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The Netherlands' Report on demonstrable progress under Article 3.2 of the Kyoto Protocol

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Contents

Introduction

This report describes the progress the Netherlands has made by 2005 in achieving its commitments under the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), as prescribed in Article 3, paragraph 2 of the Kyoto Protocol. This demonstration of progress is a legal obligation now that the Kyoto Protocol has entered into force on 16 February 2005. Under the guidelines agreed upon in the Marrakech Accords (Decision 22/CP.7), this report contains the following information:

1. A description of domestic measures, including any legal and institutional steps to prepare to implement the Netherlands' commitments under the Kyoto Protocol to mitigate greenhouse gas emissions, and any of its programmes for domestic compliance and enforcement.
2. Trends in, and projections of the Netherlands' greenhouse gas emissions.
3. An evaluation of how such domestic measures, in light of these trends and projections, will contribute to the Netherlands' meeting its commitment under Article 3 of the Kyoto Protocol.
4. A description of the activities, actions and programmes undertaken by the Netherlands in fulfilment of its commitments under Articles 10 and 11 of the Kyoto Protocol.

The chapters in this report each address one of the issues listed above.

In parallel to this report, the following other reports are published, which also contain information on the Netherlands' climate policy:

- The Netherlands' 4th National Communication
- The Greenhouse Gas Emission Trends & Projections in Europe 2005 report of the European Environment Agency (EEA)
- The annual report of the European Commission (EC) to the European Parliament and the Council on progress towards achieving the community's Kyoto target
- The European Commission's report on demonstrable progress
- The European Commission's 4th National Communication
- The second evaluation of the Netherlands' National Climate Policy Implementation Plan (NCPIP)

This report was written in parallel to the Netherlands' 4th National Communication and contains the same information, although less extensive and focused more on the progress towards the Netherlands' Kyoto target. Background information and references to this report can therefore be found in the 4th National Communication. The EEA and EC reports contain, apart from information on a European level, information specifically for the Netherlands on historical greenhouse gas emissions and projections. This is the same as used in this report and the Netherlands' 4th National Communication. The reports are therefore consistent. Policies and measures are described and taken into account in the projections as known on 1 December 2004. Since then, policy has developed further. These further developments have not been taken into account in the figures in this report and the Netherlands' 4th National Communication in order to maintain consistency with the EEA and EC reports. They have, however, been taken into account in the second evaluation of the NCPIP. For information, the main conclusions of the second evaluation of the NCPIP have been added to this report and to the Netherlands' 4th National Communication for information purposes. Overall, the general picture does not change significantly because of the further policy developments.

Summary

The greenhouse gas emission reduction target for the Netherlands under the Kyoto Protocol is 6% in the period 2008-2012 compared to base year emissions. Based on preliminary figures, this is assumed to be an average of 200 Mt CO_2 equivalents a year in 2008-2012. The Netherlands outlined its climate policy in 1999 and 2000 in its National Climate Policy Implementation Plan (NCPIP). It was decided that the Netherlands would achieve its Kyoto target both by domestic policies and measures and by using the Kyoto mechanisms. Currently, the domestic target is set at 220 Mt CO_2 equivalents in 2010. The intended use of Kyoto mechanisms totals 100 Mt CO_2 equivalents, that is on average 20 Mt CO_2 equivalents a year in the period 2008-2012. In 2004, responsibility for achieving the domestic target was divided between the relevant ministries. This provides for clearly defined responsibilities and stimulates integration of climate policy in relevant policy areas. Furthermore, an extensive programme for monitoring and evaluation of progress in climate policy was established in the NCPIP.

The general approach to achieving the domestic target consists of policies that greatly reduce emissions of the non-CO_2 greenhouse gases (CH_4, N_2O and the F-gases) on the one hand, and policies that aim at decoupling the growth in emissions of CO_2 from economic growth, on the other. Policies and measures affect all economic sectors and all greenhouse gases. They range from regulations to energy tax, subsidies, fiscal incentives, and voluntary agreements with (groups of) emitters. Since 2005, CO_2 emissions trading has been implemented as part of the European emissions trading system. Examples of policies and measures in the different sectors are: in the Energy sector, the stimulation of Combined Heat and Power (CHP) and renewable energy; in Industry, the stimulation of energy conservation and reduction of non-CO_2 greenhouse gases such as HFC during HCFC production; in Transport, measures aimed at improving vehicle efficiency and driving behaviour; in Agriculture, a reduction of energy use in greenhouse horticulture; and in the Waste sector, reduction of CH_4 emissions from landfill sites.

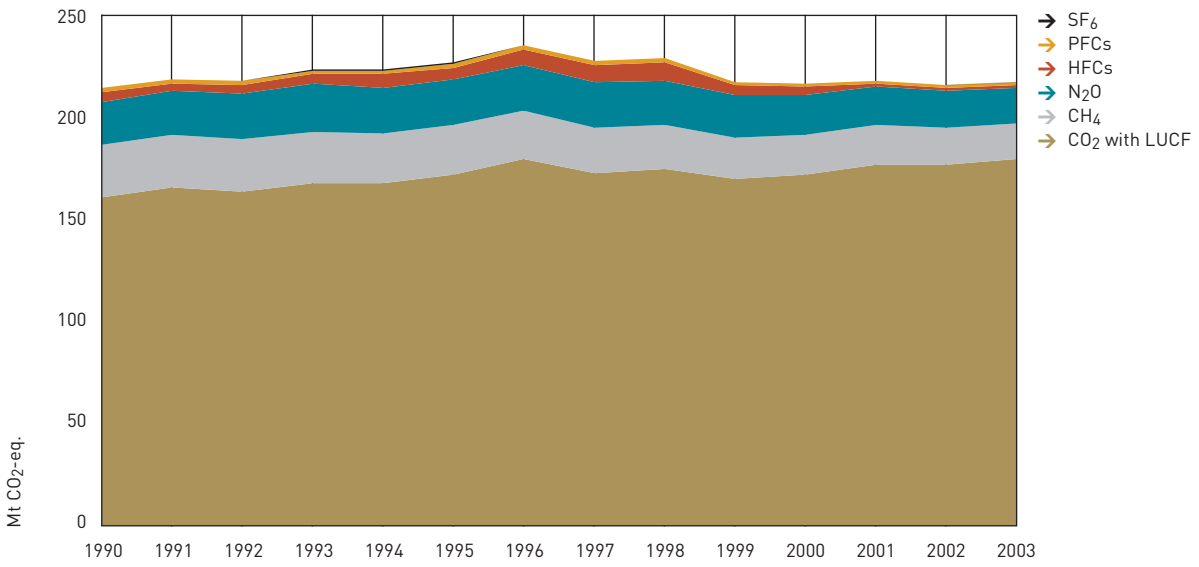
The Netherlands intends to purchase 100 Mt CO_2 equivalent emission reductions based on the Kyoto mechanisms. The Clean Development Mechanism (CDM) is expected to provide about two thirds, Joint Implementation (JI) the remaining third. By 2005, the target is entirely covered by either framework agreements with intermediary organisations, participation in funds, or project contracts. Institutional and financial arrangements have been made. The Netherlands was a first-mover on the market for emission reductions based on Kyoto mechanisms, thereby contributing to the development of this market and the instrument itself.

An estimation of emission reduction effects shows that domestic policies and measures between 1990 and 2000 reduced emissions by 26 Mt CO_2 equivalents in 2000. The largest contributions were from the stimulation of CHP (about 4 Mt), HFC reduction during HCFC production (about 5.5 Mt) and reduction of CH_4 emissions from landfill sites (about 4 Mt).

Figure S.1 shows the trend in historical greenhouse gas emissions between 1990 and 2003. It shows a slight increase of 1%, while economic growth in this period was 35%. The emission of CO_2 increased by 12%. This growth was offset by a decrease in non-CO_2 greenhouse gas emissions of more than 30%. These figures confirm the general approach of slowing down growth of CO_2 emissions and greatly reducing the emissions of non-CO_2 greenhouse gases. In 2003, total greenhouse gas emissions (215 Mt CO_2 equivalents) were below the domestic target of 220 Mt CO_2 equivalents in 2010.

Projections for future greenhouse gas emissions have been made for two scenarios: the Strong Europe scenario (SE), which assumes strong international co-operation and public responsibility with an average annual GDP (Gross Domestic Product) growth of 1.7%, and the Global Economy scenario (GE), which is oriented sharply towards international trade but little political co-operation and assumes an average annual GDP growth of 2.7%. Both 'without measures', 'with measures' and 'with additional measures' projections are made. The 'with measures' projections show that until 2010, CO_2 emissions will continue to rise at a similar pace as before. Non-CO_2 emissions will continue to decrease further. The emissions of the Energy and Transport sectors will continue to rise, while Industry will increase slightly again from 2005 onwards, after a decline in the years before. The Agriculture, Buildings and Waste sectors will decrease further. Figure S.2 shows the projections for total greenhouse gas emissions. They will increase further until 2010, in the GE more than in the SE scenario.

Figure S.1 Total greenhouse gas emissions: emission levels, trends and share of gases, 1990-2003 (No T-corr.)



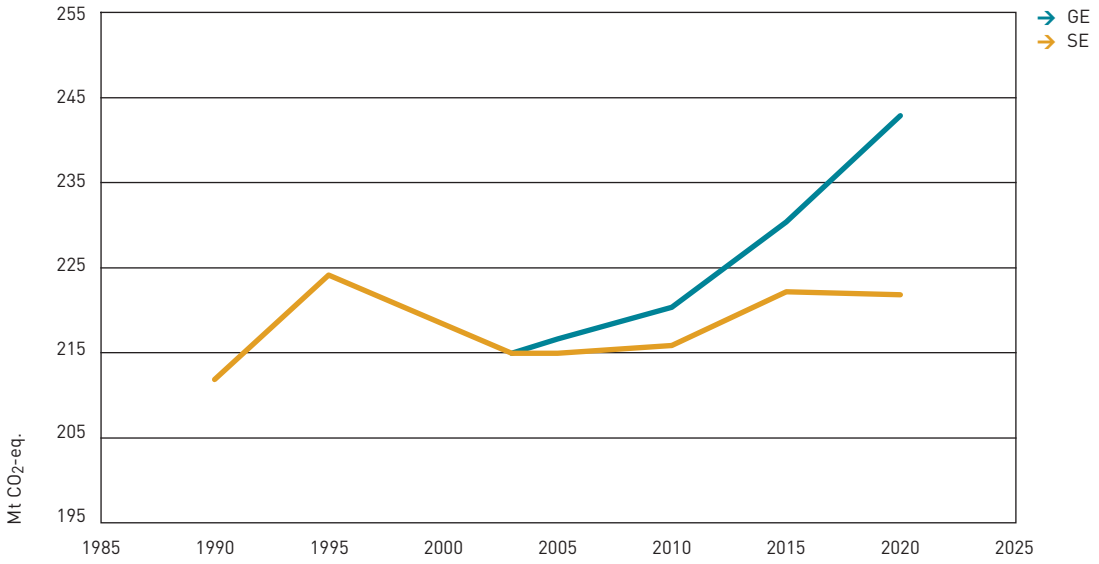
The projected effects of policies and measures between 2000 and 2010 are a reduction of about 22 Mt CO_2 equivalents in 2010. The largest contributions are from renewable energy (about 4 Mt), energy conservation and reduction of non-CO_2 greenhouse gases in industry, and reduction of CH_4 emissions at landfill sites. The additional measures are projected to have an effect of about 5.5 Mt CO_2 equivalents in 2010, mostly from the reduction of N_2O emissions during nitric acid production.

Based on the projections and the preliminary Kyoto target of, on average, 200 Mt CO_2 equivalents a year from 2008-2012, it is possible to preliminarily assess whether the Netherlands' climate policy will be sufficient for meeting its Kyoto target. Figure S3 illustrates how climate policy contributes to the Netherlands' meeting its Kyoto target. It shows that the Netherlands is projected to meet its Kyoto target. Policies and measures implemented so far will reduce emissions by 22 Mt CO_2 equivalents in 2010 (while policies and measures between 1990 and 2000, not shown in the figure, already reduced emissions by about 26 Mt). Additional measures may reduce emissions even further, while use of Kyoto mechanisms will fill the remaining gap. Depending on the scenario, it may or may not be necessary to implement all additional measures and/or purchase all 20 Mt CO_2 equivalents a year of emission reductions based on the Kyoto mechanisms. However, uncertainties should be considered with this conclusion.

The second Evaluation of the NCPIP assesses the uncertainties with regard to the achievement of the Netherlands' Kyoto target. It proposes actions to reduce the risks and secure achievement of the Kyoto target. According to the second Evaluation of the NCPIP, the chance of achieving the domestic target may be 90%, provided that the policy in preparation will be implemented and have effect, and the national emission ceiling for the European emissions trading system will not exceed the current one. Actions to secure achievement of both the domestic target and that for the Kyoto mechanisms are:

- the additional measures will be elaborated further and implemented
- to limit risks, a set of domestic reserve measures is in preparation
- the national ceiling for CO_2 emissions trading, to be

Figure S.2 Actual and projected emissions of greenhouse gases (CO_2, CH_4, N_2O and F-gases) 1990-2020 (excl. LULUCF, with measures)



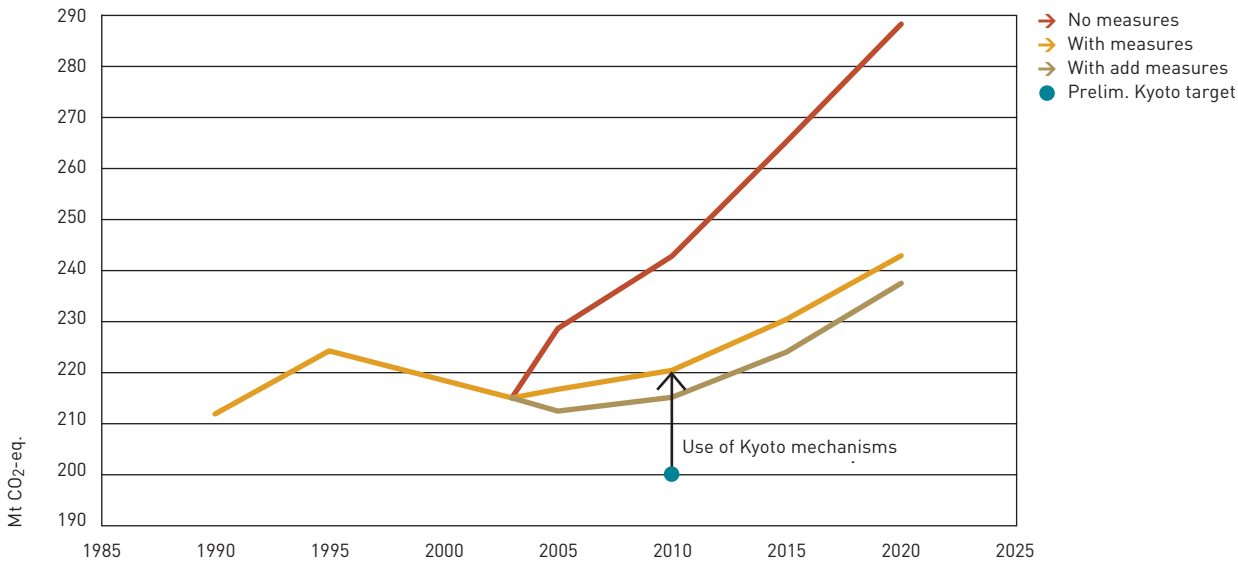
determined in early 2006, will be taken into account
- possible reserve measures to reduce risks for the Kyoto mechanisms will be assessed
- from 2006 onwards, annual intermediary assessments will be held to judge uncertainties and decide on the use of reserve measures

Since the signing of the Kyoto Protocol, the Netherlands' government has aimed at achieving the Netherlands' Kyoto target. The current Cabinet, which took office in 2003, has reaffirmed this political will. The elaborate climate policy and its estimated past and future emission reduction effects prove that this political will has resulted in actions. Through the extensive programme for monitoring and evaluation of the progress in climate policy, of which the recent second Evaluation of the NCPIP is an example, the Netherlands keeps track of its progress towards its Kyoto target. Projections show that the Netherlands will achieve its Kyoto target, which will be ensured by assessing progress annually and taking actions when necessary.

The Netherlands will establish its National System of institutional, legal and procedural arrangements for monitoring greenhouse gas emissions from sources and removals by sinks by the end of 2005. In order to ensure that monitoring complies with UNFCCC and IPCC guidelines, an improvement programme has been carried out. The resultant improved methods are laid down in protocols that form part of the National System. The establishment of the National System is on time for the deadline set by the European Union (end of 2005) and that set by the Kyoto Protocol (end of 2006).

In addition to mitigation measures, the Netherlands has also implemented and is preparing adaptation measures. The climate in the Netherlands will undergo significant changes in the coming decades. The most pressing consequences include sea level rise, wetter winters, drier summers and changes in biodiversity. At the same time, the Netherlands is subsiding. These conditions will result in climate change impacts that will have to be counteracted. Adaptation to climate change impacts has gradually gained importance on the political agenda. At the moment, adaptation is developed most strongly in the water sector.

Figure S.3 Effect of (additional) measures on total greenhouse gas emissions in relation to the Netherlands' (preliminary) Kyoto target (GE scenario)



Possible impacts of climate change for the Netherlands have been identified. For water and water management, the main impacts are sea level rise, an increase in river water discharge and increased rainfall. Important impacts for coastal areas and coastal defence are sea level rise and more storms. Impacts for nature, agriculture, food security and health are diverse and the net impact is still uncertain.

Adaptation measures for water and water management have been integrated into existing policies, such as the Dutch water policy. The core of this general policy is to give water more space. This is further detailed in the policy document 'Room for the River'. The government plans to invest €2.2 billion in improving safety against flooding river areas. Furthermore, dredging is applied as a dynamic measure. €700 mln is reserved for maintenance of inland waterways for the 2004-2010 period. Co-operation between the various authorities responsible for water management (national government, provinces, water boards and municipalities) is laid down in an Administrative Agreement. The challenges of climate change are also emphasised in the Dutch coastal plan. The coast is dynamically managed through sand suppletion. Projected costs amount to €45 mln a year.

The Netherlands' research on climate change is well embedded in, acknowledged by and co-steered in the three large international scientific programmes in the field of global change research. Extensive support is also given to the work of the IPCC. Several Dutch scientists contribute as (lead) authors to publications of the IPCC. Furthermore, many Dutch institutions carry out research projects under the 5th and 6th Framework Programme of the European Union.

The Netherlands provides assistance to developing countries and countries with economies in transition to support mitigation of climate change and adaptation to its adverse effects. This is done through a variety of programmes and projects, encompassing activities in education, capacity building, institutional set-up, research and the transfer of environmentally sound technology.

In recent years, the Netherlands has maintained its Official Development Assistance budget at more than 0.8% of its GNP, meeting the UN target of 0.7%. This budget includes expenditures on assistance in the field of the environment, including climate change. For example, in addition to other multilateral contributions, the Netherlands contributed about €29 mln for the 2001-2004 period to the Global Environment Facility (GEF) as operating entity of the financial mechanism of the UNFCCC. In addition to multilateral support, the Netherlands also has a bilateral co-operation programme in place.

The Netherlands' general climate change policy for development co-operation has the following areas for support:
- adapting to the adverse effects of climate change
- building capacity and developing institutes required for climate policy as well as for the Clean Development Mechanism.
- transferring CO_2-reducing technologies
- contributing towards providing access to energy services for the poor, where possible through low carbon development

Table S.1. presents the Netherlands' co-operation contributions to climate change for the 2001-2004 period (in mln euro).

Examples of bilateral assistance for mitigation are the FINESSE (Financing Energy Services for Small Scale End Users) projects in Asia and Africa. The Programme of Eastern European Co-operation (PSO) supports the transfer of knowledge and know-how from the Dutch private sector to central and eastern European countries. The Netherlands' projects include support for capacity building for the Clean Development Mechanism and Joint Implementation. An example of bilateral assistance for adaptation is the Netherlands Climate Assistance Programme.

Table S.1 Amounts and categories of funding for the years 2001 to 2004 by the Dutch Minister for Development Co-operation (in mln €)

		2001	2002	2003	2004
Bilateral	Mitigation	45.58	35.98	52.92	54.46
	Adaptation	4.50	10.78	9.38	6.58
Multilateral	UNDP	0.16	0.53	0.84	1.31
	UNEP		0.60	3.53	2.10
	AsDB	0.94	1.69	1.48	0.69
	AfDB			1.66	1.30
	WB	n.a.	n.a.	n.a.	n.a.
GEF		5.34	5.74	10.75	7.57
New funds	LDC				0.10
	SCCF				
	Adaptation Fund				
Total		**56.52**	**55.31**	**80.56**	**74.10**

1. Policies and measures

1.1 Introduction

Paragraph 1.2 describes legal and institutional steps, and domestic compliance and enforcement regarding implementation of the Netherlands' Kyoto target. These provide the legal and political frameworks for the Netherlands' climate policy. Furthermore, this chapter describes policies and measures and their effects. Since the Netherlands decided to achieve its Kyoto target both by domestic policies and measures and by use of the Kyoto mechanisms, both are described, in paragraph 1.3 and paragraph 1.4, respectively.

1.2 Legal and institutional steps and domestic compliance and enforcement regarding implementation of the Netherlands' Kyoto target

1.2.1 The Netherlands' emission reduction target under the Kyoto Protocol

The Netherlands ratified the Kyoto Protocol on 31 May 2002. The greenhouse gas emission reduction target for the Netherlands in the period 2008-2012 under the Kyoto Protocol is 8% less than greenhouse gas emissions in the base year. For the Netherlands, the base year for CO_2, CH_4 and N_2O emissions is 1990, for the F-gases it is 1995. The Netherlands is a member state of the European Union (EU). The reduction percentage of 8% was agreed for all countries that were a member state of the EU when the Kyoto Protocol was signed and for the EU as a whole. Within this group of EU member states, the joint reduction percentage was divided amongst member states in the burden-sharing agreement (European Council decision 2002/358/CE). For the Netherlands, this resulted in a 6% reduction percentage instead of 8%. Based on a preliminary assessment of the assigned amount for the Netherlands, using this percentage and preliminary figures for greenhouse gas emissions in the base year, a level of on average 200 Mt CO_2 equivalents a year in the 2008-2012 period is assumed as the Kyoto target in designing climate policy in the Netherlands.

1.2.2 National Climate Policy Implementation Plan

The National Climate Policy Implementation Plan (NCPIP, issued in two parts in 1999 and 2000) outlines how the Netherlands intends to meet its emission reduction commitments under the Kyoto Protocol. An important aspect of the Netherlands' climate policy, described in the NCPIP, is that the Kyoto target will be achieved both by domestic policies and measures and by use of the Kyoto mechanisms, CDM and JI. Currently, this is being elaborated into a domestic target of 220 Mt CO_2 equivalents in 2010, and a target for the purchase of emission reductions based on Kyoto mechanisms of 20 Mt CO_2 equivalents a year from 2008 to 2012 (a total of 100 Mt CO_2 equivalents).

1.2.3 Relevant inter-ministerial decision-making processes: sectoral target values

In January 2004, a major change in the Netherlands' approach to its national climate policy aimed at achieving the domestic target occurred with the adoption of target values for CO_2 emissions from four major sectors and for total emissions of the non-CO_2 gases in 2010 (see table 1.1). The sectors with a CO_2 target are Energy and Industry, Agriculture, Traffic and Transport, and Households, Trade and Services (referred to in the Netherlands as the Buildings Sector). The sectoral target values add up to 218 Mt CO_2 equivalents in 2010, somewhat below the domestic target of 220 Mt CO_2 equivalents in 2010. The responsibility for meeting the sectoral target values is delegated to the relevant ministries as indicated in table 1.1. This inter-ministerial agreement thus provides a system with clearly defined responsibilities for meeting the domestic target. It also stimulates the integration of climate policy in other policy areas.

1.2.4 Monitoring and evaluation of progress with climate policies and measures

The sectoral target value approach includes a monitoring system based on an annual assessment of progress. Emission levels for the sectors are determined based on a rolling three-year average. Should the rolling average indicate growth that puts the target value at risk, it is up to the ministry responsible to develop proposals to remedy the situation.

The NCPIP provides for evaluations of progress in climate policy in 2002, 2005 and 2008. When the sectoral target values were established, it was agreed to select one sector every year for an in-depth ex-post evaluation of (cost-)effectiveness. So far, the buildings and transport sectors have been evaluated.

Table 1.1 Sectoral target values in 2010, in Mtonnes of CO_2 equivalents

Sector	Target value 2010	Responsible ministries
CO_2		
Industry and Energy	108.6	Economic Affairs
Agriculture	7.5 (8.1)*	Agriculture, Nature and Food Quality
Traffic and Transport	38.7	Transport, Public Works and Water Management; Housing, Spatial Planning and the Environment
Buildings	28	Housing, Spatial Planning and the Environment
Subtotal	*182.8 (183.4)*	
non-CO_2 gases	35.4	Housing, Spatial Planning and the Environment
Total	**218.2 (218.8)**	

* If the area for greenhouse horticulture exceeds 11,500 acres, the target value for agriculture will be raised by at most 0.6 Mt.

1.2.5 The European policy context

As an EU member state, the Netherlands is also subject to EU climate policy and applies EU Common and Co-ordinated Policies and Measures (CCPMs) relevant for climate change. Examples are the following: the European Council decision 2002/358/CE regulates the burden-sharing of the EU emission reduction target for the Kyoto Protocol (8%), the EC decision 280/2004/EC, known as the Monitoring Mechanism decision, sets forth that progress of the EU towards the Kyoto target is assessed annually and the EU directive 2003/87/EC introduced the European system for CO_2 emissions trading.

1.2.6 Programmes for domestic compliance and enforcement

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

The Environmental Management Act provides the legal basis for most environmental regulations that affect emissions of greenhouse gases (for example, in the fields of waste prevention and landfill policy, environmental permits and CO_2 emissions trading). The Environmental Management Act also provides the framework for enforcing commitments undertaken in Long-Term Agreements on Energy Efficiency and the Benchmarking Covenant by companies.

Chapter 18 of the Environmental Management Act contains the enforcement provisions. It notes, among other things, which authorities are responsible for enforcement and requires them to designate officials to be charged with monitoring compliance. Authorities have several possibilities for imposing sanctions if violations occur. They may, for example, order that the situation be brought into compliance at the expense of the violator or impose a pecuniary penalty or withdraw a licence. The possibility of criminal sanctions also exists.

The statutory basis for the energy performance standards (EPN and EPC, see paragraph 1.3.9) that apply to new buildings is the Housing Act rather than the Environmental Management Act.

The standards themselves are set down in a decree pursuant to this Act, the Buildings Decree. The Buildings Decree also empowers municipal authorities to grant building permits when the building design is judged to meet the standards in the Decree. Compliance and enforcement authority is also vested in municipal authorities.

1.3 Domestic policies and measures

This paragraph describes policies and measures implemented since 1990 that have had, or are expected to have, a large 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 is organised by sector using the sectoral definitions requested by the UNFCCC guidelines (Energy, Transport, Industry, Agriculture, Forestry and Waste). The exact relation between these sectors and the IPCC source categories is described in the 4th National Communication.

Each section describes groups of policies and measures organised according to greenhouse gas; only the most important ones are described in detail. Each section ends with a summary table showing the effects realised in the sectors in terms of avoided emissions in the year 2000 as well as projected effects in the years 2005, 2010, 2015 and 2020. The projected effects have been estimated against the background of the Global Economy scenario described in chapter 2.

1.3.1 The general approach

The general approach for domestic policies and measures is outlined in the NCPIP. First, policies are pursued that greatly reduce emissions of the non-CO_2 greenhouse gases. Emissions of CH_4, N_2O and the F-gases have fallen by more than 30% since 1990 and are still declining. This reduction has been enough to compensate for the continued growth in CO_2 emissions. As far as CO_2 is concerned, policies and measures are aimed at decoupling the growth of CO_2 emissions from economic growth by encouraging energy conservation and use of renewable energy. CO_2 emissions increased structurally by about 0.8% a year between 1990 and 1998 (T-corrected); since 1998, average growth has slowed to 0.3% a year. Policies include a mixed bag of regulatory command and control

Table 1.2 Cross-sectoral policies and measures

	sector affected					
Instrument	households	services	agriculture	industry	energy	transport
Energy tax	■	■	■	■		
Climate Covenant	■	■	■	■	■	
EIA		■	■	■	■	■
Long-Term Agreements Energy Efficiency		■	■	■		
Benchmark Covenant				■	■	
CO_2 Reduction Programme / General			■	■	■	
Reduction Programme Non-CO_2 Gases			■	■	■	■
MEP			■	■	■	
CO_2 Emissions Trading				■	■	

measures, energy taxes, subsidies and fiscal incentives, and voluntary agreements with (groups of) emitters. CO_2 emissions trading was implemented in 2005 as part of the European emissions trading system.

1.3.2 Cross-sectoral Policies

Some policies apply to more than one sector. Existing cross-sectoral instruments include: Energy Investment Tax Deduction (EIA), CO_2 Reduction Programme/General, Reduction Programme Non-CO_2 Gases, Energy Tax, Environmentally Friendly Electricity Production Programme (MEP), Long-Term Agreements, Benchmark Covenant, CO_2 Emissions Trading and Climate Covenant with provinces and municipalities. The sectors affected by these policies are shown in Table 1.2.

CO_2 Reduction Programme/General (status = implemented)

The CO_2 Reduction Programme provides support to large-scale investment projects that contribute substantially to reducing national emissions of CO_2. The aim of the programme is to encourage investment in projects that are not yet profitable enough for independent market introduction. Cost-effectiveness is the chief criterion for assessing projects, the avoided emission per euro of subsidy must be as large as possible. The budget for the programme is €351 million. The goal of the programme is to reduce emissions by 4 or 5 Mtonnes of CO_2 equivalents a year in 2008-2012, due to the investment projects.

Reduction Programme Non-CO_2 Gases (status = implemented)

The Reduction Programme Non-CO_2 Gases was set up in 1999 and is expected to run until 2012. Its object is to reduce Dutch emissions of the non-CO_2 greenhouse gases to an average level of 33 Mtonnes of CO_2 equivalents in the period 2008-2012. Its activities include improving information about emission factors and emission levels, subsidising research into and development of new emission reduction methods and techniques and encouraging implementation of measures. The government has made a total of about €200 million available over the 1999-2012 period for subsidies, grants and tax breaks in this area.

CO_2 Emissions Trading (Status = implemented)

As prescribed by EU Directive 2003/87/EC, a trading system for CO_2 emissions started in the EU on 1 January 2005. Its initial focus is on CO_2 from large industrial emitters. It is a cap and trade system, where participants are distributed a set amount of allowances up front and they are required to annually submit an amount of allowances that is equal to that. Companies are allowed to use credits from Kyoto mechanisms to help comply with their obligation. Member states were required to develop a national allocation plan that states the total number of allowances allocated in the first trading period (2005 to 2007) and how many each installation covered by the scheme will receive. The Dutch Allocation Plan was finalised in August 2004. The allocation decision was completed in October 2004. Allocations have been made to 206 installations that together are responsible for about 40% of total CO_2 emissions in the Netherlands.

1.3.3 Energy (CO_2)

CO_2 policies relating to the energy sector have traditionally fallen into three general categories: those aimed at encouraging the use of renewable energy (such as the special provisions under articles 36o, 36i, and 36r of the Energy Tax, the Environmentally Friendly Electricity Production Programme, the Intergovernmental Wind Energy Agreement known as BLOW, and the Coal Covenant), those aimed at increasing the penetration of combined heat and power (such as the special gas price, the energy tax exemption for combined heat and power (CHP), gas and own use of CHP electricity, the CO_2 Reduction Programme), and those aimed at improving the efficiency of electric power plants (electric power producers and refineries participate in the Benchmark Covenant). The Energy Investment Tax Deduction (EIA) supports measures in all three categories.

- Environmentally Friendly Electricity Production Programme (MEP) (status = implemented)

This subsidy programme was introduced in July 2003 and replaced special energy tax provisions designed to encourage the supply of renewable energy. The MEP programme provides subsidies for environmentally friendly electricity generation, specifically that based on renewable energy and combined heat and power. This subsidy is granted for a maximum period of 10 years and the amount of the subsidy depends both on when the investment is made and the type of installation.

- Coal Covenant (status = implemented)

The government and the owners of existing coal-fired power plants signed this agreement in 2002. The companies

Table 1.3 Summary of Emission Reductions in the Energy Sector, in Mtonnes of CO_2-equivalent avoided emissions a year

policy cluster	gas	realised	projected			
		2000	2005	2010	2015	2020
combined heat and power	CO_2	4.2	1.0	1.9	1.6	1.3
renewable energy	CO_2	1.0	1.5	4.1	9.4	18.8
CO_2 emissions trading	CO_2	--	0.3	1.1	3.6	1.0
low methane oil and gas production	CH_4	1.5	0.3	0.3	0.3	0.3
total		6.7	3.1	7.1	14.9	21.4

committed themselves to increasing the amount of biomass used in their plants, with the goal of reaching an average during the period 2008-2012 that corresponds with 503 MWe of installed biomass capacity, good for 3.2 Mtonnes of CO_2 emission reduction. In 2003 (the last year for which a monitoring report is available) their use of biomass was good for 0.7 Mtonnes of CO_2 reduction.

- Intergovernmental Wind Energy Agreement (BLOW) (status = implemented)

The Intergovernmental Wind Energy Agreement (known by its Dutch acronym BLOW) was signed in July 2001. It contains agreements between central government, the provinces and the municipalities aimed at realising 1,500 MW of onshore wind power capacity in 2010.

Summary energy sector

Table 1.3 presents a summary of the emission reduction effects of the policies and measures affecting emissions from the energy sector in the 1990-2020 period.

1.3.4 Industry

CO_2

Policies affecting CO_2 emissions are generally aimed at improving industrial energy efficiency. They include the Energy Efficiency Benchmarking Covenant, Long-Term Agreements (LTAs) with industrial sectors backed up by environmental permits based on the Environmental Management Act, and the Energy Investment Tax Deduction (EIA) within the corporate income tax. The CO_2 Reduction Programme/General, a cross-sectoral subsidy scheme, is also available to firms in the industrial sector.

With the introduction of CO_2 emissions trading as of 1 January 2005, the impact of policies aimed at encouraging energy savings is expected to decline as the market price of CO_2 allowances becomes the driving force behind investments in energy efficiency by the companies falling under the trading scheme.

- Benchmarking Covenant (status = implemented)

The Benchmarking Covenant between national and provincial governments and industrial representatives dates from 1999. It is a negotiated agreement in which participating firms (energy intensive companies with annual energy consumption of 0.5 PJ or more) have committed themselves to achieving (and/or holding) a position among the most energy-efficient in their business, in the world, no later than 2012. International standards of comparison (benchmarks) are developed for each industrial process covered by the agreement.

- Long-Term Agreements on Energy Efficiency and Environmental Permits (status = implemented)

Negotiations between the government and less energy intensive industries have resulted in a second generation of Long-Term Agreements on energy efficiency. The government supports these agreements with fiscal incentives such as the EIA, described below, and enforces them with environmental permits. Measures arranged under these agreements are taken over in the permit. Companies that do not participate in the agreements are required (in their permits) to take all energy-saving measures with an internal rate of return of at least 15% after taxes.

Table 1.4 Summary of Emission Reductions in the Industry Sector, in Mtonnes CO_2-equivalent avoided emissions a year

policy cluster	gas	realised	projected			
		2000	2005	2010	2015	2020
energy efficiency	CO_2	3.2	0.9	1.4	2.1	2.1
CO_2 emissions trading	CO_2	-	-	0.3	0.5	0.3
low-HFC HCFC production	HFC	5.4	1.9	1.9	1.9	1.9
reduction Programme Non-CO_2 Gases	HFC/PFC	--	0.5	1.0	1.0	1.0
low-PFC aluminium production	PFC	1.1	1.1	1.1	1.1	1.1
total		**9.7**	**4.4**	**5.7**	**6.6**	**6.4**

- Energy Investment Tax Deduction (EIA, status = implemented)

The Energy Investment Tax Deduction allows entrepreneurs who invest in relatively innovative energy-efficient technologies or in renewable energy to deduct part of their investment costs from their corporate income tax under certain conditions. The scheme was introduced in 1997. Lists of eligible technologies and equipment are updated annually.

N_2O

- Low-N_2O nitric acid production (status = planned)

There are two companies producing nitric acid in the Netherlands, emitting on average 5.3 Mtonnes CO_2 equivalents of N_2O emissions a year. The NCPIP identified N_2O reduction from these plants as a reserve measure, to be prepared for future implementation should circumstances warrant it. In 2002, the Cabinet decided to 'activate' this measure and put it into effect regardless of whether it would be necessary for achieving the Kyoto target. At the same time, a Best Reference Document (BREF) pursuant to Directive 96/61/EC (Integrated Pollution Prevention and Control) is currently being drafted for the fertiliser industry. The total emission reduction potential of measures in nitric acid production plants has been estimated at 4 Mtonnes CO_2 equivalents in 2010. How much of this potential will be harnessed will depend on how the BREF defines Best Available Technology for this process.

HFC

- Low-HFC HCFC production (status = implemented)

There is one producer of HCFC-22 in the Netherlands. The environmental permit for this plant required installation of an afterburner to reduce emissions of HFC-33. More than €10 million has been invested in this afterburner since 1997, with the government contributing about €0.25 million in subsidy for the reserve unit (from the Reduction Programme Non-CO_2 Gases).

PFC

- Low-PFC aluminium production (status = implemented)

The Dutch government has negotiated an environmental covenant with the aluminium industry that includes emission reduction targets for a large number of pollutants, including

both PFCs and CO_2. The government has also provided financial support (amounting to €1.5 million from two different subsidy programmes, the CO_2 Reduction Programme and the Non-CO_2 Reduction Programme) for modernisation of one of the two production plants, which resulted not only in reduction of PFC emissions, but also in decreased electricity use and reduced emissions of fine particulates. The environmental permits of the installations concerned set a maximum level on emissions of PFCs.

Summary industry sector

Table 1.4 presents a summary of the emission reduction effects of the implemented policies and measures affecting emissions from the industry sector in the 1990-2020 period.

1.3.5 Transport (CO_2)

Policies and programmes that affect CO_2 emissions in the transport sector can be grouped loosely into four main categories:

- Policies aimed at improving fuel efficiency through technical measures on vehicles include energy labelling of new vehicles, a rebate on fuel efficient cars that was in effect in 2002, the ACEA covenant with car manufacturers that has been agreed on at European level, and various subsidy programmes.
- Policies aimed at improving fuel efficiency through driving behaviour and discouraging vehicle use such as the 'Buy Fuel Efficient! Drive Fuel Efficient!' programme, which was followed by The New Driving Force in 1999, stepped up the enforcement of speed limits, various tax measures aimed at stimulating econometers, on-board computers and cruise control, and programmes aimed at logistical and other measures.
- Policies aimed at encouraging modes of transport with smaller emission impacts.
- A fourth group is more difficult to categorise, since it includes policies with various kinds of effects. Excise duties on motor fuels primarily have a revenue raising function, but also impact CO_2 emissions through their effect on fuel prices. The CO_2 Reduction Programme/Passenger Transport aims to support investments in materials and the training of municipal officials, while the objective of the EU Biofuels Directive is to encourage use of renewable energy in the transport sector.

Table 1.5 Summary of Emission Reductions in the Transport Sector, in Mtonnes CO_2-equivalent avoided emissions a year

policy cluster	gas	realised	projected			
		2000	2005	2010	2015	2020
technical measures in vehicles	CO_2	--	0.2	0.4	0.4	0.4
driving behaviour/ discouraging vehicle use/ shifting modal split	CO_2	--	0.5	0.9	0.9	0.9
other (chiefly excise duties)	CO_2	1.2	--	--	--	--
total		**1.2**	**0.7**	**1.4**	**1.3**	**1.3**

A number of the policies and programmes currently in effect or in the planning stage are described in greater detail in the following sections.

- The New Driving Force (status = implemented)

The New Driving Force programme was introduced in two phases, building on a previous programme called 'Buy Fuel Efficient! Drive Fuel Efficient'! The objective of the programme is to reduce CO_2 emissions by changes in driving behaviour. The programme has four different modules: in-car apparatus, licensed drivers, driver education and research. The government made €11 million available for this programme in 1999 and an additional €10 million for a second phase in the 2004-2006 period.

- EU Biofuels Directive (status = planned)

The government announced its intentions regarding the EU biofuels directive in its Traffic Emissions Policy Document issued in 2004. It is doing its utmost to introduce an incentive scheme for biofuels from 2006. The necessary research and preparation, including the funding, are underway. In addition to

reducing CO_2 emissions, another important objective is setting in train innovations that target second-generation fuels. Preparations are being made in co-operation with the market (oil companies, chemical companies, etc.) and non-governmental organisations.

Summary transport sector
Table 1.5 presents a summary of the emission reduction effects of the policies and measures affecting the transport sector in the 1990-2020 period.

1.3.6 Agriculture

CO_2
The largest agricultural source of CO_2 emissions in the Netherlands is the greenhouse horticulture sector, which is responsible for about 80 per cent of emissions in the sector. The most important policies affecting CO_2 emissions from greenhouse horticulture are the Glami Covenant and regulations referred to as the Orders In Council Greenhouse Horticulture. These policies aim at improving energy efficiency.

Table 1.6 Summary of Emission Reductions in the Agriculture Sector, in Mtonnes CO_2-equivalent avoided emissions a year

policy cluster	gas	realised	projected			
		2000	2005	2010	2015	2020
energy savings in greenhouse horticulture	CO_2	0.9	0.2	0.4	0.8	0.7
livestock reduction	CH_4	2.0	0.1	0.3	0.15	--
manure management	N_2O	-1.5	0.4	0.6	0.3	--
total		**1.4**	**0.7**	**1.3**	**1.25**	**0.7**

In addition, Long-term Agreements on Energy Efficiency have also been negotiated with a number of other agricultural subsectors. The cross-sectoral policies MEP, EIA and the CO_2 Reduction Programme also affect CO_2 emissions in the agricultural sector.

CH_4
There are no specific policies aimed at reducing emissions of the non-CO_2 gases from the agricultural sector, although there are programmes that subsidise research and development and practical experimentation. The milk quota, which is part of the EU Common Agricultural Policy, has had an impact on the size of the dairy cattle herd in the Netherlands and on the associated CH_4 emissions. Manure policies, which regulate the application of nitrogen to the soil, also impact on the size of the livestock population.

N_2O
While there are no specific policies aimed at reducing emissions of N_2O from the agricultural sector, the standards applying to using manure on the soil and the nitrogen standards applying to total use of manure and artificial fertiliser do have an impact.

Summary agriculture sector
Table 1.6 presents a summary of the emission reduction effects of the policies and measures affecting the agricultural sector in the 1990-2020 period.

1.3.7 Forestry (CO_2)
The National Ecological Network and the creation of recreational facilities are the most important goals of the national forestry strategy. Combating climate change is just one of the benefits of this strategy.

1.3.8 Waste (CH_4)
Government policies include both those aimed at reducing the amount and composition of waste to be dumped and those aimed at collection and utilisation of landfill gas for energy production.

The general objective of waste policies is to reduce the amount of waste generated and dumped. Waste should be dumped at landfill sites only when there is no other waste treatment option

Table 1.7 Summary of Emission Reductions in the Waste Sector, in Mtonnes CO_2-equivalent avoided emissions a year

policy cluster	gas	realised	projected			
		2000	2005	2010	2015	2020
landfill policies	CH_4	4.0	3.0	4.0	5.0	6.0

available. The quantity of dumped waste fell from 14 Mtonnes in 1990 to about 5 Mtonnes in 2000 and is still decreasing. It has been estimated that this reduction in the amount of waste to be dumped reduced methane emissions by 4 Mtonnes CO_2-equivalents in 2000. This was achieved through a variety of policies and measures, such as collection of vegetable, fruit and garden waste separately from other household waste, useful application of waste, the expansion of incineration capacity, and discouraging waste dumping through landfill bans and high dumping tariffs contained in environmental taxes.

Policy instruments deployed to encourage the collection and utilisation of landfill gas include regulations as well as economic instruments (subsidy programmes and tax incentives). The regulations are aimed both at reducing methane formation and at reducing emissions while the landfill is in operation and after it has been closed.

Total investment costs for landfill gas collection and utilisation projects in the 1990-2003 period have been estimated at €35 to 55 million. Financing of these investments is very site specific. The landfill gas extraction part of the project is generally financed from dumping charge revenues. In addition, there has been financial support from governmental programmes and energy companies for projects that utilise landfill gas in energy production.

Summary waste sector

Table 1.7 presents a summary of the emission reduction effects of the policy measures affecting the waste sector in the 1990-2020 period.

1.3.9 Buildings sector (households and services) (CO_2)

The set of policies deployed in this sector has been designed to address specific issues in three different target group segments: new buildings, retrofit of existing buildings, and appliances. The set consists of a mixture of regulations, economic instruments and information and outreach programmes, supported by an energy tax. Agreements have been negotiated with important intermediary parties in the residential sector (such as housing developers and local governments) and with branch organisations in the non-residential sector.

- New buildings

The main policy instrument pertaining to new buildings in both residential and non-residential sectors is the Energy Performance Norm (EPN). The Building Code was amended in December 1995 to allow tighter regulations pertaining to energy use in new residential buildings. The object was to realise energy savings of 15 to 20 percent relative to the standards that existed before the Building Code was amended. The standard is expressed as a coefficient. The lower the value of the coefficient, the better the energy performance in the buildings. The coefficient for residential buildings was originally set at 1.4 or lower and has since been tightened. The EPN for non-residential buildings differs by type of building and has been tightened twice since its introduction in 1995.

- Existing buildings

The most important framework for encouraging energy conservation in existing residential buildings (including appliances) during the 1990-2000 period was the Environmental Action Plan (MAP) of the energy companies, which provided both information and financial support for measures to save

Table 1.8 Summary of Emission Reductions in the Buildings Sector, in Mtonnes CO_2-equivalent avoided emissions a year

policy cluster	gas	realised	projected			
		2000	2005	2010	2015	2020
energy performance of new buildings	CO_2	0.8	0.3	1.1	2.2	3.7
retrofit of existing buildings	CO_2	1.8	0.5	1.0	1.5	1.9
energy efficiency of appliances	CO_2	1.0	0.3	0.6	0.8	1.0
Total		**3.6**	**1.1**	**2.7**	**3.5**	**6.6**

energy. Financial support continued after the MAP expired in 2000 in a somewhat modified form in the Energy Premium Rebate (EPR) programme, in effect from 2000 to 2005. The EPR has been repealed but may be replaced with a scheme for subsidising large-scale projects in existing buildings through a system of tenders, for which the government has made €34.5 million available if needed. Information on energy saving potential is currently provided through the Energy Performance Advice (EPA) programme.

- Non-residential buildings

Various policies have been introduced to encourage energy savings in non-residential buildings. Financial support has been available, first through the MAP (1990-2000) and since 1997 also through the Energy Investment Tax Deduction (EIA) for commercial firms (1997-present) and the Energy Investment Subsidy Programme for Non-Profit Organizations (EINP, 1997 - 2002). Variable depreciation of energy investments under the corporate income tax (Vamil) was possible from 1997 until 2002. Long-term agreements on energy efficiency (LTAs) have been signed with a number of subsectors and a start has been made with setting energy use standards based on the Environmental Management Act.

- Energy Tax (status = implemented)

This tax on natural gas and electricity has been in effect since 1996. It increases the impact of the policies and measures for buildings described above, because it makes energy saving more cost-effective. The objective of the tax was twofold: to encourage efficient use of energy and reduce CO_2 emissions from small-scale users of energy, and to provide revenues to cover the costs of lowering direct taxes. The rates of the tax have been raised several times since 1996, and other modalities of the tax have also been changed. Some of these changes were made as part of the implementation of the EU energy tax (Directive 2003/96/EC) in the Netherlands.

Summary buildings sector

Table 1.8 presents a summary of the emission reduction effects of the policy measures affecting emissions from the buildings sector in the 1990-2020 period.

1.4 Participation in the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol

1.4.1 Institutional arrangements

- Government use of the project-based mechanisms

The target for government use of the project-based mechanisms is 100 Mtonnes CO_2 equivalents over the 2008-2012 commitment period. The Clean Development Mechanism (CDM) is expected to provide about two thirds of the emission reductions, Joint Implementation (JI) the remaining third. The Ministry of Housing, Spatial Planning and the Environment (VROM) was designated as National Authority (DNA) for CDM and JI in the Netherlands. VROM delegated the selection of projects and the purchase of emission reductions from JI projects to the Ministry of Economic Affairs, which acts as the Netherlands' JI Focal Point.

- Clean Development Mechanism

Various types of instruments are being deployed by the government in order to acquire Certified Emission Reductions (CERs). Firstly, in order to stimulate the implementation of CDM, voluntary and not legally binding Memoranda of

Understanding (MoUs) have been signed with some potential host countries such as: Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Indonesia, Mexico, Nicaragua, Panama, and Uruguay. Secondly, 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 five tracks:

1. The government agency SenterNovem conducted a public procurement procedure called CERUPT
2. Facilities with multilateral and regional financial institutions: the International Finance Corporation (IFC), the International Bank for Reconstruction and Development (IBRD), and Corporacion Andina de Fomento (CAF)
3. Facility with a private international bank (the Rabobank)
4. Bilateral purchase agreement with a host country: Indonesia
5. Participation in carbon funds: the Prototype Carbon Fund (PCF) and the Community Development Carbon Fund (CDCF)

- Joint Implementation

The Netherlands has developed three instruments for obtaining Emission Reduction Units (ERUs). Firstly, the Emission Reduction Units Procurement Tender (ERUPT) is a tender scheme with which the government acquires ERUs directly from projects via a public procurement process. Secondly, the Ministry of Economic Affairs has signed a contract with the Prototype Carbon Fund (PCF), by which the PCF endeavours to acquire cost-effective ERUs for the Netherlands in exchange for a contribution to the fund. And finally, framework contracts have been signed with the World Bank (a co-operative arrangement between the International Bank for Reconstruction and Development and the International Finance Bank) and the European Bank for Reconstruction and Development (EBRD). Under the terms of these contracts the banks endeavour to deliver ERUs at agreed prices and times. Voluntary and not legally binding Memoranda of Understanding for co-operation on implementation of JI projects have been concluded with: Bulgaria, Croatia, Estonia, Hungary, Romania, Slovakia, and New Zealand.

- Situation as of 1 January 2005

Table 1.9 shows the situation as regards each of the instru-

Table 1.9 Status of CDM and JI instruments as of 1 January 2005, Mtonnes of CERs and ERUs included in framework agreements with intermediary organisations

Instrument	Clean Development Mechanism		Joint Implementation	
	organisation	Mtonnes contracted	organisation	Mtonnes contracted
Tenders	CERUPT	+/-2.5	ERUPT	15.5
Contracts with multilateral and regional financial institutions	IFC IBRD CAF	10 32 10	EBRD IFC&IBRD	6 10
Contracts with private financial institutions	Rabobank	10	--	
Participation in carbon funds	CDCF	+/-1	Prototype Carbon Fund	+/-2.5
Bilateral purchase agreement	Indonesia	2		

ments on 1 January 2005. Framework agreements with intermediary organisations and projects selected via CERUPT and ERUPT account for 99 of the 100 Mtonnes of ERUs and CERs the government intends to purchase.

1.4.2 Financial arrangements

The government has reserved roughly €606 million for acquisition of CERs and ERUs (€204 million for Joint Implementation and €402 million for Clean Development Mechanism).

1.4.3 Decision-making procedures

Decision-making responsibility for CDM rests with the Ministry of Housing, Spatial Planning and the Environment. All intermediary organisations are contractually obliged to select, contract and purchase emission reductions only from projects that comply with the Ministry's CDM project criteria, the CDM requirements as defined in the Kyoto Protocol, the Marrakech Accords, the guidance provided by the CDM Executive Board, the approval criteria of the host country and the intermediary's own project selection criteria and environmental and social safeguard policies.

Decision-making responsibility for JI rests with the Ministry of Economic Affairs. JI projects are eligible for selection if they comply with the requirements as defined in the Kyoto Protocol and the Marrakech Accords and, depending on the instrument used, if they comply with the Terms of Reference of ERUPT or the intermediary's (bank's) own project selection criteria. In the absence of the authority of the Supervisory Committee so far, the guidance provided by the CDM Executive Board has been used in the criteria for selection by the various instruments.

2. Trends and projections of greenhouse gas emissions

2.1 Introduction

This chapter first presents the historical trends of greenhouse gas emissions in the Netherlands. Paragraph 2.2 presents the trend for all greenhouse gases together, broken down into the emissions of separate gases. The trends per sector are presented together with the projections of emissions per sector in paragraph 2.5.

Paragraphs 2.3 to 2.5 present projections of greenhouse gas emissions. Paragraphs 2.3 and 2.4 describe the scenarios used and policy variants. Paragraph 2.5 lists projections per gas, per sector and for all greenhouse gases together.

2.2 Emission trends

2.2.1 General

Figure 2.1 and 2.2 show the trend and shares for all greenhouse gases in the Netherlands from 1990-2003. Total greenhouse gas emissions (excluding emissions from LUCF) in the Netherlands amounted to 215 Mt CO_2-equivalents in 2003. Compared to the base year emission (1990 for CO_2, CH_4 and N_2O and 1995 for F-gases), which was 213 Mt CO_2-equivalents, emissions are about 1% higher. Emissions of CO_2 increased by 12% in the 1990-2003 period, while emissions of non-CO_2 greenhouse gases together decreased by 32% compared with the base year emissions. The share of the group of non-CO_2 greenhouse gases decreased from 25% in the base year to 18% in 2003. Consequently, total greenhouse gases in the Netherlands are increasingly dominated by CO_2 emissions, currently with a share of 82% in 2003.

2.2.2 Carbon dioxide

The emissions of CO_2 increased by 12% in the 1990-2003 period. CO_2 emissions peaked in 1996 due to a very cold winter. Moreover, the trend is mainly determined by growth of the economy, energy savings and use of renewable energy. Since 1998, the average growth a year has slowed down compared to 1990-1998, because between 1998 and 2003, the effect of economic growth was to a large extent offset by increased energy savings and use of renewable energy. Within energy supply, the ratio between oil, gas, coal and the import of

Figure 2.1 Greenhouse gases: emission levels and trends, 1990-2003 (No T-corr.)

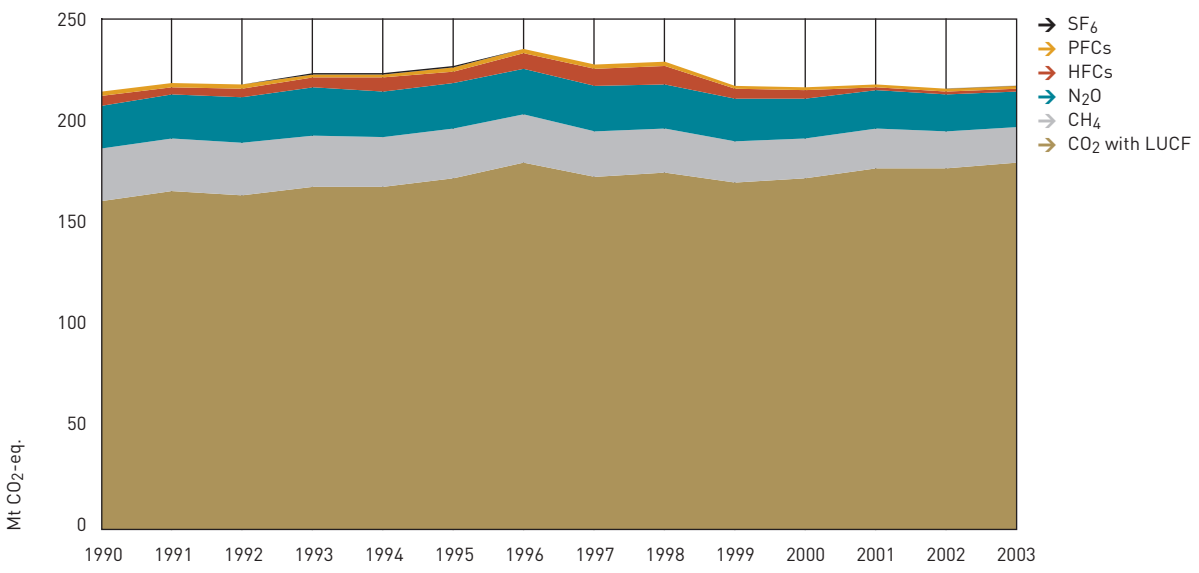
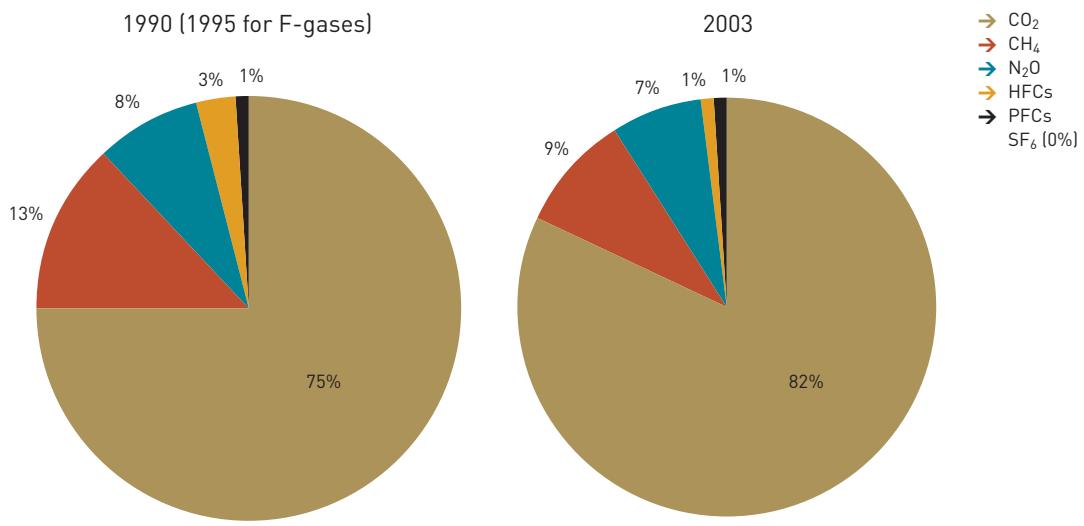


Figure 2.2 Share of separate greenhouse gases in the total, 1990 and 2003



electricity is the main factor that influences the trend. For example, in 1999 the import of electricity almost doubled compared to 1998, decreasing the CO_2 emissions of the energy sector.

2.3.3 Methane

Total national CH_4 emissions decreased by 32% compared to the 1990 level to 17.5 Mt CO_2 equivalents in 2003. This decrease was due to the reduction of the dairy cattle herd, increased collection of landfill gas and reduction of biologically degradable waste that is landfilled. Furthermore, CH_4 emissions were reduced in the oil and gas production sector.

2.3.4 Nitrous oxide

Total national N_2O emissions decreased by 19% compared to the 1990 level to 17.3 Mt CO_2 equivalents in 2003. This decrease was mainly due to reductions in industry and agriculture. In agriculture, the reduced application of manure and artificial fertiliser had an impact.

2.3.5 Fluorinated gases

Total emissions of all F-gases decreased by 62% compared to the 1995 level, to 3.1 Mt CO_2 equivalents in 2003. This decrease is mainly due to the reduction at an HCFC producer in 1996, which totalled about 6 Mt CO_2 equivalents, and measures in aluminium production.

2.3 Description of scenarios

The projections are based on two scenarios, namely Strong Europe (SE) and Global Economy (GE). While both scenarios reflect a world with broad international co-operation, they differ in their orientations.

In SE, international co-operation is coupled to public responsibility. European institutions are reformed and the EU grows into a stronger economic and political block. The United States becomes part of a worldwide climate coalition pursuing successful policies that make extensive use of the Kyoto mechanisms. The public responsibility orientation is expressed though a relatively even income distribution, greater social

security and investments in education and research. A reasonable rate of economic growth is achieved due mainly to the larger markets. Annual average growth in Gross Domestic Product between 2002 and 2020 amounts to 1.7%.

GE is oriented sharply towards international trade but little political co-operation. Strong emphasis on the personal responsibility of citizens and corporations results in relatively high economic growth and material welfare. Population growth is highest in the GE scenario. Environmental awareness is not translated into strong regulations and international climate policies fail over the longer term, although in western Europe climate policy remains strong until 2020. Gross Domestic Product grows by 2.7% a year between 2002 and 2020.

The Netherlands' one remaining nuclear power plant is assumed to close in 2013 in SE, but continues to operate after 2013 in GE. In SE, power companies expect the CO_2 price to rise and therefore invest in renewable energy and gas rather than in coal while in GE, investors assume that emission ceilings will not be tightened over time and that the CO_2 price will not rise. This assumption leads to investment in 2000 MW of new powder coal capacity after 2010.

2.4 Description of policy variants

2.4.1 The 'with measures' variant

Existing Dutch and EU policies in the areas of energy and climate are assumed to continue in the 'with measures' variant in both SE and GE. Existing policies are those that have been either adopted or implemented as of 1 December 2004.

The following list indicates the policies included in the 'with measures' variant:

- CO_2 Emissions Trading
- Energy Tax
- EPA, EPR
- EPN, EPC
- EIA, Vamil, EINP
- CO_2 Reduction Programme/General
- Benchmarking Covenant
- LTA's environmental permit
- Glami Covenant, Orders in Council Greenhouse Horticulture
- MEP, Coal Covenant, BLOW covenant
- EU Agreement with car manufacturers
- Energy labelling cars and appliances
- Excise duties on motor fuels
- Enhanced enforcement of speed limits
- The New Driving Force
- CO_2 Reduction Programmes/Passenger and Freight Transport
- Reduction Programme Non-CO_2 Gases
- Covenant with oil and gas producers
- Milk quota, manure management
- Landfill policies
- Low-HFC HCFC production
- Low-PFC aluminium production

2.4.2 The 'without measures' variant

The 'without measures' variant shows how emissions would develop in the absence of all climate change policies since 2000. The policy effects already realised before 2000 are included in the baseline scenarios.

2.4.3 The 'with additional measures' variant

The 'with additional measures' variant reflects the range of effects of six policies that are currently either in the planning or in the study stage in the Netherlands. These policies, if implemented, would generate effects that are supplementary to the effects already reflected in the 'with measures' variant. The six additional policies considered in this variant are:

- CO_2 Tender Scheme for Buildings
- CO_2 differentiation in purchase tax on new cars and purchase tax exemption for hybrid cars
- Kilometre charge
- Biofuels policy, assuming a target of 2% in 2010
- Technical measures to reduce N_2O emissions from the nitric acid production industry
- Implementation of the EU F-gases regulation

2.5 Projections by sector and gas

2.5.1 CO_2 emissions

Figure 2.3 presents the projections for emissions of CO_2. In the 'with measures' variant, domestic CO_2 emissions grow by an average of 0.6% a year until 2015 in the SE scenario and then stabilise at around 190 Mtonnes a year. In the GE scenario, CO_2 emission growth is relatively constant between 2000 and 2020

Figure 2.3 Actual and projected CO_2 emissions, 1990-2020 (excl. LULUCF), with measures

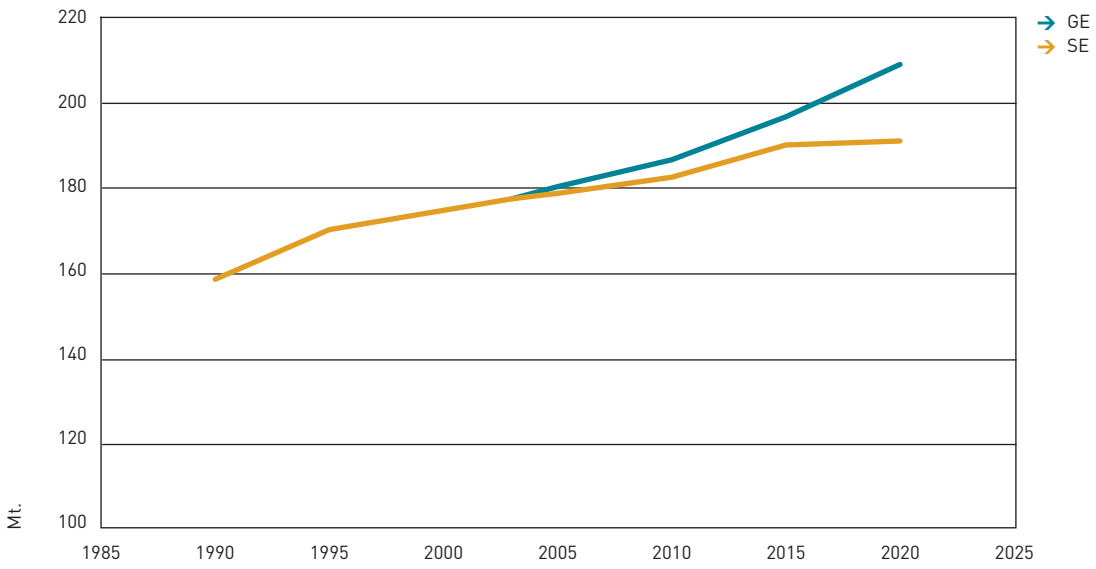


Figure 2.4 Actual and projected emissions of CH_4, N_2O and F-gases, 1990-2020, GE scenario, with measures

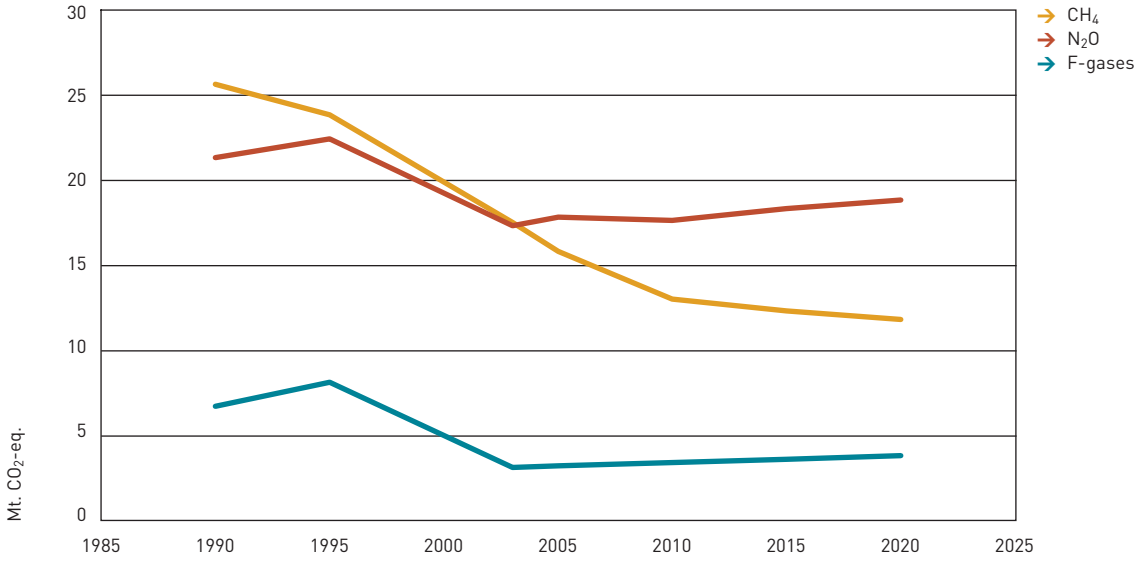
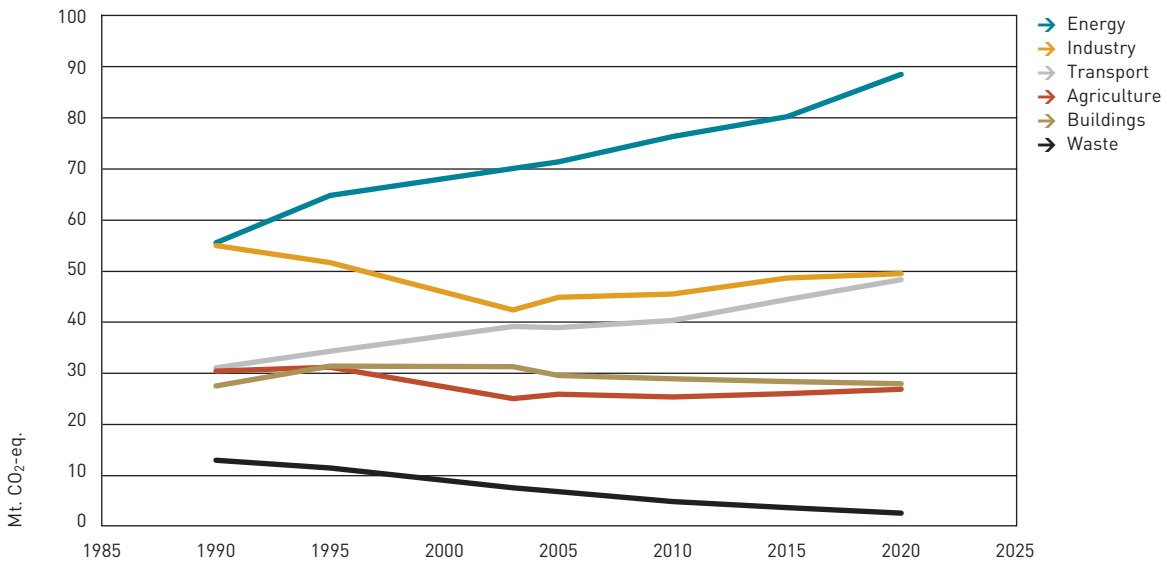


Figure 2.5 Total greenhouse gas emissions per sector, 1990-2020, GE scenario, with measures



at about 0.9% a year, a bit less than the growth in total energy use. Growth occurs largely in the electricity production sector, the industry sector and the transport sector.

2.5.2 Non-CO_2 emissions CH_4, N_2O and the F-gases

Figure 2.4 presents the projections for the emissions of non-CO_2 greenhouse gases CH_4, N_2O and the F-gases. For the sake of clarity, projections are presented for the GE scenario only.

CH_4 emissions fall by about 20 to 25% between 2003 and 2010 in both scenarios. This decrease is due to a decline in the amount of offshore gas production and to measures taken to reduce emissions from gas production. The scenarios also reflect policies aimed at a reduction in the amount and a change in the composition of waste to be landfilled, which also contributes to the drop in CH_4 emissions. Both scenarios assume continuation of the milk quota and increased productivity until 2010, leading to a fall in numbers of dairy cattle and in CH_4 emissions.

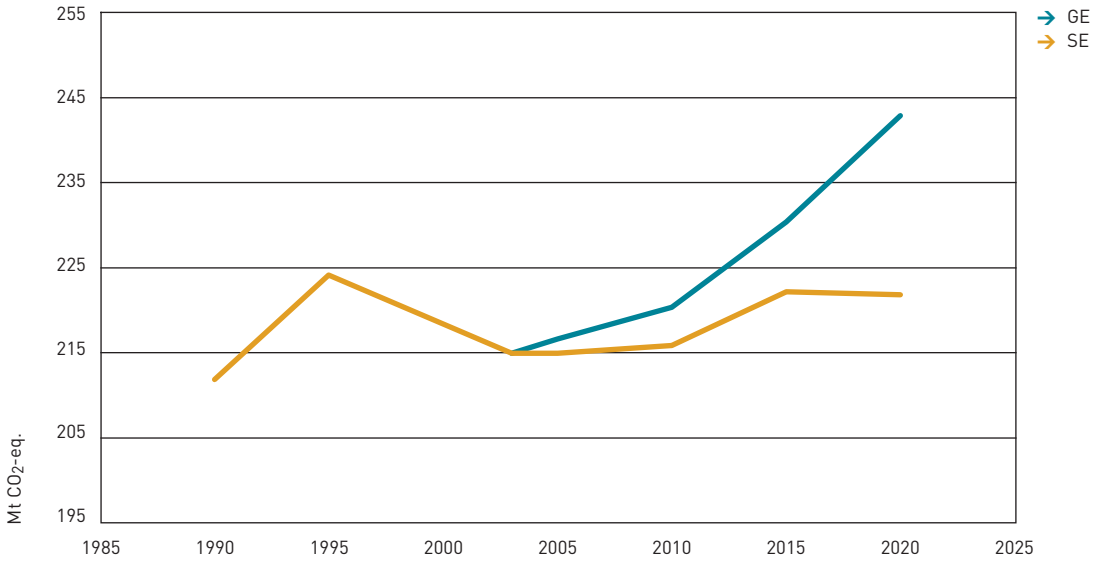
N_2O emissions remain more or less constant until 2010 in both scenarios, but rise again after 2010 in the GE scenario due to developments in the agricultural sector.

Emissions of HFCs grow by about 20% between 2002 and 2010 in both scenarios, due in part to the transition from use of HCFC22 to HFC as a coolant and in part to growth in construction, where HFCs are used in hard foam insulation materials. PFCs decline by about half as result of measures taken in aluminium production plants and the ceiling on emissions in the semiconductor industry.

2.5.3 Emissions per sector

Figure 2.5 presents the projections per sector. The sectors Energy and Transport show increasing greenhouse gas emissions due to increased energy use. Industry shows a less continuous development, due to measures for N_2O and F-gases. Agriculture and waste show declining emissions due to reduction of CH_4 emissions from manure and landfill sites. Emissions from Buildings are projected to decrease slowly.

Figure 2.6 Actual and projected emissions of total greenhouse gases (CO_2, CH_4, N_2O and F-gases), 1990-2020 (excl. LULUCF), with measures



2.5.4 Total emissions of greenhouse gases

Total emissions of greenhouse gases are just about at their 2002 level in 2010 in the SE scenario (the fall in emissions of CH_4 is sufficient to compensate for the growth in CO_2), while in the GE scenario total emissions grow by 2 to 3% between 2002 and 2010. There is further growth in total emissions after 2010 in both scenarios. Figure 2.6 shows the projected developments in total emissions in the two scenarios relative to actual developments since 1990.

3. Evaluation of the Netherlands meeting its Kyoto target

3.1 Introduction

Chapter 1 presented the emission reduction effects for clusters of policies and measures against the background of the GE scenario. Paragraph 3.2 discusses the aggregated effect for both the SE and the GE scenario. Paragraph 3.3 assesses the effect of additional measures. Finally, paragraph 3.4 contains an evaluation of whether the existing and planned policies and measures, including use of the Kyoto mechanisms, will be sufficient to meet the Netherlands' Kyoto target.

3.2 Aggregate effects of policies and measures

The total effect of current policies and measures has been determined by comparing the 'with measures' and 'without measures' policy variants. The effects realised in 2000 are estimated at 26 Mt CO_2 equivalents. These 26 Mt are already included in the baseline of both the 'with measures' and 'without measures' variants. This means that emissions in 2000, the starting point for both variants, would have been 26 Mtonnes higher had these policies not been pursued in the years 1990-2000. The effects realised per cluster of policies and measures are presented in Chapter 1. It follows that measures in the energy sector (CHP), industry (reduction of HFC) and the waste sector (reduction of CH_4 from landfill sites) have the largest shares in the 26 Mt.

The total impact of the policies in effect since 2000 is projected at 21 to 22 Mtonnes in 2010, or about 10% of projected emissions. Table 3.1 indicates that policies are especially effective in reducing emissions of the non CO_2-gases. However, in the longer term, the marginal effects of these policies decline, while the effects of policies aimed at reducing CO_2 emissions increase. The total effect of the policies in effect since 2000 reaches a level of around 40 to 45 Mtonnes in 2020, about 20% of projected emissions. The projected effects per cluster of policies and measures are presented in Chapter 1. It follows that, in 2010, the largest effect comes from the energy sector (renewable energy), industry (various sources) and the waste sector.

Table 3.1 Projected effect of policies in force since 2000 on national emissions of greenhouse gases, in Mtonnes CO_2 equivalent of avoided emissions a year.

	SE scenario				GE scenario			
	2005	2010	2015	2020	2005	2010	2015	2020
CO_2	5	12	22	29	5	13	26	35
Non-CO_2	7	9	10	10	7	9	10	10
Total	**12**	**21**	**32**	**39**	**12**	**22**	**36**	**45**

Table 3.2 Effect of additional measures in Mtonnes CO_2-equivalent of avoided emissions in 2010.

Policy	effect in Mtonnes CO_2-eq.
CO_2 tender scheme for buildings	0-0.7
CO_2 differentiation in purchase tax on new cars	PM (no estimate available)
kilometre charge	0 – 0.9
biofuels policies, assuming a target of 2 per cent in 2006	approx. 0.7*
technical measures at nitric acid production plants	approx. 4
EU F-gases regulation	no effect in 2010

* If achieved, the 2% target would reduce emissions by about 0.7 Mtonnes of CO_2 in 2010. However, this estimate is not well-to-wheel. This means it does not reflect possibly higher emissions in the agricultural sector from raising crops to be used in the manufacture of biofuels.

Figure 3.1 Emission projections 'without measures', 'with measures' and 'with additional measures' in 2010.

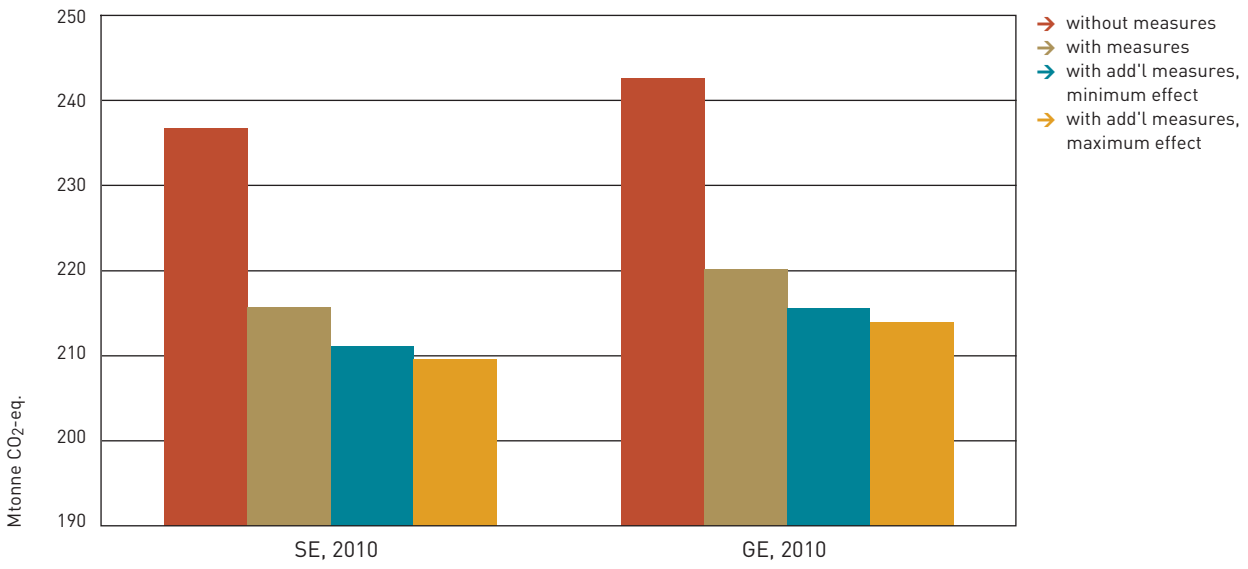
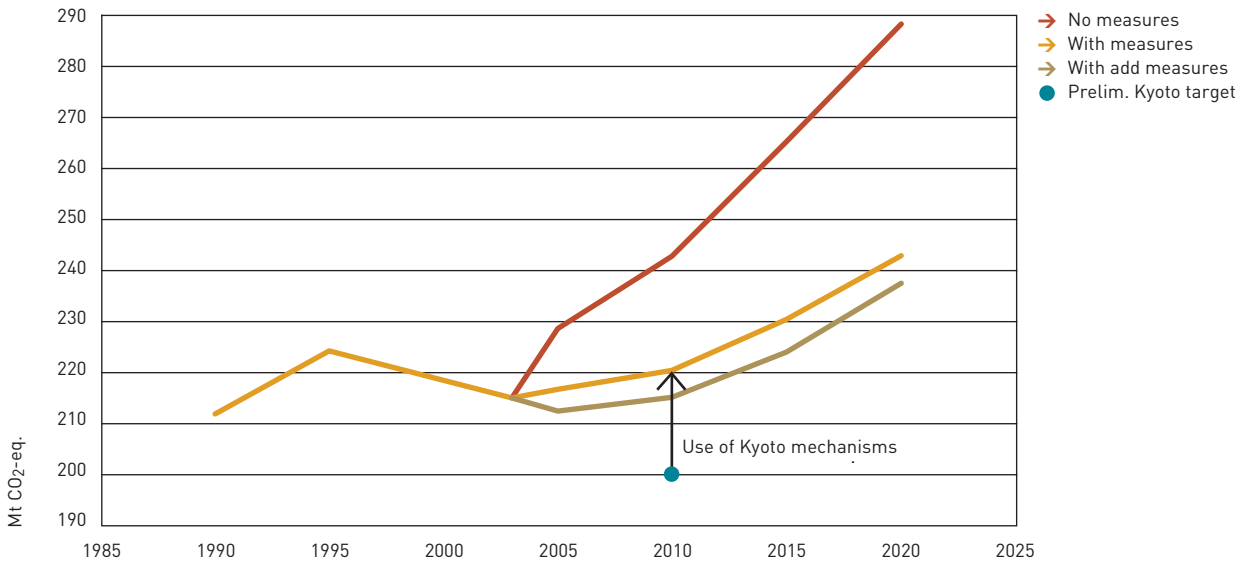


Table 3.3 Projections in relation to the Netherlands' Kyoto target

2010 (all figures in Mt CO_2 equivalents)	SE	% difference to base year	GE	% difference to base year
Projected emissions:				
With measures	215.7	1.3%	220.2	3.4%
With additional measures	210.3	-1.3%	214.9	0.9%
Planned use of Kyoto mechanisms	20		20	
Taking into account use of Kyoto mechanisms				
With measures	195.7	-8.1%	200.2	-6.0%
With additional measures	190.3	-10.7%	194.9	-8.5%
Base year	213		213	
Preliminary Netherlands' Kyoto target	200	-6%	200	-6%

Figure 3.2 Effect of (additional) measures on total greenhouse gas emissions in relation to the Netherlands' (preliminary) Kyoto target (GE scenario)



3.3 Effect of additional measure

The total effect of the extra policies analysed in the 'with additional measures' variant is estimated at a maximum of 6.3 Mtonnes of avoided CO_2-equivalent emissions in 2010. Table 3.2 indicates the estimated impact of each measure in 2010. Figure 3.1 shows the impact of (additional) measures for both scenarios in 2010.

3.4 Evaluation of the Netherlands meeting its Kyoto target

Based on the projections presented above, it is possible to preliminarily assess whether the Netherlands' climate policy will be sufficient to meet the Netherlands' Kyoto target, that is preliminarily assumed to be on average 200 Mt CO_2 equivalents a year from 2008 to 2012. Table 3.3 shows how projected emissions for both the SE and the GE scenario relate to this target. It should be noted that these projections have uncertainties. Figure 3.2 illustrates the assessment for the GE scenario, the scenario that causes most emissions. Table 3.3 and figure 3.2 show that the Netherlands is projected to meet its Kyoto target in both scenarios. Depending on the scenario, it may or may not be necessary to implement all the additional measures and/or purchase all 20 Mt CO_2 equivalents emission reductions a year based on the Kyoto mechanisms. However, with this conclusion, the following remarks should be considered:

3.4.1 Policies and measures as on 1 December 2004

In the first place, the projections in this report take into account the policies and measures as known on 1 December 2004. Since then, policy has developed further. These further developments have not been taken into account in this report, in order to maintain consistency with the Netherlands' 4th National Communication and relevant EC and EAA reports. More recent policy developments have been taken into account in the second evaluation of the National Climate Policy Implementation Plan (NCPIP), that was sent to parliament end of October 2005. In here the 'with measures' projections have been slightly adjusted, and the 'additional measures' taken into account differ at some points. However, this does not change the general picture drawn for the projections.

3.4.2 Importance of the national cap for ETS

In the second place, the national cap for the European emissions trading system (ETS) for the 2008-2012 period will influence the conclusion. This cap covers about half of total CO_2 emissions in the Netherlands, mostly from installations in the Energy and Industry sectors. This cap is not determined yet. The Netherlands will finally determine the cap in early 2006. The national cap for ETS determines the room that is left for emissions from sectors that are not covered by the ETS. After all, taken together (national cap for ETS, plus room for non-ETS sectors, minus use of Kyoto mechanisms), they should result in the Netherlands' Kyoto target. Therefore, when the Netherlands' national cap for ETS is determined, it will be assessed whether the room for the emissions of the non-ETS sectors should be adjusted by amending the sectoral target values and/or planned use of the Kyoto mechanisms. Policies and measures may have to be adjusted accordingly to bring projections in line with the adjusted sectoral target values.

3.4.3 Conclusions of the second evaluation of the NCPIP

As mentioned before, the projections have uncertainties. The second evaluation of the NCPIP describes how the Netherlands will reduce the risks that result from these uncertainties to secure achievement of its Kyoto target. According to the second evaluation of the NCPIP, there is a 50% chance that the domestic target of, on average, 220 Mt CO_2 equivalents a year in 2008-2012 will not be exceeded when implemented policy is taken into account (the 'with measures' projections). When additional measures are taken into account as well, this chance may be 90%. This is on the condition that the policy in preparation (the 'additional measures') will be implemented and has the projected effect, and that the national cap for ETS does not exceed the current cap (for the 2005-2007 period).

With regard to the purchase of emission reductions based on the Kyoto mechanisms, it is too early to draw conclusions with regard to uncertainty. The target of 100 Mt CO_2 equivalents is entirely covered by either framework agreements with intermediary organisations, participation in funds or project contracts. It will be clear at the end of 2006 whether sufficient project contracts have been concluded.

Uncertainties that may have a negative or a positive impact remain. With regard to the domestic target, these concern mostly socio-economic factors, such as growth of mobility. For the Kyoto mechanisms, possible uncertainties are related to upward pressure on prices (due to increased demand), the rules and institutions for the Kyoto Protocol that are still under development (such as the JI Supervisory Committee), and the risk of project failure.

The second evaluation of the NCPIP concludes that it is justified to have confidence that the Netherlands will meet its Kyoto target, also because extra measures, divided over all sectors, have been implemented or are planned. However, to secure achievement of both the domestic target and that for the Kyoto mechanisms, the following activities are proposed:

- the additional measures will be elaborated further and implemented
- to limit risks, a set of domestic reserve measures is in preparation
- the national cap for ETS will be determined in early 2006. Following that, the sectoral target values will be finally determined as well. The process will be flexible. Shifting targets between sectors or between the domestic target and that for the Kyoto mechanisms, will be possible.
- Possible reserve measures to reduce risks for the Kyoto mechanisms will be assessed.

In the NCPIP, the following evaluation is planned for 2008. This is the first year of the commitment period for the Kyoto Protocol. It may then be too late to implement reserve measures. The Netherlands will not wait until then to judge uncertainties and decide on the use of reserve measures. In addition to the procedures for evaluation described in 1.2.4, an intermediary assessment will be held every year in conjunction with the preparation of next year's budget. Aspects taken into consideration will include: the rolling three-year average for the sectoral target values, based on actual greenhouse gas emissions, the development of relevant socio-economic factors, the development of climate policy, the development of reserve measures and the development of the Kyoto mechanisms.

4. Fulfilment of other commitments

4.1 Improvement of national greenhouse gas inventory

This paragraph describes how the Netherlands has fulfilled its commitment under article 10 a) of the Kyoto Protocol.

4.1.1 National system

The Netherlands, as Party to the UNFCCC, has to report an inventory of greenhouse gas emissions and removals each year, in accordance with guidelines from the UNFCCC and Intergovernmental Panel on Climate Change (IPCC). Under the Kyoto Protocol, further obligations have been defined, among which the obligation (under Article 5.1) to have in place, no later than one year prior to the start of the first commitment period, a National System for the estimation of greenhouse gas emissions by sources and removals by sinks. Under Council Decision 280/2004/EC of the EU, the Netherlands is required to establish such a system as early as possible and by the end of 2005 at the latest. Under the Kyoto Protocol, a National System includes all institutional, legal and procedural arrangements made within a Party for estimating greenhouse gas emissions by sources and removal by sinks, and for reporting and archiving inventory information. The Netherlands has worked over the past years to establish a National System that meets the requirements in time. In the Netherlands, establishing the National System is the responsibility of the Ministry of Housing, Spatial Planning and the Environment.

4.1.2 Improvement programme

Since 1974, the Netherlands has a pollutant emissions inventory process in place, the Emission Registration (ER). Implemented under responsibility of the Ministry of the Environment, it is a co-operation of institutes, such as the Netherlands Environmental Assessment Agency and Statistics Netherlands. The ER aims at producing annual emission inventories for some 170 policy-relevant compounds and compound groups that are present in the air, water and soil. The system is the basis for monitoring greenhouse gas emissions and removals.

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

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

To be in compliance with the UNFCCC and IPCC guidelines, and with the extra requirements set by the Kyoto Protocol, an improvement programme was carried out in the Netherlands under the responsibility of the Ministry of the Environment. The most important projects included:

- Adapting the monitoring procedures (where needed) to new international requirements. The methods, instructions, working processes, tasks and responsibilities were described in protocols. Where needed, agreements with sectors and institutes were made on adaptations of the present methods, to comply with new international standards.
- Updating and elaborating the quality assurance and control process of greenhouse gas monitoring.
- Improving uncertainty assessment and management in emission data.
- Studies into more accurate and detailed emission factors and/or methodologies.

By the end of 2005, the improvement programme has been finalised. The methods are in compliance with the guidelines and are laid down in protocols. As a result of the improvement programme, some methods have been adapted. Examples are the shift from a bottom-up approach based on company environmental reports to a top-down approach based on national energy statistics for stationary combustion, and the establishment of a Dutch list of energy carriers and default CO_2 emission factors. A description of the improvement programme, background documents and the protocols is publicly available at *www.greenhousegases.nl*.

4.1.3 Act on Monitoring of Greenhouse Gases

In order to officially establish the Netherlands' National System, an Act on Monitoring of Greenhouse Gases is being prepared and is expected to take effect at the end of 2005. This

Act determines that there shall be a National System for monitoring greenhouse gas emissions. The Minister of the Environment will be authorised to appoint an authority responsible for the National System and the National Inventory (National Inventory Entity). Furthermore, the Act determines that the National Inventory must be based on the monitoring protocols.

4.2 Measures to mitigate climate change and facilitate adequate adaptation to climate change

This paragraph describes fulfilment by the Netherlands of article 10 b) of the Kyoto Protocol. Mitigation measures are described in Chapter 1, while this paragraph addresses adaptation measures.

The climate in the Netherlands will undergo significant changes in the coming decades. The most pressing consequences include wetter winters, drier summers, changes in biodiversity and a rising sea level. At the same time, the Netherlands is subsiding. These conditions in a country like the Netherlands - dominated by the sea and the delta of four great rivers, with a high population density and a competitive economy - will more frequently result in climate change impacts that will have to be counteracted. Adaptation to climate change impacts has gradually gained importance on the political agenda. Climate change impacts on water and ecosystems are already visible or have been accepted as nearly inevitable. Adaptation is most strongly developed in the water sector.

4.2.1 Expected impacts of climate change

Impacts on water and water management
Water management will become more complex as a result of climate change. The major water-related impacts of climate change are:

- The sea level is rising: The sea level has risen 20 centimetres in the past century and will rise even further by an expected average of 60 centimetres in the next century. This will also lead to a rise in the water level of the IJsselmeer Lake.
- River discharges are increasing: climate changes will lead to a 40% increase in river discharges in winter and 30% lower discharges in summer.
- The land is subsiding: in the low-lying parts of the Netherlands, soil subsidence will average between 2 and 60 centimetres by 2050.
- Precipitation increases: Until 2050, precipitation volumes in winter will increase by approx. 10% and decrease in summer by a few percent.

The greatest concern is flooding or breaching of water-retaining structures along the coast, the rivers Rhine and Meuse or in the IJsselmeer Lake region. Drought may also be a problem.

Impacts on the coastal areas and coastal defence
The geographical location of the Netherlands makes it highly susceptible to sea level rise and extreme weather events. The total coastline of the Netherlands is 350 km long, 300 km of which consists of dunes and beaches, while the remainder is protected by dikes and dams. Recent studies report a further increase in flooding risks due to the rise in sea level, climate change and further economic and social development.

Impacts on nature
Climate change is already having an impact on nature in the Netherlands. The growth season is longer and southern species have established themselves permanently. Prolonged droughts will also have their bearing on the resilience of ecosystems and cause increased risk of forest fires. Differentiated changes in the seasonal cycles of plant and animal species can disturb the mutual dependencies in the food web. There are also 'positive' impacts. The net impact on the Netherlands is uncertain.

Impacts on agriculture, food security and health
Climate change in the Netherlands may stimulate crop growth. Yet water and drought damage may increase, as well as the risk of plagues and diseases. Groundwater may increasingly become brackish in the coastal zones, due to sea level rise, further threatening agricultural activities. However, the net impact on the Dutch economy is expected to be limited because the share of agriculture in the overall economy is small.

4.2.2 Adaptation measures

As mentioned, adaptation to climate change impacts has gradually gained importance on the political agenda. For example, parliament requested in 2004 to be informed on the current status of climate research and specifically on

adaptation. Ministries increasingly consider adaptation measures for integration into their sectoral policies. The focus of climate change adaptation is on mainstreaming and 'no-regret' strategies. Adaptation is developed strongest in the water sector and in the policy documents of the Ministry of Transport, Public Works and Water Management.

Adaptation for water and water management
Climate change and adaptation measures are strongly integrated into the water policy agenda. The Dutch water policy (2000) recognises that in the coming years, increasing water levels in the rivers and the accelerated rise in sea level will mean that technical measures, such as raising dikes, will no longer be sufficient. The policy is to give water more space. In order to prevent floods, rivers are allowed to expand into side channels and wetland areas. Safety continues to be the top priority. Other goals are to avoid destruction of the considerable cultural-historical and natural value of the river landscapes. Guiding principles are:
- anticipating instead of reacting
- following a three-step strategy (first retention, then storage and -as a last resort- drainage)
- allocating more space to water (e.g. assign emergency flood areas) in addition to implementing technological measures (e.g. dike reinforcement)
- raising beach levels

The policy document 'Room for the River' (2000), further elaborates on planning for adaptation with regard to the river Rhine. In April 2005, the Dutch Cabinet presented the implementation plan for this policy document. After public consultations, the Cabinet expects to submit the Key Decision to parliament in 2006, allowing a budget of €2.2 billion to be invested in improving safety against flooding in river areas.

Dredging has been introduced as a way of dynamically managing the main rivers and ports. For maintenance of the inland waterways, €700 million has been reserved for the 2004-2010 period. In the period after 2010, a total of €10.3 billion will become available.

Arrangements for co-operation and implementation of the water policy are detailed in an Administrative Agreement between government, provinces, water boards and municipalities. The national government (Ministry of Transport, Public Works and Water Management) is responsible for the main waterways: the major rivers, the coast and the IJsselmeer Lake area. Water boards hold the first line of responsibility for the regional water management systems. The provincial authorities are charged with spatial incorporation of water management policy measures. They supervise the municipal authorities in adjusting their zoning plans. Water policy is integrated into other policy areas through these administrative arrangements and an obligatory water assessment.

Adaptation for the coastal areas and coastal defence
The current Dutch coastal policy plan (2000) strongly emphasises the new challenges caused by climate change, especially sea level rise and an increase in the number of storms. Three scenarios of sea level rise are detailed, based on the IPCC reports. What scenario is to be used depends on the application.

Sand suppletion was introduced in 1990 as a way of dynamically managing the coast. These sand supplements involve millions of cubic metres of sand being added to coastal areas. In 2002, the Ministry of Transport, Public Works and Water Management further intensified sand suppletion as the most appropriate way to adapt to future climate change. Its projected costs amount to €45 million a year.

The maintenance of dikes and dunes is typically the responsibility of regional water authorities, whereas combating structural coastal erosion is the responsibility of the national government. Regional water authorities develop their own coastal strategies to meet long-term challenges.

Adaptation for nature
Implementation of the existing policy of realising green corridors and ecological zones and strengthening the resilience of ecosystems is seen as the most appropriate strategy to cope with the impacts of climate change. Synergies with water management are considered, since both require space and could be combined in new ecological zones. The most recent policy document 'Agenda for a Living Countryside' (2004) announces a study that will assess:
– whether climate change requires a different spatial distribution of ecological zones and green corridors

- whether desiccation, salt intrusion and fresh water shortage intensify under climate change and require additional policy measures
- the effect of climate change on tourism

Adaptation for agriculture, food security and health
The potential impacts of drought on agriculture are well documented and are gradually being incorporated into agricultural policy at both the national and regional level. The policy document 'Health & Environment' (Ministry of Health, Welfare and Sport, 2001) recognises that climate change may alter the incidence of diseases and infections.

4.3 Co-operation in scientific and technical research

This paragraph describes how the Netherlands has fulfilled its commitment under article 10 d) of the Kyoto Protocol. Assistance for research to developing countries and countries with an economy in transition is described in paragraph 4.4.

4.3.1 General policy on research and systematic observation

Research activities in the Netherlands cover a range of climate system, impact and policy support studies. The activities are characterised by:
- intensive participation in international and European programmes
- clustering in a few larger national research programmes

4.3.2 Co-operation in international research

The Netherlands' research on climate change is well embedded in, acknowledged by and co-steered in the three large international scientific programmes in the field of global change research: the International Geosphere Biosphere Programme (IGBP), the World Climate Research Programme (WCRP) and the International Human Dimensions Project (IHDP). National research programmes further try to support this position. The Netherlands Organisation for Scientific Research (NWO) and the Royal Netherlands Academy of Arts and Sciences (KNAW) both co-ordinate Dutch contributions to the international research arena.

Extensive support is also given to the work of the IPCC. Ten Dutch scientists contribute as (lead) authors to the fourth IPCC assessment report on three of its prioritised areas: climate scenarios, mitigation and adaptation. The National Institute for Public Health and the Environment (RIVM) provides office facilities and support for one of the co-chairs and for the Technical Support Unit of IPCC Working Group III. Dutch experts also contribute to the development of the IPCC Guidelines for National Greenhouse Gas Inventories.

4.3.3 Co-operation in European research

Many of the leading Dutch institutions have research projects under the EU 5th & 6th Framework Programme (FP) and are actively involved in preparations for new projects to be submitted under the 6th FP. These projects are thematically closely connected to all main themes of national research programmes. The synergy and co-operation between European projects and the national research programmes reinforce the crucial international dimension of Dutch research activities.

4.4 Provision of financial resources, co-operation in education and training programmes and co-operation in the transfer of climate change technologies

This paragraph describes the Netherlands' development co-operation aimed at climate change. It shows how the Netherlands has fulfilled its commitments under articles 10 c), 10 d), 10 e) and 11 of the Kyoto Protocol. The text provides information on financial provisions, including new and additional financial resources, programmes that contribute to education, training, capacity building, research, and technology transfer, among others.

Acknowledging the support developing countries and countries with economies in transition need to mitigate climate change and to adapt to its adverse effects, the Netherlands provides assistance to these countries through a variety of programmes and projects. These programmes and projects encompass activities on, for instance, education, capacity building, institutional set-up and the transfer of environmentally sound climate change technologies. In addition to supporting public organisations, the Dutch programmes also aim to stimulate the private sector to increase their environmentally sound technology investments in developing countries and countries with economies in transition.

Table 4.1 Amounts and categories of funding for the years 2001 to 2004 by the Dutch Minister for Development Co-operation (in mln €)

		2001	2002	2003	2004
Bilateral					
	Mitigation[1]	45.58	35.98	52.92	54.46
	Adaptation[1]	4.50	10.78	9.38	6.58
Multilateral					
	UNDP	0.16	0.53	0.84	1.31
	UNEP		0.60	3.53	2.10
	AsDB	0.94	1.69	1.48	0.69
	AfDB			1.66	1.30
	WB[2]	n.a.[1]	n.a.[1]	n.a.[1]	n.a.[1]
GEF		5.34	5.74	10.75	7.57
New funds					
	LDC				0.10
	SCCF				
	Adaptation Fund				
Total		**56.52**	**55.31**	**80.56**	**74.10**

1 Including 'Principal' and 'Significant' projects. A weight factor of 0.4 is applied for the financial contribution of 'Significant' projects following OECD-DAC guidelines.
2 The Netherlands and the World Bank have signed a partnership agreement. Figures on the direct contribution to climate change projects are not available.

4.4.1 Environment-related development co-operation

In recent years, the Dutch government maintained its Official Development Assistance (ODA) budget at more than 0.8% of its Gross National Product (GNP). By doing so, the Netherlands is one of the few countries that meets the UN target of 0.7%. These budgets include expenditures for assistance in the field of the environment following the principles of Agenda 21. Since 1997, at least 0.1% of the 0.8% has been earmarked for additional expenditures in this field. Total ODA from 2001-2004 was about €15,320 mln, on average about €3,830 mln a year. Total environment-related assistance from 2001-2004 was about €1,630 mln, on average about €408 mln a year.

The Netherlands contributes to a variety of multilateral and intergovernmental institutions that assist developing countries, for example UNEP, the World Bank and UNDP. The Global Environment Facility (GEF) as operating entity of the financial mechanism of the Framework Convention on Climate Change received from the Netherlands a financial contribution of about €29.40 million for the 2001-2004 period.

The Netherlands also has a bilateral co-operation programme. Until 2003, the Netherlands had two types of development co-operation strategies, i.e. full co-operation or thematic co-operation. In 2003, it was decided to merge the two types of strategies into long-term partnerships. Co-operation takes place with a number of countries from several regions in the world, i.e. South America, Africa, Asia and Eastern Europe.

Support is also provided through Netherlands private-sector-targeted programmes such as the Programme for Co-operation with Emerging Markets (PSOM), the Programme of Eastern European Co-operation (PSO) and the Development-related Export Transactions Programme (ORET), which includes MILIEV - the Environment and Economic Self-sufficiency Programme, (ORET/MILIEV).

1 This paper was jointly prepared by the African Development Bank, the Asian Development Bank, the Department for International Development(United Kingdom), the Directorate-General for Development (European Commission), the Federal Ministry for Economic Co-operation and Development (Germany), the Minister for Development Co-operation (the Netherlands), the Organisation for Economic Co-operation and Development (United Nations), the Development Programme, the United Nations Environment Programme, and The World Bank in 2002.

2 This group consists of the 2001 EU countries plus Canada, Iceland, New Zealand, Norway and Switzerland

4.4.2 Climate change-related development co-operation

The general climate change policy of the Dutch Minister for Development Co-operation aims to support developing countries, planning to formulate and implement their own climate change policy. The main areas for support are:

- adapting to the adverse effects of climate change
- building capacity and developing institutes required for climate policy as well as for the Clean Development Mechanism.
- transfer of CO_2-reducing technologies
- contributing towards providing access to energy services for the poor, where possible through low carbon development

The aforementioned climate change policy is anchored in the UNFCCC and the Kyoto Protocol as well as the Netherlands' developing cooperation policy, which is strongly aimed at poverty alleviation. The Dutch Minister for Development Co-operation also contributed both financially and substantially to the joint paper on 'Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation'[1].

Table 4.1 shows relevant funding by the Dutch Minister for Development Co-operation.

At the Conference of the Parties in July 2001 in Bonn, the EU+5[2] reaffirmed their strong political commitment that in 2005 they will reach an annual funding level for climate change activities in developing nations that is $410 million higher than in the year 2001. Agreeing with a target level of €17 million more than the level of 2001, the Netherlands as a member of this group intensified its Climate Change funding for programmes and projects accordingly to reach this annual funding level in 2005.

The Netherlands has started to pledge part of the new climate change funds. In 2004, the Netherlands contributed to the Least Developing Countries Fund. In 2005, the Special Climate Change Fund received its first donation from the Netherlands, and it is anticipated that when the adaptation fund is operational, the Netherlands will pledge the fund through the share of proceeds.

4.4.3 Assistance for mitigation

The Dutch bilateral programmes and projects that deal with mitigation mainly support developing countries and countries

with economies in transition to implement activities that use environmentally sound technologies and know-how. The main sectors in both types of countries are energy, transport, industry, agriculture and forest management. A description of typical programmes and projects is given below:

Developing Countries
Acknowledging the important role energy plays in greenhouse gas emissions, the Dutch government incorporated this aspect into its development co-operation policy. The main goals of this energy policy are:
- poverty alleviation and improvement of energy-related living conditions, which in almost all cases imply promotion of low carbon development
- reduction of natural resource depletion and degradation of the local environment.

One of the successful approaches the Netherlands applied in the past and still applies in order to contribute to combating climate change through emission reduction in developing countries is to 'green' the energy sector portfolio of Multilateral Development Banks. This policy was conceptualised together with UNDP, the World Bank, and US DOE in a programme to develop green energy for small-scale urban and rural users in Asia and Africa, which was called Financing Energy Services for Small Scale End users (FINESSE).

As result of FINESSE activities in Asia, the World Bank together with partners established the Asia Alternative Energy programme (ASTAE) at the Bank in 1992. Currently, ASTAE is supporting several pipeline projects with an estimated total alternative energy cost of $2 billion and an estimated Bank/GEF support of $450-900 million. The Netherlands contributed significantly to this initiative through the World Bank Partnership (€62 million for the present reporting period of 2001 to 2004).

At present, such a FINESSE-like programme is also implemented at the Asian Development Bank, where a four-year programme called Promotion of Renewable energy, Energy efficiency and Greenhouse gas Abatement (PREGA) was established in 2001. This programme received a €4.6 million contribution from the Netherlands. This 'greening' approach was also applied in the African SADC region and resulted in market studies and business plans for sustainable energy projects. Recently, building on this experience, the Dutch government and the African Development Bank entered into a four-year agreement where the Dutch government will provide a grant funding of about €4.5 million to support FINESSE-Africa.

Two examples of mitigation projects in developing countries supported by the Dutch government are the Support project for the Biogas programme for Animal Husbandry Sector (Viet Nam) and the Wind park Tejona (Costa Rica).

Central and Eastern Europe
The aim of the co-operation between the Netherlands and the Central and Eastern European countries is to broaden support for the climate change issue in these countries and at the same time to reduce greenhouse gas emission. The main programmes implemented by the Netherlands in this region are
* Programme of Eastern European Cooperation (PSO)
* Social transformation Eastern European Programme (MATRA)
* Supporting the Co-operation of Rational Energy Use (SCORE)

The Programme of Eastern European Co-operation (PSO) supports the transfer of knowledge and know-how from the Dutch private sector to Central and Eastern European countries contributing to their transition to market-oriented and sustainable economies. Countries that receive support in the fields of energy and environment are Bulgaria, Georgia, Kazakhstan, Romania and Russia.

The SCORE programme partly financed through MATRA provided integrated support for end-use energy efficiency improvement in the countries Hungary, Poland and Latvia. This programme finished in 2001. In two countries, Bulgaria and Romania, the initial phase of SCORE was implemented in 2000. In addition, these two countries received financial support for a joint implementation capacity-building programme that was implemented from 1999 to 2002 to establish and operate local centres to provide assistance for the identification, development and implementation of JI projects.

Capacity building for mitigation
Capacity building is an integral part of the Netherlands' development co-operation in Climate Change. However, there are also programmes and projects that have typical capacity-

building elements. Examples of mitigation capacity-building programmes are the *SouthSouth*North programme, the Capacity Development for the Clean Development Mechanism (CD4CDM), the Co-operation Programme on Water and Climate, as well as Kyoto, Think Global, Act Local, and, to a lesser extent, the aforementioned PREGA. Two of these projects are described in more detail below.

The programme of SouthSouthNorth (SSN), an NGO in South Africa, contributes to poverty alleviation through capacity building among private and public stakeholders. Its objective is to contribute to a concrete and significant CDM project portfolio that will generate benefits for the poor. The SSN programme is implemented in four developing countries To implement this programme (2002-2004), the initiative of SSN received a grant from the Dutch Minister for Development Co-operation of €2.2 million.

Another programme with more emphasis on the institutional development of host countries to participate in a Carbon Market is CD4CDM. This programme is implemented by UNEP through the UNEP Riso Centre. It is a three-year programme (2003-2005) involving 12 countries worldwide and is funded by the Dutch Ministry for Development Co-operation with a grant of €7.6 million.

4.4.4 Assistance for adaptation

For a long time, the Netherlands has actively supported countries in addressing the adverse effects of climate change through support of multilateral agencies such as the GEF and other types of organisations, and through bilateral assistance programmes. It has provided both financial recourses and capacity to committees and working groups of the UNFCCC on adaptation and the least developed counties, such as the Least Developed Country Expert Group (LEG) and the Consultative Group of Experts on National Communications from Parties not Included in Annex I to the Convention (CGE).

Developing Countries

Typical examples of adaptation programmes and projects supported by the Dutch government are:

- Netherlands Climate Change Studies Assistance Programme (NCCSAP)/ Netherlands Climate Assistance Programme (NCAP)
- The Red Cross Preparedness for Disasters related to Climate Change
- Co-operative Programme on Water and Climate (WPWC)

Of these, the NCCSAP/NCAP is described in more detail below. The Netherlands Climate Change Studies Assistance Programme (NCCSAP), developed by the Netherlands and developing countries, was launched in the mid-1990s. After a successful first phase, aimed at assisting developing countries in preparing their National Communications and at undertaking capacity building, education and training activities, a second phase was launched in 2003. This programme, presently called Netherlands Climate Assistance Programme (NCAP), is scheduled to be finalised in 2007. While the first phase was mainly focused on basic climate change studies, the present phase is more geared towards policy making in relation to climate change through a multi-stakeholder process and is being implemented in 14 developing countries. The total support by the Dutch Ministry for Development Co-operation will be approximately €6.3 million.

Capacity building for adaptation

Although most of the adaptation programmes under the Netherlands Climate Change Policy target elements of capacity building, some programmes, such as START, can be considered full awareness- and capacity-building programmes. START (SysTem for Analysis Research and Training, an NGO based in the US) is responsible for research-driven capacity building in developing regions dealing with issues of global environmental change and sustainable development. It facilitates the development of human and institutional capacity in global change science, it fosters collaborative research on regional aspects of global change, it assesses the impacts of adaptations to climate and global change and it provides scientific information to policy- and decision-makers in the region. The Netherlands supports various initiatives and grants that are co-ordinated and executed by START through a financial contribution of €1.1 million.

4.4.5 Transfer of technology

Transfer and development of technology activities can range from hardware issues (equipment) to software issues (know-how), with the latter especially expressed in adaptation-related issues. The Dutch programmes and projects directly aimed at

transfer of technology comply with obligation under the UNFCC as well as the Kyoto Protocol.

The programme that contributes most to the transfer of technology in a direct way is the aforementioned PSOM. One of the main project criteria of this programme is that the projects should result in transfer of know-how and technology from the Dutch company to the company in the host developing country. Through this programme, the Netherlands contributes considerably to the development and transfer of technology to developing countries and Central and Eastern European Countries

Examples of projects that received support from the PSOM are the Biomass Gasification Unit for Sustainable Energy in Bolivia (50% contribution from PSOM of a total of €1.5 million) and the Joint Venture Rural Energy Services in South Africa (80% contribution of a total of €1 million). At the end of 2004, the Netherlands increased the budget for PSOM projects and expanded the list of eligible countries from 16 to 41. Individual projects are also tackling the issue of technology transfer. For example, in early 2003, China and the Netherlands signed a co-operation agreement to promote the comprehensive development and utilisation of renewable energy in western China's countryside through the Promotion of Rural Renewable Energy in Western China project. The project, sponsored by the China Association of Rural Energy Industry (CAREI), received an investment of €5.3 million from the Dutch government.

4.4.6 Role of the private sector

It is acknowledged that the private sector's contribution to sustainable development and thus implicitly to combating climate change in developing countries and countries with economies in transition is becoming increasingly important. Most of the environmentally sound technologies (including climate-friendly technologies) are owned by the private sector. Stimulating the private sector to actively participate in this type of projects is one of the basic concepts of the Dutch development co-operation programmes aimed at Central and Eastern European countries and developing countries. The main examples of programmes and initiatives are:

- Programme for Co-operation with Emerging Markets (PSOM)
- Development-related Export Transactions Programme (ORET)
- Solar Investment Fund

Credits

This is a publication of the Ministry of Housing, Spatial Planning and the Environment (VROM)
Directorate General of the Environment
Address for visitors: Rijnstraat 8, The Hague
Postal address: PO Box 20951, 2500 EZ The Hague
The Netherlands
www.vrom.nl/international

Preparation:
Ministry of Housing, Spatial Planning and the Environment (VROM)
Ministry of Economic Affairs (EZ)
Ministry of Transport, Public Works and Water Management (V&W)
Ministry of Agriculture, Nature and Food Quality (LNV)
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Netherlands Environmental Assessment Agency (MNP)
Wageningen University and Research Centre (WUR)
Royal Netherlands Meteorological Institute (KNMI)

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December 2005

Publication of: **The Netherlands Ministry of Housing, Spatial Planning and the Environment**
→ Rijnstraat 8 → 2515 XP The Hague → The Netherlands → www.vrom.nl/international

VROM 5314 / December 2005

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