	provided	ODA	grant	Cross-cutting	Agriculture, Forestry, Environment, WASH
Kenya	2,037,769	2,911,098	provided	ODA	grant	Cross-cutting	Biodiversity, Water
Morocco	19,927	28,467	provided	ODA	grant	Cross-cutting	Water
Mali	181,619	259,455	provided	ODA	grant	Cross-cutting	Energy, Environment
Mozambique	1,251,932	1,788,474	provided	ODA	grant	Cross-cutting	Energy
Senegal	3,460,425	4,943,465	provided	ODA	grant	Cross-cutting	Energy, Environment

Region, country	Total amount		Status	Funding source	Financial instrument	Type of support	Sector
	Climate specific						
	Euros	*USD*					
South Africa	33,022	47,174	provided	ODA	grant	Mitigation	Energy
South Sudan	-	-	provided	ODA	grant	Cross-cutting	Water
Uganda	-	-	provided	ODA	grant	Mitigation	Energy
Zambia	-	-	provided	ODA	grant	Mitigation	Energy
Regional Africa	18,396,011	26,280,016	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Forestry, Water
Subtotal	*33,976,090*	*48,537,271*					
Asia							
Bangladesh	10,233,607	14,619,438	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Water, WASH
China	-	-	provided	ODA	grant	Mitigation	Energy, Industry
Indonesia	2,585,988	3,694,268	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Water, Environment
Kyrgyz Republic	-	-	provided	ODA	grant	Mitigation	Agriculture
Mongolia	94,552	135,075	provided	ODA	grant	Cross-cutting	Energy, Environment
Myanmar	-	-	provided	ODA	grant	Mitigation	Environment
Pakistan	759,970	1,085,672	provided	ODA	grant	Mitigation	Energy
Philippines	-	-	provided	ODA	grant	Mitigation	Energy, Environment
Sri Lanka	-	-	provided	ODA	grant	Cross-cutting	Water, Waste
Viet Nam	789,915	1,128,450	provided	ODA	grant	Cross-cutting	Water, Environment
Regional Asia	1,746,000	2,494,286	provided	ODA	grant	Mitigation	Energy
Subtotal	*16,210,032*	*23,157,189*					
Latin America and the Caribbean							
Bolivia	2,635,312	3,764,731	provided	ODA	grant	Cross-cutting	Agriculture, Water, Environment
Brazil	83,742	119,631	provided	ODA	grant	Cross-cutting	Forestry, Environment
Colombia	2,226,822	3,181,175	provided	ODA	grant	Cross-cutting	Agriculture, Forestry, Environment
Guatemala	-	-	provided	ODA	grant	Cross-cutting	Water, Forestry, Environment
Peru	-	-	provided	ODA	grant	Mitigation	Forestry
Surinam	576,000	822,857	provided	ODA	grant	Cross-cutting	Forestry, Environment
Regional Latin America	1,275,355	1,821,935	provided	ODA	grant	Cross-cutting	Forestry, Water
Subtotal	*6,797,231*	*9,710,330*					

Region, country	Total amount		Status	Funding source	Financial instrument	Type of support	Sector
	Climate specific						
	Euros	USD					
TOTAL	**172,715,992**	246,737,131					

** Exchange rate Euro/ USD:* *1.43*

Table 6.6: Provision of public financial support: contribution through bilateral, regional and other channels in 2011

Region, country	Total amount		Status	Funding source	Financial instrument	Type of support	Sector
	Climate specific						
	Euros	USD					
Worldwide							
Adaptation	12,754,517	15,943,146	provided	ODA	grant	Adaptation	
Mitigation	89,484,508	111,855,635	provided	ODA	grant	Mitigation	
Subtotal	*102,239,025*	*127,798,782*					
Africa							
Burundi	-	-	provided	ODA	grant	Cross-cutting	Energy, Agriculture
Benin	27,680	34,600	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Water
Egypt	-	-	provided	ODA	grant	Mitigation	Water
Ethiopia	896,354	1,120,443	provided	ODA	grant	Cross-cutting	Agriculture, Forestry, Environment
Ghana	2,800,000	3,500,000	provided	ODA	grant	Cross-cutting	Agriculture, Forestry, Environment, WASH
Kenya	-	-	provided	ODA	grant	Cross-cutting	Biodiversity, Water
Morocco	-	-	provided	ODA	grant	Cross-cutting	Water
Mali	-	-	provided	ODA	grant	Cross-cutting	Energy, Environment
Mozambique	1,650,000	2,062,500	provided	ODA	grant	Cross-cutting	Energy
Senegal	4,400,000	5,500,000	provided	ODA	grant	Cross-cutting	Energy, Environment
South Africa	145,107	181,384	provided	ODA	grant	Mitigation	Energy
South Sudan	4,680	5,850	provided	ODA	grant	Cross-cutting	Water
Uganda	-	-	provided	ODA	grant	Mitigation	Energy
Zambia	1,193,500	1,491,875	provided	ODA	grant	Mitigation	Energy
Regional Africa	23,455,146	29,318,932	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Forestry, Water
Subtotal	*34,572,467*	*43,215,584*					

Asia							
Bangladesh	4,292,780	5,365,976	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Water, WASH
China	-	-	provided	ODA	grant	Mitigation	Energy, Industry
Indonesia	9,948,681	12,435,852	provided	ODA	grant	Cross-cutting	Energy, Agriculture, Water, Environment
Kyrgyz Republic	4,000	5,000	provided	ODA	grant	Mitigation	Agriculture
Mongolia	580,690	725,862	provided	ODA	grant	Cross-cutting	Energy, Environment
Myanmar	-	-	provided	ODA	grant	Mitigation	Environment
Pakistan	673,998	842,498	provided	ODA	grant	Mitigation	Energy
Philippines	-	-	provided	ODA	grant	Mitigation	Energy, Environment
Sri Lanka	1,000	1,250	provided	ODA	grant	Cross-cutting	Water, Waste
Viet Nam	1,615,897	2,019,871	provided	ODA	grant	Cross-cutting	Water, Environment
Regional Asia	10,247,500	12,809,375	provided	ODA	grant	Mitigation	Energy
Subtotal	*27,364,547*	*34,205,683*					
Latin America and the Caribbean							
Bolivia	2,813,160	3,516,450	provided	ODA	grant	Cross-cutting	Agriculture, Water, Environment
Brazil	39,238	49,047	provided	ODA	grant	Cross-cutting	Forestry, Environment
Colombia	1,012,747	1,265,934	provided	ODA	grant	Cross-cutting	Agriculture, Forestry, Environment
Guatemala	681,479	851,849	provided	ODA	grant	Cross-cutting	Water, Forestry, Environment
Peru	-	-	provided	ODA	grant	Mitigation	Forestry
Surinam	493,876	617,346	provided	ODA	grant	Cross-cutting	Forestry, Environment
Regional Latin America	867,497	1,084,371	provided	ODA	grant	Cross-cutting	Forestry, Water
Subtotal	*5,907,998*	*7,384,998*					
TOTAL	**170,084,037**	212,605,046					

** Exchange rate Euro/ USD: 1.25*

6.4. Provision of technology development and transfer support

The Netherlands promotes the transfer of technology through various channels, e.g. through:

- EU programmes and mechanisms;
- participation in IEA programmes;
- bilateral or multilateral programmes and schemes.

These include regional cooperation, cooperation with developing countries, and promotion of private sector involvement. Examples (non-exhaustive) are given below.

6.4.1. Actions to support institutions and frameworks for the development and transfer of technologies

- The EU's Environmental Technologies Action Plan (ETAP), succeeded by the Eco-innovation Action Plan (EcoAP) in 2011[33], helps to improve the development and wider use of eco-technologies, including climate-friendly technologies.
- The EU's emissions trading scheme (EU ETS)[34], launched in 2005, helps to improve development, deployment, and diffusion of a broad range of mitigation technologies. It is linked with CDM and JI markets, which are important mechanisms for technology transfer to developing countries and economies in transition.
- The Netherlands participates, for example, under the framework of official development assistance (ODA), in activities relating to human and institutional capacity building in a wide range of developing countries (see previous sections).

Actions to encourage effective participation by the private sector

- The EU ETS, linked to the CDM and JI markets, is designed specifically to provoke private sector actors to take action, including through the development and transfer of climate technologies.
- The Global Energy Efficiency and Renewable Energy Fund (GEEREF)[35] focuses on energy efficiency and renewable energy projects in developing countries and economies in transition.
- The Innovation Relay Centre (IRC)[36] network. This enables cooperation with organisations in third countries that, for example, result in technology transfer agreements with developing countries concerning energy and environment.

6.4.2. Actions to promote collaborative R&D and deployment of technologies for mitigation and adaptation

- Participation in the multi-annual EU Framework Programme for R&D.
- The European Energy Technology Platforms (ETPs)[37], set up to define common strategic research agendas at European level, which should mobilise a critical mass of national and European public and private resources. Examples of ETPs include solar PV, Biofuels, Zero-emission fossil fuel plants, Solar, Thermal, and Wind.
- Participation in international collaborative R&D partnerships on new energy technologies, operated as so-called Implementing Agreements under the International Energy Agency

[33] http://ec.europa.eu/environment/ecoap/index_en.htm
[34] http://ec.europa.eu/environment/climat/emission/index_en.htm
[35] http://geeref.com/
[36] http://www.innovationrelay.net/
[37] http://cordis.europa.eu/technology-platforms/home_en.html

(IEA). The Netherlands is involved in many of these agreements, e.g. for hybrid and electric vehicles, energy conservation in buildings, renewable energies, advanced fuel cells, bioenergy, clean coal sciences, demand-side management, district heating and cooling, hydrogen technologies, solar PV systems, solar heating, and wind energy.

- Bilateral or multilateral projects with developing countries. Examples include bilateral MOUs for cooperation in the field of environment and sustainable construction with China, various R&D cooperation projects between Dutch universities, knowledge institutions and partnerships, on a broad range of environmental issues (water, renewable energy, agriculture, etc.).
- The Energising Development (EnDev) programme is being financed by six donors, among which the Netherlands. The principal executor is the German GIZ, while AgNL provides its cooperation. The projects in the table are all financed by EnDev and involve only limited earmarking. Dutch funds are preferably channelled to Africa and Indonesia. DGIS contributes 72 million euros to the total basket of EnDev-phase 2 (approximately 38% of the total). Table 6.7 provides an overview of the projects.
- The Dutch contribution is funded from the 500 million euros of the PREP programme.
- At DGIS, DME is responsible for the PREP programme as well as for the EnDev contribution it provides.

Technology cooperation	Nature of agreement	Nature of cooperation	Financing and available budgets in EUR 1,000	Country involvement
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through small and pico-PV systems	12,064	Bangladesh
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves	4,000	Benin
Energising Development, access to modern energy services	Bilateral	Rural electrification through grid densification and pico-PV systems	7,160	Benin
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through grid densification, and small and pico-PV systems	9,400	Bolivia
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves	3,500	Burkina Faso
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through small and pico-PV systems	1,500	Burundi
Energising Development, access to modern energy services	Bilateral	Rural energy promotion via domestic biogas	2,000	Cambodia
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through hydro-power and small and pico-PV systems	9,900	Ethiopia

Technology cooperation	Nature of agreement	Nature of cooperation	Financing and available budgets in EUR 1,000	Country involvement
Energising Development, access to modern energy services	Bilateral	Promotion of grid-based productive use of electricity	1,650	Ghana
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through small and pico-PV systems and hydro-power	4,130	Honduras
Energising Development, access to modern energy services	Bilateral	Rural energy promotion via domestic biogas	1,150	Indonesia
Energising Development, access to modern energy services	Bilateral	Rural electrification through hydro-power and community PV grids	9,000	Indonesia
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through small and pico-PV systems	6,800	Kenya
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through small and pico-PV systems	990	Liberia
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves	300	Madagascar
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves	250	Malawi
Energising Development, access to modern energy services	Bilateral	Rural electrification through community PV grids	2,850	Mali
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through grid densification, hydro-power, and small and pico-PV systems	10,800	Mozambique
Energising Development, access to modern energy services	Bilateral	Rural electrification through grid densification and hydro power	4,740	Nepal
Energising Development, access to modern energy services	Bilateral	Rural electrification through hydro power and small PV systems	4,140	Nicaragua
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through grid densification, hydro-power, and small and pico-PV systems	11,350	Peru
Energising Development,	Bilateral	Rural electrification	12,490	Rwanda

Technology cooperation	Nature of agreement	Nature of cooperation	Financing and available budgets in EUR 1,000	Country involvement
access to modern energy services		through hydro-power and small and pico-PV systems		
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification community grid PV	8,500	Senegal
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through pico-PV systems	2,041	Tanzania
Energising Development, access to modern energy services	Bilateral	Promotion of improved biomass stoves and rural electrification through hydro-power and small and PV systems	6,000	Uganda
Energising Development, access to modern energy services	Bilateral	Rural energy promotion via domestic biogas	3,740	Vietnam

Table 6.7: Bilateral and multilateral projects with developing countries

Technology transfer may encompass both hardware (equipment) and software (know-how) on environmentally sound technologies. The Dutch support in relation to the transfer of technology is mostly in the form of support programmes relating to the private sector (encompassing hard and soft technologies). As of 2009, the Dutch support programme is called PSI (Private Sector Investment Programme) and is administered by EVD. PSI is a Dutch government programme that supports innovative investment projects in emerging markets in Africa, Asia, Central and Eastern Europe, and Latin America. A PSI project is an investment project, implemented by a Dutch (or foreign) company in cooperation with a local company, in one of the eligible developing countries. If this investment meets the criteria, it can be eligible for a PSI grant, which consists of a financial contribution to the costs of the investment. PSI consists of two components: PSI Regular applies to 45 countries in Africa, Asia, Central and Eastern Europe, and Latin America. The contribution for a project in one of these countries is 50% of the project budget, to a maximum contribution of € 750,000. The contribution under PSI Plus amounts to 60% of the project budget, up to a maximum contribution of € 900,000. For both components, the maximum project budget is €1.5 million.

An example of PSI is the establishment of the solar panel production facility of Ubbink East Africa in Kenya. This project is highly innovative. Before the project, there was no production of solar modules in East Africa and all systems were imported. The project involves a high element of technology transfer and training and will benefit urban and rural households. It contributes to policy changes to towards a more favourable investment climate for local producers of solar energy applications, and a further deepening of the solar system producer and consumer market. Since the start of the project, the production plant has been set up successfully, the production has been ISO certified, and Ubbink has further increased its range to include larger panels up to 220 Watts.

The tables below present selected projects or programmes that promote practicable steps to facilitate and/or finance the transfer of, or access to, environmentally sound technologies.

Project / Programme title:			
Promoting Renewable Energy Programme (PREP)			
Purpose:			
To enable developing countries to develop and implement policies supporting renewable energy with a focus on poverty reduction.			
Recipient country:	**Sector:**	**Total funding:**	**Years in operation**
African countries Indonesia	Energy	€500 million	2008-2014
Description:			
The following lines of action are taken in order to achieve the objective: 1. Direct investments in renewable energy installations; 2. Ensuring the sustainability of biomass production for energy purposes; 3. Influencing policy of important actors in the field of energy; 4. Capacity development in the field of renewable energy.			
Indicate factor which led to project's success:			
So far, political commitment by the Dutch government has been the main driver for the start-up of this programme. Implementation has just started.			
Technology transferred:			
Renewable energy technology.			
Impact on greenhouse gas emissions:			
Positive.			

Table 6.8 PREP Programme

Project / Programme title:			
Access to Energy Fund (AEF), FMO (Finance for Development)			
Purpose:			
Promoting renewable energy.			
Recipient country:	**Sector:**	**Total funding:**	**Years in operation**
FMO is targeting at least 75% of the total AEF capital for Sub-Saharan Africa and/or Least Developed Countries and a maximum of 25% in other emerging markets.	Energy	€100 million	2006-2017
Description:			
The AEF is a vehicle initiated by the Dutch government and FMO to make it possible to fund private sector projects that create sustainable access to energy services.			
Indicate factor which led to project's success:			
Providing financial leverage for renewable energy projects. The AEF can provide equity financing up to an amount that is the lesser of €10 million or 75% of a total transaction amount. Subordinated debt/senior loans can be made in the amounts of the lesser of €20 million or 75% of total transaction. The fund can offer longer grace periods and longer tenors often necessary to get such projects off the ground. The AEF can also play a role in the development of new projects by providing grants.			
Technology transferred:			
By providing financing for projects involved in the generation, transmission or distribution of energy, the Fund hopes to ultimately connect 2.1 million people in developing countries by 2015.			
Impact on greenhouse gas emissions:			
Positive.			

Table 6.9 AEF/FMO

Project / Programme title: Asia Biogas Programme			
Purpose: Introduction of renewable energy and alleviating poverty			
Recipient country:	**Sector:**	**Total funding:**	**Years in operation**
Vietnam, Bangladesh, Cambodia, Lao PDR	Energy	€12.9	2005-2013
Description: Introduction of biogas technology for cooking and heating at household level.			
Indicate factor which led to project's success: Strong integral approach of technology transfer, capacity building and awareness and institutional support.			
Technology transferred: By the end of 2012, more than 500,000 households worldwide have been equipped with biogas plants, supported by SNV (of which 182,781 in the four countries of the Asia biogas programme).			
Impact on greenhouse gas emissions: Positive.			

Table 6.10 Asia Biogas Programme

Project / Programme title: Africa Biogas Partnership Programme			
Purpose: Introduction of renewable energy and alleviating poverty			
Recipient country:	**Sector:**	**Total funding:**	**Years in operation**
Burkina Faso, Ethiopia, Tanzania, Uganda, and Kenya	Energy	€29.9 million	2008-2013
Description: Introduction of biogas technology for cooking and heating in 70,000 households.			
Indicate factor which led to project's success: Strong integral approach of technology transfer, capacity building and awareness and institutional support.			
Technology transferred: In cooperation with Hivos, SNV's biogas activities have been expanded to include Africa. The Partnership aims to install 70,000 biogas systems in five African countries. By 2013, the programme has reached 35,000 installed domestic biogas systems. During the period 2009-2012, expenditures totalled €21 million euros.			
Impact on greenhouse gas emissions: Positive.			

Table 6.11 Africa Biogas Partnership Programme

As of 2011, the Netherlands will support the 'Disaster Risk Reduction and Climate Change Adaptation Alliance', a co-operation that includes the Red Cross, Wetlands International, CARE, and Cordaid (€40 million in total, of which 10% is currently allocated to climate change). In addition, in the programme of the Ecosystem Alliance of IUCN, BothEnds, and Wetlands International (€39 million), climate change formed an integral part of the design and implementation (currently set at a conservative 40% allocation). The programme aims to improve rural livelihoods and ecosystem management and integrates adaptation to climate change.

Project / Programme title: Disaster Risk Reduction and Climate Change Adaptation Alliance			
Purpose: Adapt to climate changes and reduce disaster risks.			
Recipient country:	**Sector:**	**Total funding:**	**Years in operation**
37 countries	General Environmental Protection	€1.26 million	2005-2009
Description: The overall objective of the Alliance 'partners for resilience' is to reduce the impact of natural hazards on vulnerable communities.			
Indicate factor which led to project's success: Strong and capable network, building on the experience of the Red Cross/Red Crescent Climate Centre and the expertise of Wetlands International, Cordaid, and CARE.			
Technology transferred: The Climate Centre already supports national unions in 37 developing countries to analyse risks and implications of climate change and to develop enhanced disaster management plans. The network of the Alliance focuses on Ethiopia, Kenya, Mali, Uganda in Africa; Guatemala and Nicaragua in Latin America; and Indonesia, India, and the Philippines in Asia. the Alliance will help 750,000 to 1,000,000 vulnerable community members to strengthen their resilience and consequently, sustain their development.			
Impact on greenhouse gas emissions: None.			

Table 6.12 Preparedness for Climate Change programme

6.4.3. Technology transfer and international cooperation through flexible mechanisms

During the period 1992-1997, the Netherlands participated in the Activities Implemented Jointly (AIJ) pilot phase, where a variety of project types were implemented covering different mitigation technologies. These projects were hosted by Annex-I, as well as by non-Annex-I countries, and have contributed to both the development of CDM and JI programmes and technology transfer. Since the introduction of AIJ in 1995, the Netherlands has funded 25 AIJ projects in 14 countries. All projects involved a transfer of environmentally friendly technology and know-how.

The Netherlands then became involved in technology transfer via CDM and JI. In the years 2002 and 2003, framework contracts have been signed with the Rabobank, the International Finance Corporation (IFC), the International Bank for Reconstruction and Development (IBRD), the European Bank for Reconstruction and Development (EBRD), and the regional development bank for the Andes (CAF) to purchase carbon credits from CDM- and JI-projects in the period 2002-2009, with delivery of these carbon credits in the period 2006-2013. CDM- and JI-projects have stimulated the transfer and deployment of technologies in these projects, for example on high-efficiency power plants, cogeneration, renewable energy, harnessing of landfill waste gases, etc.

In addition to the mechanisms, in 2009, the Netherlands purchased carbon credits via International Emissions Trading, in particular via Green Investment Schemes (GIS). The profits from the sale of these carbon credits have been used to finance environmental and sustainable activities in Latvia, which contributed and is currently still contributing to a lower GHG economy in the long term.

6.4.4. Technology transfer for adaptation

For the Netherlands, some essential lessons learned in relation to technologies for adaptation include the need to build a solid knowledge base and the need for a more cross-sectoral and more integrated approach. Some of the barriers consist of the lack of supportive policies, cost/benefit analyses, and the

non-availability of local/regional climate data. Furthermore, from the outcomes of activities completed under the Nairobi Work Programme, a number of gaps in present knowledge and evidence for best practise have been identified. Technologies for adaptation include 'hard' technologies, such as drought-resistant crop varieties, seawalls, and irrigation technologies, or 'soft' technologies, such as crop rotation patterns. Many technologies have both hard and soft characteristics, and a successful adaptation action would typically combine the two. There is also a continuing need to build better human capacity/skills for implementing and developing technologies in relation to understanding climate information and predictions (spatial analysis skills, satellite imagery etc.). Some examples of climate adaptation/technologies-related foreign support are:

- *Catalysing Acceleration of Agricultural Intensification for Stability and Sustainability.* In Rwanda, the Netherlands is providing assistance through the Strategic Alliance for Agricultural Development in Africa (SAADA). As part of the CATALIST project, the University of Wageningen is implementing a research project on the Nile delta's vulnerability to climate change, and assessing the options for economic sectors and water management strategies and relevant technologies.
- *Consultative Group International Agricultural Research (CGIAR).* The priorities of CGIAR research are reducing hunger and malnutrition by producing more and better food through genetic improvement, sustaining agriculture biodiversity, both *in situ* and *ex situ*, promoting opportunities for economic development and through agricultural diversification and high-value commodities and products, ensuring sustainable management and conservation of water, land and forests and improving policies and facilitating institutional innovation.
- *Climate Monitoring for Africa.* This yields data that are essential for the description of the climate, detection of climate change, improvements of climate models, and development of climate scenarios, both on global and regional scales, and for adaptation measures. The ongoing work will be capacity building for the climate monitoring in Africa.

6.5. Provision of capacity building support

Capacity building of local partners in non-Annex I countries forms an integral part of almost all worldwide, regional and bilateral programmes. More information on capacity building can be found in the 6th National Communication. As described in the programmes throughout chapter 7 of this National Communication, capacity building and institutional strengthening is an important element of Dutch programmes. Further examples are given in Chapter 6 of the NC (e.g. on cooperation and capacity building with developing countries for water management) and Chapter 8 (cooperation in research and development). Some examples are follows.

Sustainable forest management and agriculture are important themes for climate adaptation. Besides support to developing countries on mitigation and adaptation, an additional effort is also made in relation to preventing deforestation. For capacity building activities related to forest and agriculture in the period 2009-2012 financial contributions were of €24.8 and €26.3 million. More details are presented in Table 7.8 of the NC.

Various Dutch universities and institutes offer training and other professional education programmes for foreign students and professionals in climate change, mitigation, and adaptation-related topics. In addition, universities offer MSc degrees for foreign students e.g. in sustainable energy technology or environmental sciences. Section 9.7 of the NC holds examples for foreign students and professionals include e.g. postgraduate courses and training in the field of water management, flood risk management, energy management, and cleaner energy, climate change adaptation in agriculture, and natural resources management.
Not only in developing countries but also with economies in transition, capacity-building actions are implemented, for example, through so-called G2G[38] projects with Croatia (on ETS), Romania (on inventories and projections), Turkey (on Long-Term Agreements with industry) etc.

[38] http://www.senternovem.nl/KEI/31_projecten/index.asp (in Dutch only)

REFERENCES

Chapter 1

[3] http://ec.europa.eu/clima/policies/g-gas/documentation_en.htm#national_communications

Chapter 2

[6] www.nlagency.nl/nie

Chapter 3

[10] http://ec.europa.eu/clima/policies/g-gas/documentation_en.htm#national_communications

Chapter 4

[12] www.energieakkoordser.nl/~/media/files/energieakkoord/overzicht-belangrijkste-maatregelen-energieakkoord.ashx
[13] www.pbl.nl/sites/default/files/cms/publicaties/pbl-2013-uitgangspunten-referentiepad-evaluatie-SER-energieakkoord-1214.pdf
[14] www.hetnieuwerijden.nl
[15] www.rijksoverheid.nl,

Chapter 5

[17] www.rivm.nl/bibliotheek/digitaaldepot/E10004.pdf
[18] www.ecn.nl/docs/library/report/2012/e12039.pdf
[19] www.rijksoverheid.nl/documenten-en-publicaties/kamerstukken/2012/05/25/voorjaarsnota-2012.html
[20] www.energieakkoordser.nl/~/media/files/energieakkoord/overzicht-belangrijkste-maatregelen-energieakkoord.ashx
[21] www.pbl.nl/sites/default/files/cms/publicaties/pbl-2013-uitgangspunten-referentiepad-evaluatie-SER-energieakkoord-1214.pdf
[23] www.wbcsdcement.org/pdf/tf1/Table_of_contents.pdf
[24] www.pbl.nl/publicaties/nederland-voldoet-aan-de-kyoto-verplichting-uitstoot-broeikasgassen
[26] http://www.iioa.org/conferences/intermediate-2004/pdf/wilting.pdf
[27] http://www.google.nl/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CDEQFjAA&url=http%3A%2F%2Fwww.cpb.nl%2Fsites%2Fdefault%2Ffiles%2Fpublicaties%2Fdownload%2Fworldscan-model-international-economic-policy-analysis.pdf&ei=8e-
[28] www.ecn.nl/docs/library/report/1995/95005.pdf
[29] www.ecn.nl/publicaties/author/41901
[30] www.ecn.nl/publicaties/author/41901
[31] www.ecn.nl/publicaties/author/41901

Chapter 6

[33] http://ec.europa.eu/environment/ecoap/index_en.htm
[34] http://ec.europa.eu/environment/climat/emission/index_en.htm
[35] http://geeref.com/
[36] http://www.innovationrelay.net/
[37] http://cordis.europa.eu/technology-platforms/home_en.html
[38] http://www.senternovem.nl/KEI/31_projecten/index.asp (in Dutch only)

GLOSSARY

CHEMICAL COMPOUNDS

C_2F_6	Perfluoroethane (hexafluoroethane)
CF_4	Perfluoromethane (tetrafluoromethane)
CFCs	Chlorofluorocarbons
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2-eq.	Carbon dioxide equivalent (in this report using a GWP-100)
CTC	Carbon tetrachloride (tetrachloromethane)
FICs	Fluoroiodocarbons
HFCs	Hydrofluorocarbons
HCFCs	Hydrochlorofluorocarbons
MCF	Methyl Chloroform (1,1,1-Trichloroethane)
NMVOC	Non-Methane Volatile Organic Compounds
N_2O	Nitrous oxide
NOx	Nitrogen oxide (NO and NO_2), expressed as NO_2
PFCs	Perfluorocarbons
SF_6	Sulphur hexafluoride
SO_2	Sulphur dioxide
VOC	Volatile Organic Compounds (may include or exclude methane)

UNITS

Gg	Giga gramme (10^9 gramme)
GJ	Giga Joule (10^9 Joule)
ha	hectare
kton	kilo ton (= 1,000 metric ton = 1 Gg)
kW	kilo Watt (1000 Watt)
mld	1,000 million
mln	million
Mton	Mega ton (= 1,000,000 metric ton = 1 Tg)
MWe	Mega Watt electricity (10^6 Watt)
Nm^3	Normal cubic metre (volume of gas at 10^5 Pa and 20^{o}C)
Pg	Peta gramme (10^{15} gramme)
PJ	Peta Joule (10^{15} Joule)
TJ	Tera Joule (10^{12} Joule)
Tg	Tera gramme (10^{12} gramme)
US$	US Dollar
€	Euro

ABBREVIATONS

A

AAU	Assigned Amount Units
Argo	Array for Real-time Geostrophic Oceanography
AIJ	Activities Implemented Jointly
ALW	Earth and Life Sciences; NWO research theme
ARK	Adaptatie Ruimte en Klimaat (National Programme for Spatial Adaptation to Climate Change)
ASTAE	Asia Sustainable Technology and Alternative Energy
AVV	Adviesdienst Verkeer en Vervoer (Transport Research Centre)

B

BLOW	Intergovernmental Netherlands wind energy agreement
BEES(/A)	Order governing combustion plants emission requirements (Besluit Emissie-Eisen Stookinstallaties)
BSIK	Subsidy scheme for the knowledge infrastructure (Besluit Subsidies Investeringen Kennisinfrastructuur)

C

CAF	Regional Development Bank for the Andes
CBS	Netherlands Statistics (Centraal Bureau voor de Statistiek)
CCPM	Common and Coordinated Policies and Measures (of EU)
CD4CDM	Capacity Development for the Clean Development Mechanism
CDM	Clean Development Mechanism
CER	Certified Emission Reductions Unit
CERUPT	Certified Emission Reduction Unit Procurement Tender
CESAR	Cabauw Experimental Site for Atmospheric Research
CHP	Combined Heat and Power (Cogeneration)
CoP	Conference of the Parties (to the Climate Change Convention)
CPB	Central Planning Bureau
CRF	Common Reporting Format
CROW	Information and Technology Platform for Transport, Infrastructure and Public Space

D

DECC	UK Department of Energy and Climate Change
DES	Data Exchange Standards
DGIS	Directoraat-Generaal Internationale Samenwerking (Development Cooperation)

E

EC	European Commission/European Community
ECA&D	European Climate Programme and Dataset
ECN	Netherlands Energy Research Centre (Energie Centrum Nederland)
EDF	European Development Fund
EDGAR	Emission Database for Global Atmospheric Research
EHS	National Ecological Network (Ecologische Hoofdstructuur)
EIA	Energie Investerings Aftrek (Energy investment Allowance)
EINP	Energy Investeringsaftrek Non-Profit Organisaties (Energy investment tax deduction for non-profit sectors)
ENINA	Task Force on Energy, Industry and Waste Management
EPA	Energie Prestatie Advies (Energy performance advice)
EPA	Environmental Protection Act
EPBD	Energy Performance of Buildings Directive
EPC	Energy performance coefficient

EPN	Energy performance Standard (Energie Prestatie Norm)
EPR	Energie Premie Regeling (Energy premium rebate)
ER	Emissions Registration
ER	European Renaissance scenario
ERU	Emission Reduction Unit
ESA	European Space Agency
ESF	European Science Foundation
ESFRI	European Strategy Forum for Research Infrastructures
ESMAP	Energy Sector Management Assistance Programme
ETP	Energy Technology Platform
EU	European Union
EU-ETS	European Union Greenhouse Gas Emission Trading System
EUMETNET	European Organisation for the Exploitation of Meteorological Network
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
EZ	Ministry of Economic Affairs (Ministerie van Economische Zaken)

F

F-gases	Fluorinated greenhouse gases (HFCs, PFCs, SF_6)
FAO	Food and Agriculture Organisation of the United Nations
FCPF	The Forest Carbon Partnership Facility
FINESSE	Financing Energy Services for Small Scale Energy Users
FLUXNET	Global Terrestrial Network – Carbon
FP	Framework Programme (EU research fund)
FTP	File Transfer Protocol

G

GCOS	Global Climate Observing System
GDP	Gross Domestic Product
GE	Global Economy (scenario)
GEF	Global Environmental Facility
GGD	National Health Authority (Gemeentelijke Gezondheidsdiensten)
GHG	GreenHouse Gas
GIS	Green Investment Schemes
GNI	Gross National Income
GOME	Global Ozone Monitoring Experiment
GOOS	Global Ocean Observing System
GPS	Global Positioning System
GRETA	Cooperation scheme that developed the Greenhouse Gas Registry for Emissions Trading Arrangements
GSN	GCOS Surface Network
GTN-G	Global Terrestrial Network - Glaciers
GTN-P	Global Terrestrial Network - Permafrost
GTOS	Global Terrestrial Observing System
GUAN	GCOS Upper Air Network
GWP	Global Warming Potential

H

HDD	Heat Degree Day
HYDE	Hundred Year Database of the Environment

I

IBRD	International Bank for Reconstruction and Development
ICAO	International Civil Aviation Organisation
ICSU	International Council for Science
IEA	International Energy Agency

I&M	Ministry of Infrastructure and the Environment (Ministerie van Infrastructuur en Milieu)
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IGBP	International Geosphere-Biosphere Programme
IGOS	Integrated Global Observing Strategy
IHDP	International Human Dimensions Programme (of Global Environmental Change)
IMAU	Institute for Marine and Atmospheric Research
IMO	International Maritime Organisation
IOC	Intergovernmental Oceanographic Commission of UNESCO
IPCC	Intergovernmental Panel on Climate Change
IPO	Association of Provincial Authorities (Interprovinciaal overleg)
ITL	Independent Transaction Log

J

JI	Joint Implementation

K

KADO	Cabinet's Approach to Sustainable Development (Kabinetsbrede aanpak Duurzame Ontwikkeling)
KPI	Key Performance Indicator
KNAW	Royal Netherlands' Academy of Arts and Sciences
KNMI	Royal Netherlands Meteorological Institute (Koninklijk Nederlands Meteorologisch Instituut)
KvK	Knowledge for Climate (Kennis voor Klimaat)
KvR	Climate Changes Spatial Planning (Klimaat voor Ruimte)

L

LTA's	Long Term Agreements
LDC	Least Developed Countries
LDCF	Least Developed Countries Fund
LEI	Agricultural Economics Institute (Landbouw Economisch Instituut)
LPG	Liquefied Petroleum Gas
LTA	Long-Term Agreement
LULUCF	Land-use, Land-Use Change and Forestry

M

MATRA	Social Transformation Eastern Europe Programme
MDG	Millenium Development Goal
MEPC	(IMO) Marine Environment Protection Committee
MFS	Co-financing System
MIA-Water	Maatschappelijke Innovatie Agenda Water
MILIEV	Milieu en Economische Verzelfstandiging (ORET MILIEV is a development and environment related export transactions programme)
MJA	Long Term Agreement (LTA) (Meerjaren afspraak)
MJV	Annual Environmental Report (Milieujaarverslag)
MPE	Environmental Quality of Electricity Production (Milieukwaliteit Elektriciteits-productie)

N

NASA	National Aeronautics and Space Administration
NBW	Nationaal Bestuursakkoord Water
NC	National Communication
NCAP	Netherlands Climate Assistance Programme

NCCSAP	Netherlands Climate Change Studies Assistance Program
NCPIP	National Climate Policy Implementation Plan
NEa	Dutch Emissions Authority (Nederlandse Emissie Autoriteit)
NEPP	National Environmental Policy Plan
NGO	Non-Governmental Organisation
NIE	National Inventory Entity (Single National Entity under Kyoto Protocol)
NIOZ	Netherlands Institute for Sea Research
NIR	National Inventory Report
NMP	National Environmental Policy Plan
NMVOC	Non-Methane Volatile Organic Compounds
NRP-CC	National Research Programme on Climate Change
NWO	Netherlands Organisation for Scientific Research (Nederlandse Organisatie voor Wetenschappelijk Onderzoek)
NWP	Nairobi Work Programme

O

OCW	Ministry of Education, Arts and Science
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OMI	Ozone Monitoring Instrument
ORET	Programma Ontwikkelingsrevelante Export Transacties (Development-Related Export Transactions). Predecessor of ORIO (see below)
ORIO	Facility for Infrastructure Development (Ontwikkelingsrelevante Infrastructuur-ontwikkeling)

P

PfCC	Preparedness for Climate Change
PREP	Promoting Renewable Energy Programme
PSO	Programme of Eastern European cooperation
PSOM	Programme for Stimulation of Upcoming Markets
PV	Photovoltaic

Q

QA	Quality Assurance
QC	Quality Control
QUELRC	Quantified Emission Limitation and Reduction Commitment

R

REDD	Reducing Emissions from Deforestation and Forest Degradation
RIVM	National Institute of Public Health and the Environment (Rijksinstituut voor Volksgezondheid en Milieu)
ROB	Reduction Programme for non-CO_2 greenhouse gases (Reductieprogramma Overige Broeikasgassen)
R&D	Research & Development
RMNO	Advisory Council for Research on Spatial Planning, Nature and the Environment
RMU	Removal Units

S

SAF	Satellite Application Facilities
SBI	Subsidary Body for Implementation
SCCF	Special Climate Change Fund
SCER	Steering Committee for the Emissions Registrations project
SCIAMACHY	Scanning Imaging Absorption Spectrometer for Atmospheric Cartography
SDE	Stimulation of Sustainable Energy Production (Stimulering Duurzame Energieproductie)

SE	Strong Europe (scenario)
SLOK	Stimulating Local Climate Initiatives (Stimulering Lokale en Regionale Klimaatinitiatieven)
SNV	Netherlands Development Organisation
SMEC	Second Memorandum on Energy Conservation
SOOP	Ship of Opportunity Programme
SRON	Space Research Organisation Netherlands

T

TNO	Netherlands Organisation for Applied Scientific Research
TMF	Thematic Co-Financing

U

UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
URC	UNEP Risø Centre
UU-IMAU	Utrecht University-Institute for Marine and Atmospheric Research
UvW	Dutch Association of Regional Water Authorities (Unie van Waterschappen)

V

VAMIL	Arbitrary Depreciation of Environmental Investments
VER	Verified Emission Reductions
VNG	Vereniging Nederlandse Gemeenten (Association of Netherlands Municipalities)
VOS	Volunteer Observing Ship
VROM	(Ministry of Housing, Spatial Planning and the Environment (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer):in 2010 a merger took place with the Ministry of V&W. The new name is: Ministry of Infrastructure and the Environment (IenM)

W

WCRP	World Climate Research Programme
WFD	Water Framework Directive
WHO	World Health Organization
WMO	World Meteorological Organisation
WUR	Wageningen University and Research centre
WWF	World Wildlife Fund
WWW	World Weather Watch of WMO

ANNEX I Summary tables on emission trends

GREENHOUSE GAS SOURCE AND SINK CATEGORIES (CO_2)	Base year (Gg)	1990 (Gg)	1995 (Gg)	2000 (Gg)	2005 (Gg)	2010 (Gg)	2011 (Gg)
1. Energy	**151.037,75**	**151.037,75**	**162.557,87**	**162.397,68**	**168.728,37**	**174.753,77**	**160.850,98**
A. Fuel Combustion (Sectoral Approach)	149.860,15	149.860,15	161.599,50	161.708,72	167.055,53	172.758,96	159.313,54
1. Energy Industries	52.501,43	52.501,43	61.416,34	63.629,75	67.312,52	66.236,95	62.061,15
2. Manufacturing Industries and Construction	33.008,39	33.008,39	28.840,37	27.344,92	27.405,89	27.226,98	25.744,29
3. Transport	25.993,57	25.993,57	29.166,05	32.395,25	34.639,76	34.662,49	34.900,18
4. Other Sectors	37.791,04	37.791,04	41.664,63	37.755,60	37.322,06	44.305,46	36.253,25
5. Other	565,72	565,72	512,10	583,19	375,30	327,09	354,67
B. Fugitive Emissions from Fuels	1.177,60	1.177,60	958,36	688,96	1.672,84	1.994,80	1.537,44
1. Solid Fuels	402,67	402,67	516,87	421,71	598,54	972,43	637,15
2. Oil and Natural Gas	774,93	774,93	441,49	267,24	1.074,30	1.022,37	900,30
2. Industrial Processes	**7.881,69**	**7.881,69**	**7.937,88**	**7.353,89**	**7.050,10**	**6.472,11**	**6.576,50**
A. Mineral Products	1.171,53	1.171,53	1.732,89	1.410,71	1.446,82	1.253,72	1.295,31
B. Chemical Industry	3.744,48	3.744,48	4.005,66	4.076,89	3.745,83	3.881,70	3.408,51
C. Metal Production	2.661,20	2.661,20	1.908,06	1.519,38	1.476,39	997,54	1.547,97
D. Other Production	72,48	72,48	22,37	48,97	33,45	29,07	18,83
E. Production of Halocarbons and SF_6							
F. Consumption of Halocarbons and SF_6							
G. Other	232,00	232,00	268,91	297,94	347,59	310,08	305,89
3. Solvent and Other Product Use	316,44	316,44	242,29	169,28	134,80	154,53	122,56
4. Agriculture							
A. Enteric Fermentation							
B. Manure Management							
C. Rice Cultivation							
D. Agricultural Soils							
E. Prescribed Burning of Savannas							
F. Field Burning of Agricultural Residues							
G. Other							
5. Land Use, Land-Use Change and Forestry[(2)]	**2.999,07**	**2.999,07**	**2.850,22**	**2.924,60**	**3.013,54**	**2.991,77**	**3.265,12**
A. Forest Land	-2.350,44	-2.350,44	-2.493,53	-2.477,85	-2.567,09	-2.685,33	-2.433,87
B. Cropland	122,34	122,34	126,26	129,19	160,81	164,06	164,70
C. Grassland	4.484,94	4.484,94	4.529,62	4.563,16	4.431,04	4.473,92	4.482,37
D. Wetlands	80,46	80,46	85,02	88,45	125,64	131,18	134,85
E. Settlements	458,61	458,61	482,59	500,43	763,17	807,80	816,60
F. Other Land	20,00	20,00	22,06	23,61	25,23	26,82	27,13
G. Other	183,15	183,15	98,20	97,62	74,74	73,32	73,32
6. Waste	**IE,NA,NO**	**IE,NA,NO**	**IE,NA,NO**	**IE,NA,NO**	**IE,NA,NO**	**IE,NA,NO**	**IE,NA,NO**
A. Solid Waste Disposal on Land	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
B. Waste-water Handling							
C. Waste Incineration	IE	IE	IE	IE	IE	IE	IE
D. Other	NA	NA	NA	NA	NA	NA	NA
7. Other *(as specified in Summary 1.A)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Total CO_2 emissions including net CO_2 from LULUCF	**162.234,95**	**162.234,95**	**173.588,26**	**172.845,45**	**178.926,81**	**184.372,18**	**170.815,16**
Total CO_2 emissions excluding net CO_2 from LULUCF	**159.235,89**	**159.235,89**	**170.738,03**	**169.920,85**	**175.913,27**	**181.380,41**	**167.550,04**
Memo Items:							
International Bunkers	**38.897,84**	**38.897,84**	**42.982,73**	**52.431,45**	**64.988,72**	**53.354,55**	**58.665,16**
Aviation	4.540,46	4.540,46	7.584,14	9.749,35	10.875,58	10.168,31	10.447,85
Marine	34.357,38	34.357,38	35.398,58	42.682,10	54.113,14	43.186,24	48.217,31
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass	4.001,86	4.001,86	4.541,99	6.207,01	8.898,28	12.679,64	13.059,05

Table 1.1 Emission Trends CO_2 (In Gg)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES (CH_4)	Base year (Gg)	1990 (Gg)	1995 (Gg)	2000 (Gg)	2005 (Gg)	2010 (Gg)	2011 (Gg)
1. Energy	114,67	114,67	123,79	83,13	80,97	118,67	115,00
A. Fuel Combustion (Sectoral Approach)	34,84	34,84	44,30	43,49	43,75	83,23	78,08
1. Energy Industries	2,78	2,78	3,82	4,39	5,97	5,45	5,03
2. Manufacturing Industries and Construction	2,76	2,76	2,74	3,03	2,64	2,62	2,51
3. Transport	7,56	7,56	5,56	3,64	2,67	2,21	2,19
4. Other Sectors	21,68	21,68	32,13	32,37	32,44	72,92	68,32
5. Other	0,05	0,05	0,05	0,06	0,04	0,03	0,03
B. Fugitive Emissions from Fuels	79,83	79,83	79,49	39,64	37,21	35,44	36,92
1. Solid Fuels	1,59	1,59	1,60	1,06	1,12	1,01	0,99
2. Oil and Natural Gas	78,24	78,24	77,89	38,58	36,09	34,43	35,93
2. Industrial Processes	**14,14**	**14,14**	**14,14**	**14,19**	**14,84**	**13,85**	**13,40**
A. Mineral Products	NO	NO	NO	NO	NO	NO	NO
B. Chemical Industry	12,13	12,13	12,13	12,33	13,07	12,15	11,71
C. Metal Production	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO
D. Other Production							
E. Production of Halocarbons and SF_6							
F. Consumption of Halocarbons and SF_6							
G. Other	2,01	2,01	2,01	1,86	1,77	1,69	1,69
3. Solvent and Other Product Use							
4. Agriculture	**509,80**	**509,80**	**505,82**	**451,26**	**429,61**	**454,54**	**437,06**
A. Enteric Fermentation	364,44	364,44	353,99	313,33	303,56	316,65	311,66
B. Manure Management	145,36	145,36	151,83	137,93	126,05	137,89	125,41
C. Rice Cultivation	NO	NO	NO	NO	NO	NO	NO
D. Agricultural Soils	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NE,NO	NA
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO
G. Other	NA	NA	NA	NA	NA	NA	NA
5. Land Use, Land-Use Change and Forestry	**0,03**	**0,03**	**0,03**	**0,03**	**0,03**	**0,03**	**0,04**
A. Forest Land	0,03	0,03	0,03	0,03	0,03	0,03	0,04
B. Cropland	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE
C. Grassland	NE	NE	NE	NE	NE	NE	NE
D. Wetlands	NE	NE	NE	NE	NE	NE	NE
E. Settlements	NE	NE	NE	NE	NE	NE	NE
F. Other Land	NE	NE	NE	NE	NE	NE	NE
G. Other	NE	NE	NE	NE	NE	NE	NE
6. Waste	**585,80**	**585,80**	**514,99**	**399,90**	**241,28**	**171,81**	**161,27**
A. Solid Waste Disposal on Land	571,95	571,95	500,08	385,73	228,03	161,13	150,77
B. Waste-water Handling	13,79	13,79	11,48	10,50	10,03	9,70	9,48
C. Waste Incineration	IE	IE	IE	IE	IE	IE	IE
D. Other	0,06	0,06	3,43	3,67	3,23	0,97	1,02
7. Other *(as specified in Summary 1.A)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Total CH_4 emissions including CH_4 from LULUCF	**1.224,43**	**1.224,43**	**1.158,77**	**948,52**	**766,73**	**758,90**	**726,77**
Total CH_4 emissions excluding CH_4 from LULUCF	**1.224,40**	**1.224,40**	**1.158,74**	**948,49**	**766,70**	**758,86**	**726,74**
Memo Items:							
International Bunkers	1,06	1,06	1,24	1,48	1,76	1,45	1,60
Aviation	0,22	0,22	0,36	0,46	0,52	0,48	0,50
Marine	0,84	0,84	0,88	1,02	1,25	0,96	1,10
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass							

Table 1.2 Emission trends CH4 (in Gg)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES (N_2O)	Base year	1990	1995	2000	2005	2010	2011
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
1. Energy	**1,06**	**1,06**	**1,63**	**1,79**	**1,85**	**1,97**	**1,96**
A. Fuel Combustion (Sectoral Approach)	1,06	1,06	1,63	1,79	1,85	1,97	1,96
1. Energy Industries	0,45	0,45	0,54	0,63	0,78	0,84	0,83
2. Manufacturing Industries and Construction	0,10	0,10	0,08	0,07	0,07	0,10	0,09
3. Transport	0,33	0,33	0,84	0,93	0,84	0,86	0,88
4. Other Sectors	0,14	0,14	0,14	0,13	0,13	0,15	0,13
5. Other	0,03	0,03	0,03	0,03	0,02	0,02	0,02
B. Fugitive Emissions from Fuels	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO
1. Solid Fuels	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO	NA,NO
2. Oil and Natural Gas	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO	IE,NA,NO
2. Industrial Processes	**22,90**	**22,90**	**22,86**	**22,07**	**20,56**	**3,21**	**3,63**
A. Mineral Products	NO	NO	NO	NO	NO	NO	NO
B. Chemical Industry	22,89	22,89	22,85	22,04	20,53	3,17	3,59
C. Metal Production	NO	NO	NO	NO	NO	NO	NO
D. Other Production							
E. Production of Halocarbons and SF_6							
F. Consumption of Halocarbons and SF_6							
G. Other	0,01	0,01	0,02	0,03	0,03	0,04	0,04
3. Solvent and Other Product Use	0,73	0,73	0,64	0,44	0,25	0,09	0,10
4. Agriculture	**38,23**	**38,23**	**37,41**	**30,24**	**25,58**	**22,88**	**22,10**
A. Enteric Fermentation							
B. Manure Management	3,81	3,81	3,76	3,26	2,97	3,24	3,39
C. Rice Cultivation							
D. Agricultural Soils	34,42	34,42	33,65	26,98	22,61	19,64	18,70
E. Prescribed Burning of Savannas	NO	NO	NO	NO	NO	NO	NO
F. Field Burning of Agricultural Residues	NO	NO	NO	NO	NO	NO	NO
G. Other	NA	NA	NA	NA	NA	NA	NA
5. Land Use, Land-Use Change and Forestry	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
A. Forest Land	0,00	0,00	0,00	0,00	0,00	0,00	0,00
B. Cropland	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE	NA,NE
C. Grassland	NE	NE	NE	NE	NE	NE	NE
D. Wetlands	NE	NE	NE	NE	NE	NE	NE
E. Settlements	NE	NE	NE	NE	NE	NE	NE
F. Other Land	NE	NE	NE	NE	NE	NE	NE
G. Other	NE	NE	NE	NE	NE	NE	NE
6. Waste	**1,56**	**1,56**	**1,58**	**1,58**	**1,57**	**1,56**	**1,59**
A. Solid Waste Disposal on Land							
B. Waste-water Handling	1,55	1,55	1,45	1,44	1,44	1,45	1,47
C. Waste Incineration	IE	IE	IE	IE	IE	IE	IE
D. Other	0,00	0,00	0,14	0,15	0,13	0,11	0,11
7. Other *(as specified in Summary 1.A)*	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Total N_2O emissions including N_2O from LULUCF	**64,47**	**64,47**	**64,13**	**56,13**	**49,82**	**29,70**	**29,37**
Total N_2O emissions excluding N_2O from LULUCF	**64,47**	**64,47**	**64,13**	**56,13**	**49,81**	**29,70**	**29,37**
Memo Items:							
International Bunkers	**0,31**	**0,31**	**0,34**	**0,41**	**0,51**	**0,42**	**0,46**
Aviation	0,04	0,04	0,06	0,08	0,09	0,09	0,09
Marine	0,27	0,27	0,28	0,33	0,42	0,34	0,38
Multilateral Operations	IE	IE	IE	IE	IE	IE	IE
CO_2 Emissions from Biomass							

Table 1.3 Emission trends N_20 (in Gg)

GREENHOUSE GAS SOURCE AND SINK CATEGORIES (F-gasses)	Base year[1)]	1990	1995	2000	2005	2010	2011
	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)	(Gg)
Emissions of HFCs - (Gg CO_2 equivalent)	**6.018,69**	**4.432,03**	**6.018,69**	**3.891,67**	**1.512,48**	**2.259,88**	**2.132,84**
HFC-23	0,49	0,38	0,49	0,21	0,02	0,03	0,01
HFC-32	0,00	NO	0,00	0,01	0,02	0,03	0,02
HFC-41	IE,NO	NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO
HFC-43-10mee	IE,NO	NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO
HFC-125	0,00	NO	0,00	0,06	0,09	0,14	0,13
HFC-134	IE,NO	NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO
HFC-134a	0,04	NO	0,04	0,16	0,34	0,41	0,41
HFC-152a	0,02	NO	0,02	0,02	0,00	0,00	0,00
HFC-143	IE,NO	NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO
HFC-143a	0,00	NO	0,00	0,08	0,08	0,12	0,12
HFC-227ea	IE,NO	NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO
HFC-236fa	IE,NO	NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO
HFC-245ca	IE,NO	NO	IE,NO	IE,NO	IE,NO	IE,NO	IE,NO
Unspecified mix of listed HFCs - (Gg CO_2 equivalent)	187,14	NO	187,14	780,76	299,76	470,43	602,41
Emissions of PFCs - (Gg CO_2 equivalent)	**1.937,82**	**2.264,48**	**1.937,82**	**1.580,60**	**265,34**	**208,86**	**182,85**
CF_4	0,24	0,28	0,24	0,16	0,01	0,01	0,01
C_2F_6	0,04	0,05	0,04	0,04	0,00	0,00	0,00
C_3F_8	NO	NO	NO	NO	NO	NA,NO	NA,NO
C_4F_{10}	NO	NO	NO	NO	NO	NA,NO	NA,NO
c-C_4F_8	NO	NA,NO	NO	NO	NO	NA,NO	NA,NO
C_5F_{12}	NO	NO	NO	NO	NO	NA,NO	NA,NO
C_6F_{14}	NO	NO	NO	NO	NO	NA,NO	NA,NO
Unspecified mix of listed PFCs - (Gg CO_2 equivalent)	37,03	18,26	37,03	193,35	178,19	151,16	100,67
Emissions of SF6 - (Gg CO_2 equivalent)	**286,78**	**218,28**	**286,78**	**295,33**	**240,00**	**184,10**	**146,63**
SF_6	0,01	0,01	0,01	0,01	0,01	0,01	0,01

Table 1.4 Emission trends F gasses (in Gg) [1)] Base year for F gasses is 1995

GREENHOUSE GAS EMISSIONS	Base year[1)]	1990	1995	2000	2005	2010	2011
CO_2 emissions including net CO_2 from LULUCF	162.234,95	162.234,95	173.588,26	172.845,45	178.926,81	184.372,18	170.815,16
CO_2 emissions excluding net CO_2 from LULUCF	159.235,89	159.235,89	170.738,03	169.920,85	175.913,27	181.380,41	167.550,04
CH_4 emissions including CH_4 from LULUCF	25.712,96	25.712,96	24.334,10	19.918,85	16.101,28	15.936,83	15.262,25
CH_4 emissions excluding CH_4 from LULUCF	25.712,42	25.712,42	24.333,53	19.918,23	16.100,60	15.936,10	15.261,51
N_2O emissions including N_2O from LULUCF	19.986,29	19.986,29	19.880,66	17.399,05	15.442,67	9.207,58	9.105,36
N_2O emissions excluding N_2O from LULUCF	19.986,24	19.986,24	19.880,61	17.398,99	15.442,61	9.207,51	9.105,29
HFCs	6.018,69	4.432,03	6.018,69	3.891,67	1.512,48	2.259,88	2.132,84
PFCs	1.937,82	2.264,48	1.937,82	1.580,60	265,34	208,86	182,85
SF_6	286,78	218,28	286,78	295,33	240,00	184,10	146,63
Total (including LULUCF)	**216.177,49**	**214.848,99**	**226.046,30**	**215.930,95**	**212.488,59**	**212.169,43**	**197.645,09**
Total (excluding LULUCF)	**213.177,82**	**211.849,32**	**223.195,45**	**213.005,67**	**209.474,30**	**209.176,86**	**194.379,16**

GREENHOUSE GAS SOURCE AND SINK CATEGORIES	Base year[1)]	1990	1995	2000	2005	2010	2011
1. Energy	153.773,92	153.773,92	165.663,58	164.698,77	171.002,40	177.856,01	163.872,14
2. Industrial Processes	23.520,99	22.192,49	23.566,18	20.261,49	15.752,68	10.409,25	10.444,88
3. Solvent and Other Product Use	541,19	541,19	439,85	306,94	212,99	181,19	154,50
4. Agriculture	22.557,40	22.557,40	22.220,10	18.849,29	16.951,38	16.638,47	16.028,63
5. Land Use, Land-Use Change and Forestry	2.999,67	2.999,67	2.850,85	2.925,28	3.014,29	2.992,57	3.265,93
6. Waste	12.784,32	12.784,32	11.305,74	8.889,18	5.554,85	4.091,93	3.879,01
7. Other	NA	NA	NA	NA	NA	NA	NA
Total (including LULUCF)[(5)]	**216.177,49**	**214.848,99**	**226.046,30**	**215.930,95**	**212.488,59**	**212.169,43**	**197.645,09**

Table 1.5 Emission trends (Summary) (in $C0_2$ equivalents) [1)] Base year for F gasses is 1995

ANNEX CHAPTER 5

Table 5.1.Key variables projections

	Units	Historic values			projected with current policy				projected with current and planned policy			
		2000	2005	2010	2015	2020	2025	2030	2015	2020	2025	2030
General economic parameters												
1a. Gross Domestic Product	Millions of Euro2000	417960	446282	480470	507974	560965	600799	646185	507974	560965	600799	646185
1b. Gross domestic product growth rate	%	3,9%	2,0%	1,6%	1,8%	2,1%	1,4%	1,5%	1,8%	2,1%	1,4%	1,5%
2a. Population	x1000	15.864	16.306	16.575	16.941	17.229	17.488	17.688	16.941	17.229	17.488	17.688
2b. Population growth rate and base year value	%	0,8%	0,2%	0,5%	0,2%	0,3%	0,2%	0,2%	0,2%	0,3%	0,2%	0,2%
3. International coal import prices	Euro2000/GJ	2,39	2,10	2,22	2,48	2,59	2,68	2,75	2,48	2,59	2,68	2,75
4. International oil import prices	Euro2000/GJ	5,30	6,75	8,60	11,24	12,49	13,46	14,23	11,24	12,49	13,46	14,23
5. International gas import prices	Euro2000/GJ	3,67	4,07	4,74	6,49	7,09	7,67	8,12	6,49	7,09	7,67	8,12
Carbon price	Euro2010/ton	0	12,25	15,92	10,13	12,00	24,00	36,00	10,13	12,00	24,00	36,00
Energy sector												
6. Total gross inland consumption	PJ	2640,4	2690,9	2682,6	2702,6	2722,5	2641,2	2597,3	2669,8	2656,9	2529,2	2447,6
6a. - Liquid Fuels (fossil)	PJ	718,7	750,1	734,5	768,7	802,9	784,2	774,0	763,1	791,7	755,8	725,7
6b. - Solid Fuels (fossil)	PJ	254,6	257,6	243,5	345,1	446,7	381,7	347,0	298,5	353,5	316,9	298,6
6c. - Gaseous Fuels	PJ	1509,3	1496,2	1545,1	1409,2	1273,4	1273,6	1242,4	1403,1	1261,2	1207,4	1156,5
6d. - Biomass	PJ	49,2	79,9	111,1	123,8	136,5	167,5	194,9	156,8	202,4	221	233,9
6e. - Nuclear (IEA definition for energy calc.)	PJ	40,5	41,3	38,4	40,5	42,5	42,5	42,5	40,5	42,5	42,5	42,5
6f. Net electricity import (-+)	PJ	68,1	65,9	10,0	15,2	20,5	-8,3	-3,4	7,8	5,7	-14,4	-9,6
Total gross electricity generation by fuel type	GWhe	91639	104000	112944	118569	124194	129667	129556	119139	125333	128389	128250
7. - Liquid Fuels (fossil)	GWhe	4778	3361	3639	3388,9	3139	3278	3167	3305,6	2972	3389	3250
8. - Solid Fuels (fossil)	GWhe	24083	25972	23722	33416,7	43111	35111	30472	28000,0	32278	27472	24583
9. – Gaseous Fuels	GWhe	55222	62694	69972	61250,0	52528	60222	58917	60666,7	51361	54028	52250
10. – Renewable	GWhe	2819	7208	10236	15076,4	19917	25486	31333	21729,2	33222	37931	42500
11. Nuclear (IEA definition for energy calc.)	GWhe	3722	3722	4028	4027,8	4028	4028	4028	4027,8	4028	4028	4028
12. - Other	GWhe	1014	1042	1347	1409,7	1472	1542	1639	1409,7	1472	1542	1639
Energy demand by sector	PJ	3021,7	3110,8	3045,8	3072,9	3100,0	3074,1	3036,8	3052,4	3059,0	2998,2	2942,0
13. Energy Industries	PJ	920,5	1005,8	992,0	990,9	989,9	948,7	892,0	976,3	960,6	890,1	828,2
13a. Liquid Fuels (fossil)	PJ	189,7	184,3	117,3	141,0	164,7	154,7	144,3	140,2	163,1	148,2	130,9
13b. Solid Fuels (fossil)	PJ	244,2	246,9	233,7	314,9	396,1	326,2	293,9	268,4	303	261,3	245,6
13c. Gaseous Fuels	PJ	440,1	499,6	562,2	459,0	355,8	374,8	343,7	458,3	354,4	331,7	298,6
13d. Renewables	PJ	6,0	33,7	40,4	35,6	30,8	50,5	67,6	69,0	97,6	106,4	110,6
13e. Nuclear (IEA definition for energy calc.)	PJ	40,5	41,3	38,4	40,5	42,5	42,5	42,5	40,5	42,5	42,5	42,5
14. Industry	PJ	718,5	726,9	652,9	703,0	753,1	761,1	769,2	702,4	752,0	761,3	769,3
14a. Liquid Fuels (fossil)	PJ	100,0	110,5	129,2	149,9	170,5	158,0	156,4	150,1	171,0	163,4	158,7
14b. Solid Fuels (fossil)	PJ	83,2	94,6	84,0	116,8	149,7	163,3	167,6	116,7	149,5	163,5	167,6

	Units	Historic values			projected with current policy				projected with current and planned policy			
		2000	2005	2010	2015	2020	2025	2030	2015	2020	2025	2030
14c. Gaseous Fuels	PJ	315,2	281,0	241,3	232,5	223,8	217,2	211,9	231,2	221,1	211,7	207,1
14d. Renewables	PJ	0,6	0,9	2,6	11,6	20,6	41,5	54,4	11,6	20,6	41,5	54,4
14e. Electricity	PJ	124,1	128,6	124,0	128,4	132,7	124,1	121,2	129,3	134,5	125,7	124,5
14f. Heat (from CHP)	PJ	95,4	111,3	71,9	63,9	55,8	57,0	57,7	63,7	55,4	55,5	57,0
15. Commercial (Tertiary)	PJ	487,2	477,1	491,3	513,8	536,3	544,5	555,1	513,5	535,8	551,9	564,3
15a. Liquid Fuels (fossil)	PJ	46,1	39,2	32,5	39,9	47,2	48,5	49,8	39,9	47,2	48,5	49,8
15b. Solid Fuels (fossil)	PJ	1,0	0,3	0,1	0,3	0,5	0,5	0,5	0,3	0,5	0,4	0,4
15c. Gaseous Fuels	PJ	295,7	300,0	334,4	328,0	321,6	310,1	312,9	324,5	314,7	296,3	283,4
15d. Renewables	PJ	6,4	6,7	15,1	26,8	38,4	55,4	67,8	30,8	46,5	73,0	93,6
15e. Electricity	PJ	107,6	113,0	95,1	97,6	100,1	90,1	88,6	92,8	90,5	78,5	75,1
15f. Heat	PJ	30,5	17,9	14,1	21,3	28,4	40,0	35,5	25,3	36,5	55,1	62,0
16. Residential	PJ	445,3	421,2	418,5	393,9	369,3	366,5	365,3	393,3	368,0	367,0	367,0
16a. Liquid Fuels (fossil)	PJ	3,6	3,8	4,4	3,5	2,6	2,5	2,3	3,5	2,6	2,5	2,3
16b. Solid Fuels (fossil)	PJ	0,2	0,2	0,2	0,1	0,0	0,0	0,0	0,1	0,0	0,0	0,0
16c. Gaseous Fuels	PJ	355,8	320,4	312,6	284,6	256,7	249,4	244,6	284,2	255,7	246,3	239,5
16d. Renewables	PJ	0,3	1,0	1,7	4,2	6,6	9,4	12,3	4,7	7,6	13,0	18,4
16e. Electricity	PJ	78,5	87,2	88,9	90,1	91,3	92,4	92,7	89,1	89,4	90,6	90,4
16f. Heat	PJ	6,8	8,6	10,7	11,4	12,1	12,9	13,4	11,7	12,7	14,7	16,4
17. Transport	PJ	450,2	479,7	491,2	471,3	451,4	453,3	455,2	466,9	442,6	427,9	413,2
17a. Gasoline	PJ	177,7	180,6	184,0	167,0	149,9	142,2	134,4	164,6	145,2	128,9	112,5
of which biofuels	PJ	0	0	5,6	9,8	13,9	13,2	12,5	9,6	13,5	12,0	10,5
17b. Diesel	PJ	241,0	277,0	282,6	269,2	255,7	258,4	261,0	266,8	251,0	245,6	240,1
of which biofuels	PJ	0	0	3,96	13,4	22,8	23,0	23,2	13,2	22,4	21,8	21,3
17c. Jet Kerosene	PJ				0,0				0,0			
17d. Other liquid fuels	PJ	25,7	16,3	13,9	10,6	7,4	6,6	5,9	10,5	7,0	5,8	4,5
17e. Gas (fossil)	PJ	0,0	0,0	0,5	3,1	5,8	7,5	9,3	3,1	5,6	6,8	7,9
17f. Electricity	PJ	5,9	5,8	6,2	8,0	9,8	15,6	21,4	8,8	11,3	19,1	26,9
17g. Renewables	PJ	0,0	0,0	4,0	13,4	22,8	23,0	23,2	13,2	22,4	21,8	21,3
Weather parameters												
18a. Heating Degree Days	Annual HDD	2928	2861	2797	2762	2727	2661	2595	2762	2727	2661	2595
18b. Cooling Degree Days	Annual CDD	86	95	99	104	109	120	130	104	109	120	130
Industry sector (for industrial sectors contributing significantly to the national total for the base or target year)												
19. Gross value-added total industry, Bio Euro (EC95) 2000	billions of Euro2000			52,9	58,5	64,7	68,2	72,1	58,5	64,7	68,2	72,1
22a. Chemical industry	production index			100	111,9	126,0	132,0	138,6	111,9	126,0	132,0	138,6
22b. Refineries	production index			100	105,9	113,4	112,4	111,4	105,9	113,4	112,4	111,4
22c. Printing industry	production index			100	104,9	116,6	124,2	132,5	104,9	116,6	124,2	132,5
22d. Food and drink	production index			100	104,5	111,1	116,5	122,4	104,5	111,1	116,5	122,4
22e. Wood processing	production index			100	109,6	115,1	115,9	117,0	109,6	115,1	115,9	117,0
22f. Rubber and plastic	production index			100	111,0	122,4	124,9	127,7	111,0	122,4	124,9	127,7
22g. Basic metals	production index			100	104,5	110,6	114,4	120,4	104,5	110,6	114,4	120,4
22h. Pulp and paper	production index			100	112,5	130,6	139,5	149,4	112,5	130,6	139,5	149,4
22i. Building materials	production index			100	111,6	118,1	120,4	123,4	111,6	118,1	120,4	123,4

	Units	Historic values			projected with current policy				projected with current and planned policy			
		2000	2005	2010	2015	2020	2025	2030	2015	2020	2025	2030
22j. Metal products	production index			100	110,8	119,8	123,6	127,7	110,8	119,8	123,6	127,7
22k. Other production	production index			100	108,7	120,4	126,9	134,7	108,7	120,4	126,9	134,7
24a. Growth of Passenger person kilometres (all transport modes in absolute figures)	billion passenger km	180,7	188,2	191,2	196,7	206,1	208,8	211,6	196,7	207,35	211,90	216,46
24b. Total kilometres by passenger cars, Mpkm	billion vehicle km	91,2	96,9	101,3	105,1	110,7	113,4	116,1	105,1	111,9	116,4	120,9
25a. The growth of freight tonne kilometres (all transport modes in absolute figures)	million tonne km	94,8	103,9	96,1	107,5	119,0	126,8	134,7	107,5	119,0	126,8	134,7
25b. Road freight transport, Mtkm	million tonne km	48,9	54,9	50,0	55,1	60,2	64,0	67,7	55,1	60,2	64,0	67,7
Built environment (in residential and commercial or tertiary sector)												
26. Gross value-added — services, Bio Euro (EC95)	Value (EUR billion)			320	336	376	405	439	336	376	405	439
29. Average floor space per dwelling	m2 / dwelling	106	107	107	107	107	107	107	107	107	107	107
30. Average Floor space per employee	m2/FTE		133	132	133	134	136	138	133	134	136	138
31a. The number of dwellings	1000 dwellings	6.590	6.859	7.172	7.426	7.680	7.925	8.099	7.426	7.680	7.925	8.099
31b. Number of employees in the tertiary sector	1000 FTE		3481	3770	3852	4050	4064	4086	3852	4050	4064	4086
Agriculture sector												
33. Total Cattle	1000 heads	4070	3799	3976	3844	3711	0	3599	3843,5	3711	0	3599
33a. Dairy cattle	1000 heads	1504	1433	1479	1477	1475		1418	1477	1475		1418
33b. Non-dairy cattle	1000 heads	2566	2366	2497	2367	2236		2181	2367	2236		2181
34. sheep	1000 heads	1308	1363	1130	1130	1130		1117	1130	1130		1117
35. swine	1000 heads	13118	11312	12255	11264	10273		9423	11264	10273		9423
36. poultry	1000 heads	53078	48418	56500	57800	59099		61610	57800	59099		61610
37a. broilers	1000 heads	53439	46772	46871	47125	47378		48231	47125	47378		48231
37b. rabbit and mink	1000 heads	641	745	1001	1001	1001		911	1001	1001		911
37c. horses (including non-agriculture hores)	1000 heads	418	433	441	441	441		445	441	441		445
37d. goat	1000 heads	179	292	353	353	353		374	353	353		374
38a. grassland	Hectares	1161219		1161219	1161219	1161219		1161219	1161219	1161219		1161219
38b. arable land	Hectares	932943		932943	932943	932943		932943	932943	932943		932943
39. Fertilizer used (synthetic & manure)	kt Nitrogen	647,2	541,5	512,9	501	488,9		497,6	501	488,9		497,6
40. enteric fermentation - dairy cattle	t CO2-equivalent / 1000 heads	2520,5	2653,3	2702,0	2779	2856,2		3003,0	2779	2856,2		3003,0
41. enteric fermentation - non-dairy cattle	t CO2-equivalent / 1000 heads	771,4	757,8	738,4	730	721,2		700,2	730	721,2		700,2
42. enteric fermentation - sheep	t CO2-equivalent / 1000 heads	167,9	167,9	167,9	168	167,9		169,9	168	167,9		169,9
43. manure management - dairy cattle	t CO2-equivalent / 1000 heads	704,7	797,0	894,0	905	917,0		831,7	905	917,0		831,7

	Units	Historic values			projected with current policy				projected with current and planned policy			
		2000	2005	2010	2015	2020	2025	2030	2015	2020	2025	2030
44. manure management - non-dairy cattle	t CO2-equivalent / 1000 heads	147,6	136,5	157,2	150	142,6		146,2	150	142,6		146,2
45. manure management - sheep	t CO2-equivalent / 1000 heads	4,2	3,8	3,4	3,4	3,4		3,3	3,4	3,4		3,3
46. manure management - swine	t CO2-equivalent / 1000 heads	98,1	95,7	86,8	83	80,2		87,4	83	80,2		87,4
47. manure management - poultry	t CO2-equivalent / 1000 heads	2,1	0,9	0,5	0,5	0,4		0,4	0,5	0,4		0,4
48. fertilizer use & crops												
48a. synthetic	kg N2O-N/kg N	0,013	0,013	0,013	0,013	0,013		0,013	0,013	0,013		0,013
48b. manure	kg N2O-N/kg N	0,00870	0,00868	0,00867	0,00867	0,00867		0,00867	0,00867	0,00867		0,00867
Waste sector												
49. Municipal solid waste generation	kt	13,5		10,3	10,5	11,0			10,5	11,0		
50. The organic fraction (DOC) of municipal solid waste	%	36%		43%	43%	44%			43%	44%		
51. Municipal solid waste disposed to landfills	%	51%		26%	25%	23%			25%	23%		
52. Municipal solid waste disposed incinerated	%	37%		61%	63%	65%			63%	65%		
53. Municipal solid waste disposed composted	%	12%		13%	12%	12%			12%	12%		
54. Municipal solid waste disposed to landfills	kt	6,95	0	2,7	2,6	2,5	0	0	2,6	2,5	0	0

Table 5.2 Climate and energy policy

		Reference Projection energy and emissions 2010-2020			Updated reference Projection 2012	
Sector	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Current + planned policy**
General	MIA (Environment Investment Rebate) / Vamil (Arbitrary depreciation of environmental investments)	X	X (adjustment)		X	
General	Energy Investment Allowance (EIA)	X	X (higher budget)	X (higher budget)	X	
General	Local Climate Agenda		Supportive		X	
General	Incentives policy on local Climate initiatives (SLOK)		Supportive		X	
General	Heating Expertise Centre (NEW)		Supportive		X	
General	Innovations Agenda		Supportive		Ceased	
General	European CO_2-Emission Trading Scheme (EU-ETS)	X	X		X	
General	Energy tax		X		X	
General	Green Deals				X	X
Transport	Decree on biofuels in road transport		X		Ceased	
Transport	Regulations on Renewable Energy in Transport (successor to Decree on biofuels in road transport)				X	
Transport	Renewable Energy Directive (RED)			X	X	
Transport	Adjusted Fuel Quality Directive (98/70/EC)		X		X	
Transport	Innovative bio-fuels tender scheme		X		Ceased	

		Reference Projection energy and emissions 2010-2020			Updated reference Projection 2012	
Sector	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Current + planned policy**
Transport	Subsidy Programme for Petrol stations with Alternative Fuels		X		X	
Transport	Market introduction Driving on Natural Gas		X		Ceased	
Transport	Fiscal greening (conform Tax Plan 2008 en 2009)		X		X	
Transport	Fiscal greening (conform Tax Plan 2010)			X	X	
Transport	Fiscal greening (conform Tax Plan 2011)				X	
Transport	Fiscal greening (conform Tax Plan 2012, including elaboration of 'AutoBrief')				X	
Transport	Kilometre pricing			X	Ceased	
Transport	EU-norm CO_2-emissions of new passenger vehicles		X (130 g/km in 2015)	X (95 g/km in 2020)	X (130 g/km in 2015)	X (95 g/km in 2020)
Transport	Car tyre low rolling resistance scheme (EC/661/2009)		X	X (labelling)	X	
Transport	EU-norm CO_2-emissions new delivery vans			X	X (175 g/km in 2017	X (147 g/km in 2020)
Transport	Renewable purchasing policy		X		X	
Transport	Testing grounds ("proeftuinen") for renewable mobility (electric cars)		X		X	
Transport	Testing grounds ("proeftuinen") for renewable mobility (hydrogen etc.)			X	X	
Transport	Renewable logistics programme		X		X	
Transport	Innovative busses tender scheme		X		Ceased	

		Reference Projection energy and emissions 2010-2020			Updated reference Projection 2012	
Sector	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Current + planned policy**
Transport	Dutch national ecodriving programme 'Het Nieuwe Rijden' (phases 1 to 3)	X				
Transport	Dutch national ecodriving programme 'Het Nieuwe Rijden' (phase 4)		X		Ceased	
Transport	Efficient Navigation (voortvarend besparen)		X		Ceased	
Transport	Encouraging the use of bicycles			X	Ceased	Ceased
Transport	Smart working smart travelling platform		X		X	
Transport	Long Term Agreement on energy efficiency by Dutch Railways (NS)		X	X (continued)	X	
Transport	Sector agreement on mobility, logistics and infrastructure: Sustainability on the Move				X	
Transport	Increase maximum speed on Dutch highways from 120 km/h to 130 km/h					X
Transport	EEDI/SEEMP sea-going vessels				X	
Transport	Smart Travel budget					X
Industry	Long term agreement on energy-efficiency ETS-businesses (MEE)		X	X	X	
Industry	Benchmarking Covenant	X				
Industry	Long term agreements (MJA) on energy efficiency	X (MJA2)	X (MJA3)		X (MJA3)-	
Industry	Opt in N_2O nitric acid industry in ETS		X		X	

		Reference Projection energy and emissions 2010-2020			Updated reference Projection 2012	
Sector	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Current + planned policy**
Energy	Eco Design Directive		X	X (expanding scope)	X	X
Energy	Energy labelling		X		X	X (expansion)
Energy	Coal covenant (Kolen convenant)	X				
Energy	MEP (Environmental Quality of Electricity Production)	X				
Energy	Stimulation of Sustainable Energy Production (SDE)		X	X (reforming funding)		
Energy	Stimulation of Sustainable Energy Production + (SDE+)				X	
Energy	Congestion management			X		X
Energy	Carbon Capture and Storage (CCS)		X (small-scale demo's)	X (large-scale demos)	X (demos by Buggenum, K12, forerunner ROAD)	X (demos ROAD, Pegasus, Air Liquide)
Energy	Heating infrastructure subsidy (CHP)			X		
Energy	Safety net scheme CHP (vangnet regeling WKK)			X		
Agriculture and horticulture	Covenant (i.e., Innovation and Action programme) Clean and Efficient Agricultural sectors		X		X	
Agriculture and horticulture	Innovation contracts					X
Greenhouse horticulture	Glasshouse Horticulture and Environmental Covenant	X			Ceased	

		Reference Projection energy and emissions 2010-2020			Updated reference Projection 2012	
Sector	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Current + planned policy**
	(GLAMI),					
Greenhouse horticulture	Continuation of agreements Greenhouse as a Source of Energy		X		X	
Greenhouse horticulture	Proof-of-principle (part of agreements on Greenhouse as a Source of Energy)				X	
Greenhouse horticulture	Market introductions of energy innovations scheme (MEI)		X (budget to 2020)			X
Greenhouse horticulture	Investments in energy efficiency scheme (IRE)		X			X
Greenhouse horticulture	Energy networks scheme			X		
Greenhouse horticulture	Geothermal energy guarantee facility			X (to 2020)	X	X (optimisation)
Greenhouse horticulture	Internal CO_2 equalisation system for Greenhouse cultivation (CO2 kosten vereveningssysteem)			X		X
Agriculture and horticulture	Annual small sector work programmes		X		X	
Agriculture and horticulture	Demonstration projects Clean and Efficient		X		X	
Agriculture and horticulture	Innovation programme Collaborating on Innovation (including New Challenges)				X	
Agriculture and horticulture	Precision agriculture innovation programme				X	
Agriculture and horticulture	Low-Emissions animal feed innovation programme				X	

		Reference Projection energy and emissions 2010-2020			Updated reference Projection 2012	
Sector	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Current + planned policy**
Agriculture and horticulture	Bio-based Economy innovation programme		X		X (Innovation contract Bio-based Economy)	
Agriculture and horticulture	Small Business Innovation Research programme (SBIR)	X (once-only tender)	X		X	
Agriculture and horticulture	Farmers and climate programme (boerenklimaat.nl)				X	
Agriculture and horticulture	Unique Chances Programme (UKP)		X		Ceased	
Agriculture and horticulture	Networks in practice subsidy scheme				X	
Agriculture and horticulture	Environmentally friendly measures subsidy scheme				X	
Built environment	Energy Performance Standard (EPN) and the Spring Agreement	X	X (stricter enforcement of rules)	X (increased stricter enforcement of rules)	X (EPC from 0.6 for homes)	X (further tightening up, to 0.4 in 2015) X (tightening up utility building 50% in 2015)
Built	Exemplary role of the			X	X	

		Reference Projection energy and emissions 2010-2020			Updated reference Projection 2012	
Sector	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Current + planned policy**
environment	Government Buildings Agency (RGD)					
Built environment	More with Less Agreement		X	X	X (no more u-building)	
Built environment	Crisis subsidy package on Energy efficiency		X (only education)	X (expanding to include health care and care liaison offices)	Ceased	
Built environment	Customised advice subsidy (maatwerkadvies)		Supportive		Ceased	
Built environment	More with Less Encouragement Premium		Supportive		Ceased	
Built environment	Green projects scheme		Supportive		X	
Built environment	Energy efficiency credit guarantee		Supportive		Ceased	
Built environment	VAT reduction on insulation		X		X	
Built environment	HR++ glass subsidy		X		Ceased	
Built environment	Renewable heating subsidy scheme		X		Ceased	
Built environment	Agreement with housing associations		X		X	
Built environment	Adjustment in Home Evaluation system			X	X	
Built environment	Enforcing the Environmental Management Act				X	
Built environment	Block-by-block approach				X	

Table 5.3 Air policy

		Reference Projection 2010			Actualisation Reference Projection 2012	
Scale	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Including planned policy**
Global	IMO requirements from 2008 for sea-going vessels		X		X	
European policy	Euro-norms for passenger cars and delivery vans up to and incl. Euro-6		X		X	
	Euro-norms for heavy duty vehicles up to and incl. Euro-VI		X		X	
	Revised fuel quality directive for inland shipping and Mobile equipment		X		X	
Dutch policy	Encouraging soot-filters new diesel-fuelled vehicles		X		Ceased	
	Retrofit subsidy scheme for light and heavy duty vehicles (soot-filters, SRP and SRV)		X		Ceased	
	Soot-filters for new taxis and delivery vans subsidy scheme (STB)		X		Ceased	
	Encouraging clean local transport such as busses and waste collection trucks		X		Ceased	
	Encouraging the sale of Euro IV/V heavy duty vehicles 2005-2009		X		Ceased	
	Differentiation diesel tax		X		Ceased	

		Reference Projection 2010			Actualisation Reference Projection 2012	
Scale	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Including planned policy**
	according to sulphuric content					
	Limiting BPM (tax on passenger cars and motorbikes)		X		X	
	Limiting MRB (vehicle road tax) advantage due to commercial registration number		X		X	
	Increasing diesel tax by 3 eurocents per litre in 2008		X		X	
	Agreement limiting fine dust emissions of light duty vehicles		X		Ceased	
	Fiscal benefit of soot-filters diesel-fuelled passenger cars rounded off		X		Ceased	
	Encouraging Euro-6 passenger cars as of Jan 2011 (Tax Plan 2010)		X		X	
	Subsidising diesel engines for inland shipping (VERS)		X		Ceased	
	NO_x and SO_2 emissions control areas in the North Sea[1)]				X (SO_2)	X (NO_x)
	Soot filters for Mobile Equipment subsidy scheme (SRMW)		X		Ceased	
	Encouraging Euro-VI trucks and busses		X		X	
	Encouraging Euro-VI delivery vans and taxis					X
	Dry-dock electricity Schiphol		X		X	

		Reference Projection 2010			Actualisation Reference Projection 2012	
Scale	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Including planned policy**
	Flexibilising NRMM Directive				X	
	Application of fixed electricity connection and pre-conditioned air provision at Schiphol as of 2010		X		X	
	Limiting Schiphol's growth (implementing advice Alderstafel medium-long range)					X
	Agreements with refineries about ceiling for SO_2 (16 million kg)		X		X	X (tightening up to 14.5 million kg)
	Agreements with power production companies about ceiling for SO_2 (13.5 million kg in 2010 to 2020)		X		X	
	Fine dust target for the industry					X
	Stricter prestation standard for NO_x-emission trading from 40 to 37 g NOx/GJ in 2013		X		X	
	Abolishing NO_x-emission traiding as of 2013					X
	Stricter emissions requirements of medium to large combustion plants (BEMS) as of 1 April 2010		X	X	X	
	Air scrubbers in stables of intensive cattle breeders (general subsidy + subsidy scheme focusing on cleaning up poultry farms)		X		X[2]	

		Reference Projection 2010			Actualisation Reference Projection 2012	
Scale	**Measure**	**Reference (not Clean & Efficient)**	**Current policy (V)**	**Including planned policy (VV)**	**Current policy**	**Including planned policy**
	Accommodation Resolution – low-emission stables obligatory in intensive cattle farming as of 2013		X		X	
	Imposing low-emissions – prohibition on using trailing suction dredger on sandy ground as of 2012		X			

Source: GCN (2011)

[1] Only relevant for GCN (air quality). For NEC emissions at sea are not included.

[2] Effect estimate of subsidy scheme depends on the availability of monitoring statistics on the provision of subsidies and the implementation of air purifiers.

Table 5.4 Greenhouse gases, excluding emissions from LULUCF

V=current policy, VV=current and planned policy

[Mton CO_2-equivalents]	V 2020	V 2030	VV 2020	VV 2030
Carbon dioxide				
Total	186.0 (166.4-195.5)	173.7	176.8 (156.6-187.5)	160.5
Built environment	25.9 (23.6-28.2)	24.6	25.5 (23.0-27.6)	22.6
Consumers	14.7 (13.3-15.9)	13.6	14.7 (13.3-15.8)	13.3
Commercial/tertiary sector	11.2 (9.4-13.1)	10.9	10.8 (8.8-12.7)	9.3
Industry/energy	118.4 (101.7-124.9)	108.7	110.7 (93.3-118.3)	101.2
Transport	34.5 (32.1-37.6)	34.1	33.8 (31.2-37.1)	30.8
Agriculture	7.1 (5.7-8.3)	6.3	6.9 (5.4-8.0)	5.8
Non-CO_2-greenhouse gases				
Total	25.8 (20.1-32.3)	24.0	25.8 (19.9-32.4)	24.0
Agriculture	15.8 (10.3-21.2)	15.2	15.8 (10.3-21.2)	15.2
Other sectors	10.0 (7.5-13.3)	8.8	10.0 (7.5-13.2)	8.8
Total greenhouse gases				
Total	211.8 (190.8-223.5)	197.7	202.7 (181.2-215.4)	184.5

Source: PBL and ECN

Table 5.5 Non-CO_2 greenhouse gases

V=current policy, VV= current and planned policy

[Mton CO_2-equivalents]	2010	V 2020	V 2030	VV 2020	VV 2030
Methane (CH_4)	16.8	14.0	12.3	14.0	12.3
Agriculture	9.4	9.0	8.5	9.0	8.5
Waste disposal	4.3	2.0	0.9	2.0	0.9
Energy sector	0.7	0.6	0.5	0.6	0.5
Laughing gas (N_2O)	9.4	9.3	9.3	9.3	9.3
Agriculture	7.1	6.8	6.7	6.8	6.7
Industry	1.0	1.3	1.3	1.3	1.3
HFKs	2.3	2.0	1.9	2.0	1.9
PFKs	0.2	0.3	0.3	0.3	0.3
SF_6	0.2	0.3	0.3	0.3	0.3
Total non-CO_2-greenhouse gases	28.9	25.8	24.0	25.8	24.0

Source: Emission Registration (ER) and PBL

Table 5.6 Nitrogen Oxide (NOx)

V=current policy, VV=current and planned policy

Nitrogen oxide (kilotons)	2010	V 2020	V 2030	VV 2020	VV 2030
Industry, Energy, Refineries & Waste disposal	66.5	65.8 (54.2-70.0)	64.5	59.4 (49.3-68.0)	58.2
Transport NEC	164.4	95.6 (63.7-142.2)	77.4	96.9 (65.2-142.9)	78.8
Agriculture	18.3	11.6 (10.5-12.7)	12.2	11.2 (10.1-12.2)	12.2
Consumers	12.7	5.8 (4.7-9.2)	5.1	5.7 (4.6-9.1)	5.0
Commercial/ tertiary sector and Construction	14.0	6.5 (5.4-9.1)	6.9	6.3 (5.2-8.9)	6.2
Total NEC	275.9	185.2 (144.7-237.0)	166.1	179.5 (142.1-233.9)	160.4

Source: Emission Registration (ER) and PBL

Table 5.7 Sulphur Oxides

V=current policy, VV=current and planned policy

Sulphur oxides (kilotons)	2010	V 2020	V 2030	VV 2020	VV 2030
Industry, Energy, Refineries & Waste disposal	31.9	36.7 (26.6-44.5)	33.7	33.8 (25.4-41.9)	31.7
Transport NEC	1.2	0.3 (0.3-0.4)	0.3	0.3 (0.3-0.4)	0.3
Agriculture	0.0	0.1 (0.1-0.1)	0.1	0.1 (0.1-0.1)	0.1
Consumers	0.6	0.3 (0.3-0.4)	0.3	0.3 (0.3-0.4)	0.3
Commercial/tertiary sector and Construction	0.1	0.0 (0.0-0.0)	0.0	0.0 (0.0-0.0)	0.0
Total NEC	33.9	37.4 (27.3-45.3)	34.4	34.5 (26.0-42.7)	32.4

Source: Emission Registration (ER) and PBL

Table 5.8 Ammonia

V=current policy, VV=current and planned policy

Ammonia (kilotons)	**2010**	**V 2020**	**V 2030**	**VV 2020**	**VV 2030**
Industry, Energy, Refineries & Waste Disposal	2.0	2.0 (1.7-2.4)	2.1	2.0 (1.7-2.4)	2.1
Transport NEC	2.5	2.5 (0.6-6.7)	2.4	2.5 (0.7-6.8)	2.4
Agriculture	105.2	92.4 (61.1-126.7)	92.7	92.4 (61.2-127.0)	92.7
Consumers	9.0	9.3 (6.6-12.1)	9.6	9.3 (6.6-12.1)	9.6
Commercial/tertiary sector and Construction	3.1	3.1 (2.2-4.0)	3.1	3.1 (2.2-4.0)	3.1
Total NEC	121.8	109.4 (76.8-147.4)	109.9	109.4 (77.3-147.4)	109.9

Source: Emission Registration (ER) and PBL

Table 5.9 Non-methane volatile organic substances

V=current policy, VV=current and planned policy

Non-methane volatile organic substances (kilotons)	**2010**	**V 2020**	**V 2030**	**VV 2020**	**VV 2030**
Industry, Energy, Refineries & Waste disposal	49.9	50.2 (43.0-57.4)	49.3	50.2 (43.1-57.5)	49.3
Transport NEC	37.9	27.5 (19.1-36.0)	25.5	27.5 (19.3-35.9)	25.5
Agriculture	2.0	2.0 (2.0-2.0)	2.0	2.0 (2.0-2.0)	2.0
Consumers	32.6	37.2 (34.5-40.1)	45.6	37.2 (34.5-40.1)	45.6
Commercial/tertiary sector and Construction	28.2	32.3 (30.6-34.2)	35.7	32.3 (30.6-34.2)	35.7
Total NEC	150.6	149.1 (136.4-162.4)	158.0	149.1 (136.5-162.4)	158.0

Source: Emission Registration (ER) and PBL

Table 5.10 Fine dust (PM10)

V=current policy, VV=current and planned policy

Fine dust (PM_{10}) (kilotons)	**2010**	**V 2020**	**V 2030**	**VV 2020**	**VV 2030**
Industry, Energy, Refineries & Waste disposal	8,5	8.6 (6.8-10.4)	8.5	8.5 (6.8-10.3)	8.5
Transport NEC	9.2	5.9 (3.2-10.4)	5.6	5.9 (3.3-10.3)	5.7
Agriculture	6.1	6.8 (1.5-12.2)	6.8	6.8 (1.5-12.1)	6.8
Consumers	3.1	3.1 (2.9-3.4)	3.2	3.1 (2.9-3.4)	3.2
Commercial/tertiary sector and Construction	2.2	2.6 (2.0-3.2)	2.8	2.6 (2-3.2)	2.8
Total NEC	29.1	27.0 (20.1-36.0)	26.8	26.9 (20.1-35.7)	26.9

Source: Emission Registration (ER), PBL and ECN

Table 5.11 Fine dust (PM2,5)

V=current policy, VV=current and planned policy

Fine dust ($PM_{2.5}$) (kilotons)	**2010**	**V 2020**	**V 2030**	**VV 2020**	**VV 2030**
Industry, Energy, Refineries & Waste disposal	4.0	4.1 (3.3-4.9)	3.8	4.0 (3.3-4.8)	3.8
Transport NEC	7.0	3.2 (3.2-3.2)	2.8	3.2 (3.2-3.2)	2.9.0
Agriculture	0.6	0.6 (0.3-0.9)	0.6	0.6 (0.3-0.9)	0.6
Consumers	3.1	3.1 (2.9-3.3)	3.2	3.1 (2.9-3.3)	3.2
Commercial/tertiary sector and Construction	0.6	0.7 (0.6-0.8)	0.7	0.7 (0.6-0.8)	0.7
Total NEC	15.3	11.7 (10.8-12.6)	11.1	11.7 (10.8-12.6)	11.2

Source: Emission Registration (ER), PBL and ECN

COLOFON / CREDITS

This is a publication of the Ministry of Infrastructure and the Environment (I&M)
Directorate General of the Environment

Address for visitors: Plesmanweg 1-6, The Hague
Postal Address: PO Box 20901, 2500 EX The Hague
The Netherlands

www.government.nl/ministries/ienm

Preparation:

Ministry of Infrastructure and the Environment (I&M)
Ministry of Economic Affairs (EZ)
Ministry of Foreign Affairs (BuZa)
Ministry of the Interior and Kingdom Relations (BZK)
NLAgency (AGNL)
Statistics Netherlands (CBS)
Netherlands Environmental Assessment Agency (PBL)
Royal Netherlands Meteorological Institute (KNMI)
Wageningen University and Research Centre (WUR)

December 2013