

2006

BELGIUM'S REPORT ON DEMONSTRABLE PROGRESS

under the Kyoto Protocol

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Report on demonstrable progress under the Kyoto protocol

Introduction



Belgium is firmly committed to combating global warming. This commitment was first put into practice with the signature (1992) and ratification (1996) of the United Nations Framework Convention on Climate Change, followed by ratification of the Kyoto Protocol (2002). Bound to its European Union partners by the agreement on joint fulfilment of the Kyoto commitments (1998), Belgium intends to implement all measures necessary to ensure that it achieves its commitments under the Kyoto Protocol.

The country has taken several important steps in that direction in the past few years. A cooperation agreement adopted in 2003 formalised cooperation between the federal state and the three regions with a view to ensuring optimal integration of the policies of the different authorities and guaranteeing a coherent and ambitious National Climate Plan. The cooperation agreement also resulted in the setting up of the different structures needed for implementing the Kyoto Protocol and for sharing data and reporting information to European and international bodies.

The internal burden sharing agreement (2004) negotiated between the federal and regional governments also constituted an important step forward, establishing differentiated targets and a clear framework for the responsibilities of the different federated entities.

Belgium moved further down the road to meeting its Kyoto target with the development of its National Allocation Plan in accordance with the European Emission Allowance Trading Directive (2003/87/EC). This system became operational in 2005 with the creation of a national registry. It constitutes a key instrument that will be used to help energy-intensive sectors improve their energy efficiency while optimising costs.

The climate policies implemented by the regional and federal authorities have also evolved appreciably in recent years. The structures necessary for the use of the Kyoto project-based mechanisms are also being put into place. The state and the three regions have already set their objectives and have initiated and are financing Clean Development Mechanism and Joint Implementation projects. With these projects, complementing a range of policies and measures implemented recently by the regional and federal authorities, Belgium will enter confidently into the first commitment period of the Kyoto Protocol.

This report summarises both past trends in and projections for greenhouse gas emissions and describes the different policies and measures introduced, as well as the contribution domestic measures and the flexible mechanisms will make to achieving the Kyoto objective. Information on other aspects of the commitments under the Kyoto Protocol is also included. This Report on Demonstrable Progress constitutes Belgium's official notification under

UNFCCC CoP Decision 25/CP.8 (Demonstrable progress under Article 3, paragraph 2, of the Kyoto Protocol), and under Article 5(4) of Decision 280/2004/EC concerning a mechanism for monitoring Community greenhouse gas emissions and for implementing the Kyoto Protocol.

Description of domestic measures

Policy-making process

In the federal system of Belgium, climate policy is elaborated at different levels of government, in keeping with the division of power between the federal state and the regions. Each of these authorities defines its own priorities for environmental and climate policy, and implements the relevant actions. Another important driver of the Belgian climate policy is the relationship between domestic and European Union legislation in the field of climate change. In this regard, the different regulations, directives and decisions established within the framework of the European Climate Change Programme (ECCP) constitute the context of climate policy in Belgium.

The coherence of the **national climate policy** is ensured through co-ordina-

tion bodies, which have been established in order to harmonise and create synergy between the federal and regional policies. The most important body as regards climate policy is the National Climate Commission, established by the Cooperation Agreement of 14 November 2002. One of its main responsibilities consists in the establishment, implementation and follow-up of the National Climate Plan. This plan aims at fulfilling Belgium's commitments under the UNFCCC and the Kyoto Protocol. A first evaluation of the National Climate Plan, based on environmental, social and economic criteria, will take place in early 2006 and will be followed by an update of the Plan. The National Climate Plan is currently made up of a number of actions and programmes implemented by the federal and regional authorities. These main programmes, which determine the climate policy objectives and strategies of the federal and regional authorities, are described hereafter.

The action of the **federal government** in the field of climate policy is guided by the Federal Plan for Sustainable Development, established in the context of the Law on the coordination of federal policy for sustainable development (5 May 1997). A second version of this plan (2004-2008), which defines the measures to be taken at the federal level to achieve SD objectives, was adopted in September 2004. One of its six themes is the 'limitation of climate changes and more intensive use of clean energy'. Various specific actions fall under

this theme; they aim notably at: strengthening federal coordination, implementing a 'green' tax system, developing a fair pricing strategy, developing solidarity through the 'flexible mechanisms', promoting alternative energies and 'clean buildings', improving the public transport supply, developing clean car technologies, etc. Furthermore, the Council of Ministers of 19-20 March 2004 approved a set of measures aiming at reducing greenhouse gas emissions. These measures constitute the core of federal climate policy. As a whole, this set of measures should guarantee a cut in the national greenhouse gas emissions by 4.8 Mt CO₂ equivalent/year for the period 2008-2012.

The Flemish Climate Plan, approved by the **Flemish government** on 28 February 2003, is intended to give an overview of all climate related policies and measures in the Flemish Region. The plan was the first result of the policy-integrating work of the Flemish Taskforce on Climate, an administrative working group with all climate relevant policy competences, established by the government in 2001. The central part consists of 33 projects, divided into three categories: projects with a certain emission reduction potential, research and policy-oriented studies and communication campaigns. A new climate plan 2006-2012 is under preparation by the Taskforce. It is based on the first Flemish Climate Plan and its intermediary reports and accompanied by a broad consultation process with the stakeholders (the Flemish

climate conference). The third Environmental Policy Plan (MINA-plan 3) 2003-2007 was approved on 30 September 2003. It takes the same approach as the Climate Plan by promoting three strategic elements for an integrated Flemish climate policy: optimisation of the foundations on coordination and reporting (task force, emission inventories, projections and monitoring), a sectoral approach with actions for each key source sector and a clear strategy on the use of flexible mechanisms, including implementation of the EU emission trading scheme (European Directive 2003/87/EC).

On 19 July 2001, the **Walloon Government** adopted the Walloon Region Action Plan for Climate Change. The Walloon Air Plan (18 December 2003) ensures the integration of the climate policies and measures in the global frame of environmental and non-environmental regional policies. Among the numerous results of this plan, some recent actions are noteworthy. First, the EU emission trading scheme was implemented in 2004. 128 industries received an allowance of greenhouse gas emissions based on energy audits performed at each plant. The incentives to reduce industrial GHG emissions were reinforced by voluntary branch agreements, under which the main industry sectors made an undertaking to improve their energy efficiency. Second, the Walloon Plan for Sustainable Management of Energy' (18 December 2003) proposed different ways of stepping up the policy of rational use of energy (RUE) and developing renewable energy sources

(RES). RUE is promoted by grants (energy audits, etc.) or tax deductions on investments (insulation of houses, replacement of old boilers, etc.). This plan also aims to ensure that 8% of electricity and 12% of heat are produced from RES by 2010. To achieve that objective, 'green' electricity is promoted by the allocation of a minimum quota of RES certificates for each energy supplier ('green certificates'). Third, structural measures were taken recently in the transport sector, e.g. improvement of public transport or multimodal system for transport of goods. Finally, two legislative instruments have come into force in the agriculture and forestry sectors: the decrees implementing the decree on environmental permits (11 March 1999) and the decree on the Walloon sustainable management program for nitrogen in agriculture (10 October 2002). In the waste sector, implementation of the waste plan has cut the total amount of waste being placed in landfills and its biogenic content. Biogas recovery is also encouraged by the plan and has been strongly developed since 1993, leading to a substantial decrease in net methane emissions from landfills.

The **government of the Brussels-Capital region** adopted on 13 November 2002 (Decision G-31.55.0) an eight year Air and Climate Plan, the 'Plan for Structural Improvement in Air Quality and the Fight against Climate Change, 2002-2010'. The legal basis of this Plan is the decree on the evaluation and improvement of ambient air quality (25 March 1999), which is

the transposition of European Directive 1996/62/EC. Due to the urban nature of the region (city-region), the main sources of greenhouse gas emissions (as well as other atmospheric pollutants) are the heating of buildings (residential and tertiary) and transport. For that reason, the Air and Climate Plans have been merged. The Air and Climate Plan is managed by the Brussels Institute for Environmental Management (IBGE/BIM) in collaboration with other regional administrations such as the Administration for Infrastructure and Mobility (AED) and the Administration for Land Management and Housing (AATL). The Plan comprises 81 measures to reduce the main sources of greenhouse gases and other pollutants.

The development of all these federal and regional plans involved large-scale consultations of the public and the different stakeholders.

Finally, an important element of the climate policy framework in Belgium is the internal burden sharing agreement negotiated between the federal government and the three regions, in the context of the Cooperation Agreement of 14 November 2002. This agreement clarifies the respective responsibilities of the different authorities as regards compliance with international commitments. It defines differentiated targets for the three regions and determines the extent to which the federal level will contribute to the national effort, both through the implementation of

domestic measures and the use of flexible mechanisms.

■ PAMs by sector

A brief history

In 1991, the federal government set the target of reducing Belgian CO₂ emissions by 5% from their 1990 level by the year 2000.

This decision was taken in the framework of the burden sharing arrangement reached by the countries of the European Union in the drive to stabilise CO₂ emissions. The commitment was made as part of the Community strategy comprising four planks: the introduction of a monitoring instrument for CO₂ emissions; the development of the rational use of energy via the SAVE programme; the promotion of alternative energies under the ALTENER programme; and the introduction of a European CO₂/energy tax. In May 1992, the Belgian federal government transmitted to the European Commission its first report on its policy.

At regional level, the plans setting out the strategic elements of environment policy date from the same period. These are the MINA Plan 2000 for the Flemish Region (approved in 1990), the Environment Plan for Sustainable Development for the Walloon Region (approved in 1995) and the Development Plan of the Brussels-Capital Region (approved in 1992).

Over the past decade, the federal and regional strategic plans have evolved profoundly, taking into account the evolution of European policies, international treaties (United Nations Framework Convention on Climate Change and Kyoto Protocol), economic and social developments, the evolution of greenhouse gas emissions and technological progress. The principal constituent elements of national climate policy are described on page 2.

The main actions that are being implemented (or have been adopted) to reduce greenhouse gas emissions in the different sectors are listed below by sector.

Energy

In Belgium, energy policy encompasses both federal and regional competences. The federal government is responsible for 'matters which, owing to their technical and economic indivisibility, require equal treatment at national level', including electricity and gas tariffs, market regulation for large infrastructures for storage, transmission and production of energy, the nuclear fuel cycle, and R&D in both nuclear fusion and fission.

The regional governments of Flanders, Walloon and Brussels-Capital are mainly responsible for formulating and implementing policies for energy efficiency, renewable energy, non-nuclear energy research and development (R&D) and market regulation for the distribution and supply of electricity and gas through distribution networks (see page 4).

Policies and measures implemented at the federal and/or regional levels include:

- Green certificates: this system assures an increasingly larger proportion of electricity generated from renewable energy sources; it works in tandem with a guaranteed price policy and the access of producers and consumers of 'green' electricity to the liberalised segment of the electricity market.
- Investment support: investments designed to improve energy efficiency, increase the use of renewable sources of energy or cogeneration, and promote the rational use of energy are encouraged by tax deductions or subsidies granted to companies and/or individuals.
- Voluntary agreements: the public au-

thorities have introduced a system of voluntary agreements for energy-intensive industries in order to optimise energy efficiency in these sectors.

These measures are supplemented with a number of provisions, in particular concerning energy pricing, energy audits, insulation standards for buildings, the promotion of renewable energy sources and new infrastructure (notably wind energy).

Transport

The policies and measures focus on three main approaches:

- measures aimed at shifting the mode of transport of passengers and goods to other forms (modal shift), including

- measures encouraging a reduction in the demand for transport;
- measures aiming to reduce polluting emissions from vehicles
- mobility plans.

Measures implemented by the federal and regional authorities to promote modal shift focus basically on limiting the growth of road traffic and on promoting other means of transport:

- Better public transport service: improvements in infrastructure, increased frequency, better connections, combined tickets (train, tram, bus, underground), improved personal safety, passenger information systems, etc.
- Promotion of alternative means of transport: a set of measures aimed at encouraging people to use public transport, car-pooling, bicycling or walking for everyday mobility; business transport plans.

Various measures aiming at limiting vehicle greenhouse gas emissions have been implemented: modulation of the road tax and tax deduction for the use of clean vehicles, CO₂ guide for the purchase of cars, promotion of LPG vehicles, ecodriving, etc.

Industry

The strategy of the regional governments to encourage industry to reduce greenhouse gas emissions per unit produced is mainly based on negotiated vol-

untary agreements (Wallonia) or benchmarking agreements for energy efficiency (Flanders). Agreements covering an entire sector constitute a 'contract' between the public authorities and sectoral associations of companies (e.g. in the following industries: iron and steel, chemicals, paper, refinery, brick, food, metal, textiles, etc.), with the two parties agreeing on a quantitative improvement in pollutant emissions.

In addition to improving energy efficiency, these agreements aim especially at the management of industrial waste, the implementation of 'best available technologies' (changes to structural processes) and product policies. They will provide for penalties if not respected.

Measures aimed at reducing industrial non-energy-related greenhouse gas emissions are also part of the regulations governing environmental permits. They cover the restriction of the use of fluorinated gases, the introduction of best available technologies (e.g. voluntary agreement between sector of nitric acid production and the Flemish government), etc.

In application of European Regulation 2037/2000 on ozone-depleting substances, Belgium has to adopt national regulations aimed at reducing emissions of refrigerant gases that deplete the ozone layer (HCFCs and CFCs). The three regions have recently adopted, or will adopt shortly, regulations related to stationary applications containing refrigerant gases (refrigeration, air conditioning and heat pump equipment).

Division of Responsibilities for Energy Policy between the federal and regional governments

Federal government	Regional governments
<ul style="list-style-type: none"> - Indicative programme for the electricity sector - Nuclear fuel cycle and related R&D programmes and nuclear fusion research - Large storage infrastructure, - Transmission and production of energy - Tariffs - Offshore energy 	<ul style="list-style-type: none"> - Distribution and transmission of electricity through networks with maximum voltage of 70 kV - Public distribution of gas - Use of methane and blast furnace gas - District-heating equipment and networks - Use of waste products from coal tips - New and renewable sources of energy - Recovery of waste energy from industry or other uses - Rational use of energy

Agriculture and Forestry

Actions in the agricultural sector focus primarily on reducing the factors of production (establishing new land application standards for animal manure, limiting growth of the livestock population) and on improving farming practices (treatment, storage and spreading of manure, recovery of waste, combating soil degradation, etc.).

Reforestation and forest conservation are encouraged by specific laws.

Waste

The policies implemented to reduce the volume of waste and to optimise treatment are based on environmental taxation (favouring re-usable packaging), stricter regulations (ban on landfill, compulsory treatment of landfill gases, standards for incinerators) and the development of specific channels for treating and recovering waste materials.

Allocation plan and flexible mechanisms

For implementation of the European Emission Trading scheme (Directive 2003/87/EC), the regions are in charge of issuing greenhouse gas emission permits and implementing the allocation plan for installations on their territories, excluding nuclear plant support and safety installations, which are the responsibility of the federal government. The Belgian National

Allocation Plan is based on the sum of the three regional plans and the federal plan.

Belgium will make use of the Kyoto mechanisms to fulfil its emission reduction commitment. The National Climate Commission has been designated as the Belgian Designated National Authority (DNA) and Focal Point. The priority of both the federal government and the regions is to use the project-based mechanisms (CDM or JI). The Federal and Flemish governments launched this year their first JI/CDM tender in order to purchase emission reductions from JI and CDM projects. The Walloon and Brussels-Capital Regions have invested in the World Bank CDCF (small-scale CDM projects).

Further action is planned...

While significant progress has been made in tackling greenhouse gas emissions, Belgium is determined to take further action, with a new phase of the National Climate Plan. Federal and regional authorities are reviewing the progress made and exploring new options for cost-effective emission reductions. Special attention will be paid to energy efficiency, renewable energy and road transport. Assessing vulnerability and promoting adaptation are other priorities of the revision of the National Climate Plan.

Greenhouse gas emission trends and projections

Belgium's greenhouse gas emissions were almost stabilised in 2003, compared to 1990. Substantial reductions are expected in the future. Projections of greenhouse gas emissions indicate that Belgium will be able to achieve its reduction target under the Kyoto Protocol on the basis of current and additional policies and measures, and the use of flexible mechanisms.

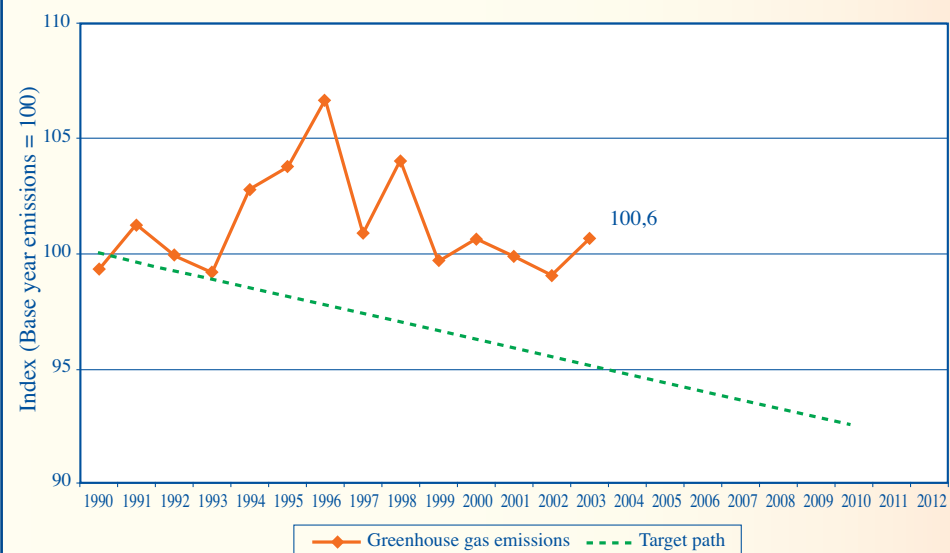
Past GHG emission trends

Greenhouse gas emissions data presented here are extracted from the national inventory submitted in 2005.

Total greenhouse gas emissions (without LUCF) in Belgium amounted to 147.7 Mt CO₂ eq. in 2003, which is 1.4% above 1990 emissions. Compared to the

Figure 3.1: Belgian GHG emissions 1990-2003 (excluding LULUCF) compared with Kyoto target.

For fluorinated gases, the assumed base year is 1995, so the index value 100 on the Y-axis is: CO₂, CH₄ and N₂O emissions in 1990 + HFC, PFC and SF₆ emissions in 1995.



base year¹, however, emissions increased by 0.6% in 2003 (Figure 3.1). Under the Kyoto Protocol and the EU 'burden sharing' agreement, Belgium is committed to reducing its GHG emissions by 7.5%. Assuming a linear target path from 1990 to 2010, total GHG emissions in 2003 were 5.5 index points above this target path.

The major greenhouse gas in Belgium is carbon dioxide (CO₂), which accounted for 85.5% of total emissions in 2003. Emissions

of CO₂ increased by 6% during the period 1990-2003, while N₂O, CH₄ and fluorinated gas emissions dropped 8%, 21% and 67% respectively during the same period. The share of the main sectors is given in figure 3.2.

In Belgium, greenhouse gas emissions increased by 0.6% in 2003 compared to the base year emissions. This apparent stability actually masks contrasting evolutions within the sectors.

This is illustrated by Figure 3.3, which gives the impact of the main sectors on the national trend. It clearly shows that the increase in Belgian emissions is due to the sharp increase in emissions from road transport and the residential and commercial sectors. Since 1990, those sectors have been responsible for a 7.1% increase in to-

tal emissions. This trend is counterbalanced by the decrease in emissions from the other sectors, particularly industry, which altogether led to a 6.5% decrease in emissions, giving an overall trend of +0.6%.

CO₂ emissions from road transport have risen constantly since 1990, due to the growing number of cars, and increased traffic. Emissions from the residential and commercial sectors have also risen due to various factors such as increasing housing stock, the rising number of employees in the commercial /institutional sector and the limited switch to gas in sparsely populated areas.

On the other hand, the switch from solid fuel to gaseous fuels is observed in all fuel combustion sectors. Together with the development of biomass fuels in some sectors, such as cement kilns, this has resulted in a reduction in CO₂ emissions since 1990, by reducing the average CO₂ emission factor for an equal level of energy consumption. The more rational use of energy is also developing but it often goes together with increased use of electricity, so its impact on actual emissions is generally more difficult to quantify.

In agriculture, CH₄ and N₂O emissions are decreasing, reflecting the evolu-

¹ Belgium's base year emissions are calculated as the sum of the emissions of CO₂, CH₄ and N₂O in 1990, and emissions of fluorinated gases in 1995; this methodology is allowed by Art. 3.8 of the Kyoto Protocol, which states that Parties included in Annex 1 may use 1995 as the base year for HFCs, PFCs, and SF₆.

Figure 3.2: Share of the main sectors in 2003

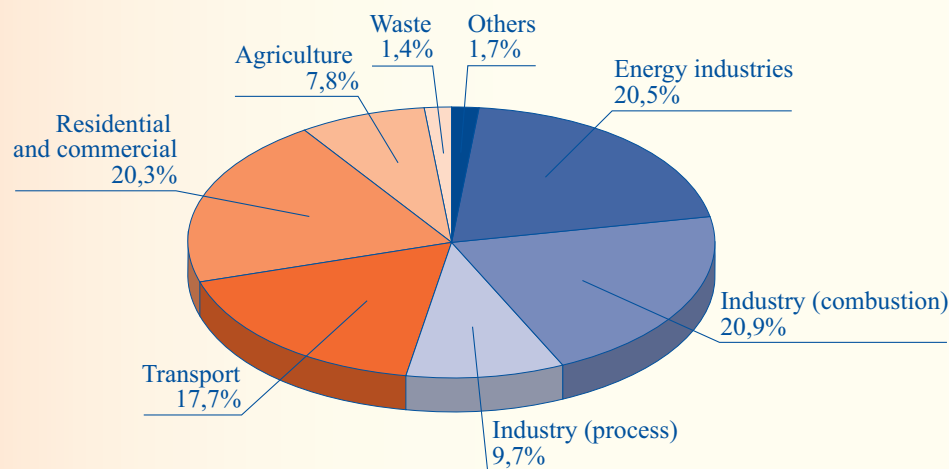
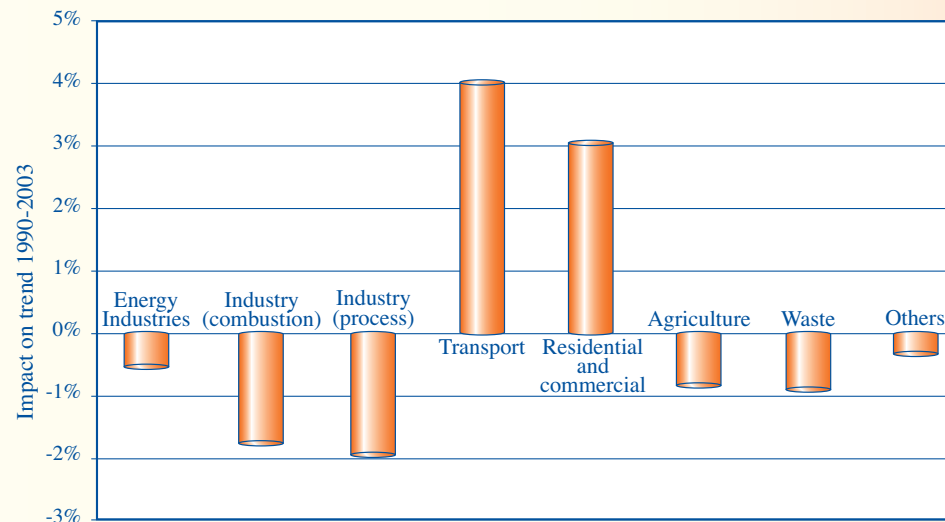


Figure 3.3: Impact of the main sectors on the global trend 1990-2003



tion of the livestock population and certain changes in agricultural practices. The other main source of N₂O is the chemical industry, where process improvement combined with increased production led to fairly stable emission levels. In solid waste disposal, biogas recovery and use has resulted in a net reduction of CH₄ emissions in recent years.

GHG emission projections

The national projections reported here are based on the addition of the projections elaborated by the three regions (Flanders, Wallonia, Brussels-Capital), as part of their respective climate strategies. Assumptions and key parameters were harmonised during a forecasting round held in spring 2005.

The scenario ‘with measures’ indicates the likely evolution of greenhouse gas emissions in Belgium under current policies and measures. This scenario includes all policies and measures either adopted or under implementation by the end of April 2004 including the National Allocation Plan. It does not include additional measures that could be proposed in the revised National Climate Plan, under discussion at the time of writing this report.

In particular, this scenario includes:

- at the federal level, measures decided by the Council of Ministers (19-20 March 2004) aimed at reducing emissions by 4.8 Mt CO₂ eq. per year during the 2008-2012 period;

- the Flemish Climate Plan 2002-2005, adopted on 28 February 2003, and its yearly progress report;
- the Action Plan for Climate Change adopted by the Walloon government on 19 July 2001. It was supplemented by the Walloon Plan for Sustainable Management of Energy in 2003;
- the Air and Climate Plan adopted by the Brussels-Capital Region on 13 November 2002, which focuses in particular on the residential, commercial and transport sectors.

Projections “with measures”

Under current policies, as described in the ‘with measures’ scenario, greenhouse gas emissions in Belgium (without LULUCF) are expected to increase from 146.8 Mt CO₂ eq. in the base year to 148.5 Mt CO₂ eq. in 2010 and 154.0 Mt CO₂ eq. in 2020, i.e. an increase of 1.1% and 4.9% respectively compared to the base year.

The largest contributor by far to this increase is CO₂ emissions, which rose from 119 Mt in the base year to 126.6 Mt (+6.4% compared to the base year) in 2010 and 131.9 Mt (+10.8%) in 2020. Up to 2010, the largest growth of CO₂ emissions will come from energy used in transport and in the residential and services sectors. Between 2010 and 2020, CO₂ emission growth will mostly occur in the electricity generation sector, owing to the progressive

Table 3.1: GHG projections for Belgium by sector (Mt CO₂ eq.)

	Base year	2000	2005	2010	2015	2020
1 Energy	113.1	117.0	122.3	120.0	122.6	125.1
1A Fuel combustion	112.3	116.2	121.5	119.2	121.8	124.4
1A1 Transformation (including CHP)	30.2	28.3	33.6	31.9	33.5	36.0
1A2 Industry (without CHP)	33.6	33.1	28.7	25.5	25.8	25.5
1A3 Transport (road, railway, inland navigation)	20.2	24.6	26.3	28.6	29.8	30.8
1A4 Commercial / residential / agriculture	28.1	30.1	32.9	33.3	32.7	32.0
1B Fugitive emissions	0.8	0.8	0.8	0.8	0.8	0.8
2 Industrial processes	17.2	15.5	14.4	15.0	15.6	16.1
3 Solvent and other Product Use	0.3	0.3	0.3	0.3	0.3	0.3
4 Agriculture	12.8	12.4	11.7	11.5	11.3	11.0
5 Land-Use Change and Forestry	-3.1	-3.1	-2.0	-3.3	-3.3	-3.3
6 Waste	3.4	2.7	2.1	1.8	1.6	1.6
7 Other	0.0	0.0	0.0	0.0	0.0	0.0
Total (without LUCF)	146.8	147.7	150.7	148.5	151.4	154.0
Total (with LUCF)	143.7	144.6	148.7	145.2	148.1	150.7

Note: Emissions for the base year are calculated by adding the 1990 emissions for CO₂, CH₄ and N₂O, and the 1995 emissions for F-gas.

Sources: National inventory (base year, 2000) and national projections (2005-2020)

replacement of nuclear power stations by gas combined-cycle power stations, and in transport.

Emissions of methane will slowly decline over time, from 10.8 Mt CO₂ eq. in the base year to 7.9 Mt CO₂ eq. in 2010 (-26.5% compared to the base year) and 7.5 Mt CO₂ eq. in 2020 (-30.6%). Emissions of nitrous oxide rose slightly in the 1990s, from 12.2 Mt CO₂ eq. to 12.9 Mt CO₂ eq., but will also decline in the future, to 11.3 Mt CO₂ eq. in 2010 (-7.6%) and 11.1 Mt CO₂ eq. in 2020 (9.1%).

Emissions of F-Gas, which declined appreciably between the base year (1995 in this case) and 2000, will progressively edge up again between 2000 and 2020, while remaining below their base year level. They will reach 2.7 Mt CO₂ eq. in 2010

and 3.6 Mt CO₂ eq. in 2020, which corresponds to declines of 44.3% and 25.2% relative to the base year.

Sensitivity analysis

The impact of changing certain key assumptions of these projections has been tested through sensitivity analyses. The following cases have been tested: changing climate conditions, higher electricity imports, lower energy demand, higher price of crude oil, and lower or higher economic growth. In the analyses performed for this report, these changes will not exceed, on an individual assumption basis, 3 Mt CO₂ eq. in 2020, i.e. less than 2% of total emissions. It is thus likely that, even if some of the key assumptions of the 'with measures' scenario were to change in the future, GHG

emissions would still increase between 1990 and 2020, though the amount of this increase could vary to a limited extent.

In the case of climate conditions, for example, the 'with measures' scenario is based on an average of 1,900 degree-days (reference 15°C - this is the 1993-2003 average) each year. Changing this assumption to a colder climate (2,010 degree-days

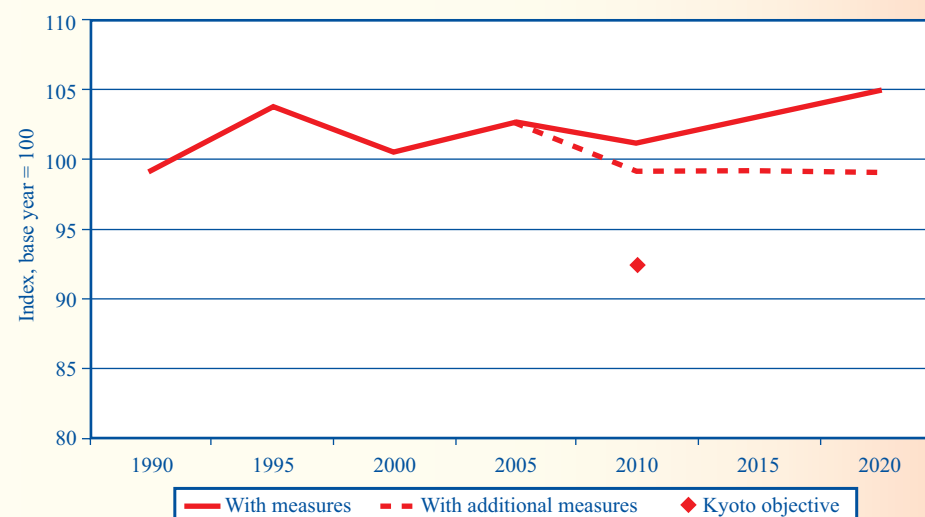
each year, the 1971-2000 average) increases CO₂ emissions in 2020 to 133.5 Mt from 131.9 Mt in the 'with measures' scenario, a 1.2% increase. Conversely, with a warmer climate assumption (1,714 degree-days each year, the value observed in 2000), CO₂ emissions in 2020 reach 129.4 Mt, 1.9% below the level of the 'with measures' scenario.

Table 3.2: GHG projections for Belgium – by gas

	Base year	2000	2005	2010	2015	2020
CO ₂	119.0	123.8	129.1	126.6	129.3	131.9
Methane	10.8	9.8	8.4	7.9	7.7	7.5
N ₂ O	12.2	12.9	11.4	11.3	11.2	11.1
F-gas	4.8	1.3	1.7	2.7	3.2	3.6
Total (without LUCF)	146.8	147.7	150.7	148.5	151.4	154.0

Sources: National inventory (base year, 2000) and national projections (2005-2020)

Figure 3.4: Total GHG emission projections for Belgium



Note: Emissions for the base year are computed by adding the 1990 emissions of CO₂, CH₄ and N₂O, and 1995 emissions of F-gas.

Sources: National inventory (base year, 1990 to 2000) and national projections (2005-2020)

As another example, let us consider the impact of economic growth on GHG emissions. In the ‘with measures’ scenario, economic growth averages 1.9% between 2000 and 2010. Assuming that a rise (or fall) in exports would increase (decrease) economic growth by 0.3% per year, GHG emissions would increase (decline) by 2.6 Mt CO₂ eq. in 2010, i.e. a 1.8% change.

Scenario ‘with additional measures’

A number of additional measures and their impact have been assessed. The most significant additional measures focus on transport policy, the substitution of wood and biofuels for fossil fuels, the reduction of F-gas emissions and the further reduction of N₂O-emissions from nitric acid production.

Considered together, these measures could provide an additional reduction of GHG emissions of 8.4 Mt CO₂ eq. by 2020. This includes savings of 6.3 Mt of CO₂, 0.07 Mt CO₂ eq. of methane, 0.73 Mt CO₂ eq. of nitrous oxide and 1.3 Mt CO₂ eq. of F-gases. These measures are described in more detail in the report prepared by Belgium under Article 5.3 of Decision 280/2004/EC.

Conclusions

Figure 3.4 illustrates the aggregated emissions projections in the ‘with measures’ scenario and the impact of the additional measures. At this point, it is expected that, over the period 2008-2012, GHG emissions in Belgium will remain above the Kyoto target. The use of flexible mechanisms, which forms an integral part of the federal and regional climate policies, will complement the emission reductions and ensure that Belgium achieves its commitments under the Kyoto Protocol.

Contribution of domestic/European measures and use of Kyoto mechanisms

Evaluation of projected progress in emission reduction by measure

Two projection scenarios were presented in the previous section. First, a scenario ‘with measures’ evaluates the future trends

of greenhouse gas emissions under implemented policies and measures.

The scenario ‘with measures’ indicates the likely evolution of greenhouse gas emissions in Belgium under current poli-

Table 4.1. EU Common and co-ordinated measures implemented in Belgium

Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC
Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market
Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings
Shifting the balance between modes of transport, in particular towards rail transport 2001/12/EC, 2001/13/EC, 2001/14/EC of 15/03/01 Regulation 881/2004 of 29/04/2004, 2001/49/EC, 2001/50/EC, 2001/51/EC of 29/04/2004
Commission Recommendations of 5 February 1999 and 13 April 2000 on the reduction of CO ₂ emissions from passenger cars (voluntary agreement of the car manufacturers from EU, Japan and Korea to reduce fleet average CO ₂ emissions to 140 g/km by 2008/09)
Directive 1999/94/EC of the European Parliament and the Council of 13 December 1999 relating to the availability of consumer information on fuel economy and CO ₂ emissions in respect of the marketing of new passenger cars
Council Regulation (EC) No 1783/2003 of 29 September 2003 amending Regulation (EC) No 1257/1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF)
Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

cies and measures (see pages 7 and 8). This scenario includes all policies and measures either adopted or being implemented by the end of April 2004, including the National Allocation Plan.

Some domestic policies and measures constitute national implementation of European Directives. Actions carried out at both the Belgian federal level and at the European Union level contribute to achievement of the overall GHG emission target. Common and coordinated policies and measures (CCPMs) are used in areas where common action strengthens and supports national efforts to reduce greenhouse gases most effectively. A comprehensive description of common and coordinated policies and measures is presented in the EU Report on Demonstrable Progress. Table 4.1 lists the CCPMs already implemented in Belgium, by the federal and/or regional authorities.

Work under way in the National Climate Commission and the regional and federal governments aims to put in place a national system for monitoring the impacts of Belgium's different policies and measures. This system will reside on a complete data base and the use of specific indicators to evaluate the effects of policies and measures implemented to reduce greenhouse gas emissions. There are also plans to assess the environmental and socio-economic effects. This evaluation must then be used to adapt the policies and measures of the National Climate Plan. Since the monitoring system is still in the planning stage, it is impossible to provide an individual assessment of the effects of policies and measures. These effects are nonetheless taken into consideration, on an aggregate basis, in emission projections.

Achievement of targets

The scenario 'with measures' includes all policies and measures either adopted or being implemented by the end of April 2004, including the National Allocation Plan. Under these policies, greenhouse gas emissions in Belgium (without absorption by LUCF) are expected to increase from 146.8 Mt CO₂ eq. in the base year (see note under table 3.1 for definition of the base year) to 148.5 Mt CO₂ eq. in 2010, an increase of 1.2% (see table 3.1 and 4.2). The largest contributor by far to this increase is CO₂ emissions from energy used in transport, electricity generation, and the residential and services sectors.

The additional measures presented in this report allow further emission reductions in 2020, in the amount of 8.4 Mt CO₂ eq. The most significant additional measures focus on transport policy, the substitution of wood and biofuels for fossil fuels, the reduction of F-gas emissions and further reduction of N₂O-emissions from nitric acid production.

The table 4.2 illustrates these aggregated projections for the 'with measures' scenario and the impact of the additional measures. At this point, it is expected that, for the period 2008-2012, GHG emissions in Belgium will remain higher than the level of its commitment under the Kyoto protocol. The federal and regional governments intent to make use of the flexible mechanisms (currently estimated at 8.59 Mt CO₂ eq. / year in 2008-2012), filling the remaining gap. Furthermore, the National Climate Plan and the

three regional climate plans are currently under revision and will be adapted to ensure that the country will meet its Kyoto objective. These adaptations may encompass both new measures, and the adjustment of the use of flexible mechanisms. The LULUCF projections show no net C sequestration or emission in forests under Article 3.3 of the Kyoto Protocol.

Progress on other commitments

Improvements to national/EC greenhouse gas inventories

Many improvements to the inventory preparation process have been made in recent years. In 2002, Belgium submitted its first National Inventory Report, including key source analysis, and provided for the first time a complete time series since 1990. In 2003 and 2004, comprehensive sectoral background information was provided, allowing detailed analysis and further harmonisation of the methodologies between the regions. In 2005 a Tier1 uncertainty analysis of the complete inventory was reported and a detailed comparative analysis of the approaches used for estimating CO₂ emissions (reference and national approaches) was presented in the NIR.

Table 4.2. Emissions projections without LULUCF for the various scenarios, with and without Kyoto mechanisms

	Base year	Without Kyoto mechanisms		With Kyoto mechanisms	
		2010	change base yr. - 2010	2010	change base yr. - 2010
	Mt CO ₂ eq.	Mt CO ₂ eq.	%	Mt CO ₂ eq.	%
With measures projections	146.8	148.5	1.2%	139.91	-4.7%
With additional measures projections	146.8	145.7	-0.7%	137.11	-6.6%

In the meantime, emissions have been recalculated for the whole time series since 1990, taking into account revisions of emission factors, harmonisation of methodologies between regions and availability of new data, leading to greater consistency in the time series.

The improvement of the inventory is a continuous process that takes place mainly in the regional inventory agencies, with co-ordination provided by a permanent body, the Emissions Working Group of the Co-ordination Committee for International Environmental Policy (CCIEP). Inventory experts in that body discuss methodologies and share experiences and information related to inventories (methodological developments, results from workshops or reviews, new guidelines, etc.). A comprehensive description of the national inventory system will be available in January 2006.

■ Regional/global measures for adapting to climate change

A number of adaptation measures currently exist in Belgium, but these do not form part of an adaptation plan as such. One of the reasons for this is that vulnerability to the impacts of climate change is not yet known comprehensively in Belgium. Existing studies generally offer incomplete coverage of the potential issues. More comprehensive analysis of future vulnerability will be needed in order to formulate appropriate adaptation measures

in all relevant sectors. This is particularly important where measures or investments have long-term effects, e.g. in the construction sector.

Favourable economic conditions give most sectors a high adaptive capacity. Even if the regional mean temperature increase stays below 3°C in summer, however (from end 20th to end 21st century⁽²⁾), ecosystems and forestry will probably be affected significantly. Coastal areas, water resources, risks of flooding, and human health may also become causes for concern in such a scenario, although this involves more uncertainty. As a result of high (world-scale) emissions, summer temperatures in Belgium may increase well above 3°C, causing much greater vulnerability and affecting more sectors (see chapter 6 of the Fourth National Communication of Belgium). The following paragraphs report recent measures that contribute to adaptation to climate change.

Ecosystems. The general principle of adaptation measures for the natural environment is that a healthy ecosystem will be better able to resist and adapt to climate change. Ecosystems have already been severely damaged by a range of pressures from human activities, including habitat fragmentation and various pollutants. Several measures have been taken to reduce non-climate stresses and these will need to be reinforced in the future. The ongoing definition of protected zones in the framework of the Natura 2000 European network contributes to this objective.

Agriculture and forests. As long as the temperature increase remains below about 3°C, the expected impacts on agriculture are limited. Warming would reduce yields for a number of existing crops, but increasing carbon dioxide concentration would have positive effects on most yields. In addition, current agricultural choices in Belgium are widely affected by policy measures, and adaptation seems possible in the future. Forestry seems to be more at risk, notably due to the timescale of tree growth. Current forest management focuses on planting species adapted to mild and rainy winters such as Norway Spruce. Both sectors will face impacts from the increased frequency of summer drought and heat waves, and may be affected by the migration of pests. Warming contributes to the decomposition of the organic matter contained in soils, reducing fertility. The expansion of biofuel production would have consequences on land use and landscapes.

Floods and water resources. Plans for the management of flood risks and related water issues have been established in the three regions. While climate change is usually not taken into account explicitly, reducing the current risk clearly contributes to reducing future damage. This is a reasonable approach, at least initially, particularly for events of intense rainfall (flash floods), because future changes are not precisely known and even present-day statistics are limited regarding the probability of such events.

In the Walloon Region, a new flood-prevention plan was approved in 2003 (PLUIES

plan). This global plan is aimed at improving knowledge of the risk of flooding, reducing and slowing the flow of water on slopes, improving the management of rivers, decreasing vulnerability in zones liable to flooding, and improving crisis management. Rules banning the construction of buildings in area susceptible to flooding have been imposed. *In Flanders, similar rules have been set up in the framework of a global water policy that concerns floods as well as water resources (managed by the Coördinatiecommissie Integraal Waterbeleid). Water resources are already an important concern in Flanders. The authorities can demand specific measures such as the use of permeable ground surfaces. Current measures (e.g. for agriculture) aimed at improving surface and groundwater quality will help sustain the availability of affordable drinking water. Another important aspect is the rational use of water, currently promoted through a large-scale information campaign. In the Brussels-Capital Region, a range of prevention measures are in place to retain water at its sources and improve ground infiltration (subsidies in favour of rain water use in homes and the rehabilitation of rivers). As a palliative measure, there are more than 10 storm water basins in the region, and new ones are currently being built. Maps identifying the flood risk were prepared to facilitate the execution of these*

² Models suggest that regional change over Belgium in summer is likely to be above the global annual mean, so this roughly corresponds to +2°C from pre-industrial level at global scale (EU target).

measures, and should soon become available for the three regions on a common basis. *The federal government* recently introduced flood cover in household fire insurance policies. This may have a dissuasive effect on living in flood-prone areas, in particular if it results in higher insurance premiums.

Coastal area. Since 1960, coastal erosion has been offset by moving sand to the beaches, as was done recently in Ostende, where the beach level was raised to temporarily decrease the risk of flooding in the town. It is currently considered that compensating for future erosion by adding sand when needed will continue to be possible. When dykes need to be constructed, a 60 cm rise in sea level. For the 21st century, the cost of adaptation is regarded as moderate, but a further rise in sea level would make adaptation much more difficult. With the current climate, the risk level is estimated at one flood every 350 years, but the risk is expected to rise to up to once in 25 years in 2100 due to climate change. The Sigma Plan for flood protection was recently revised. The resulting plan, adopted in July 2005, involves new controlled flooding zones and takes a 60 cm increase in sea level into account.

Human health. As a first step towards adaptation, the federal government has set up a 'heat-wave and ozone plan'³ introducing phased-in measures and communication actions. The first phase takes place every summer and focuses mainly on preparatory actions and public information and calls for solidarity with people at risk. The alert phase is declared when a heat wave (temperature

above the 95th percentile) of 3 days or more is forecast by the Royal Institute of Meteorology or ozone concentrations above the EU information threshold are forecast by the Interregional Environment Unit. Warnings are sent to emergency and geriatric departments of hospitals, rest homes, etc. A survey on the application of measures in these organizations is being conducted. This monitoring is one of the elements which authorities take into account in deciding whether it is necessary to move into the crisis phase, which implies the creation of a crisis unit and additional measures, e.g. in hospitals.

Another type of adaptation to heat waves is the structural protection of buildings: thermal insulation, solar protection by external blinds and windows, ventilation, etc. Initial regulations with this aim in view are being established in the framework of implementation of the EU Directive on the energy performance of buildings⁴. The Flemish Region recently introduced regulations specifically aimed at reducing the risk of overheating in new houses⁵, and the other regions are expected to take similar measures. Regarding other impacts of climate change on health, such as a possible contribution to the observed increase in the prevalence of Lyme disease, adaptation is currently focusing on better knowledge of the issue by health professionals.

Cooperation on adaptation. The priorities of Belgian development cooperation in the environmental field include several aspects that contribute to adaptation to climate change, particularly for water supply

and treatment. Aid focusing on reducing the vulnerability of less favoured populations, in particular in the fields of education, basic health care and infrastructures, is also helping to improve the adaptation capacity of populations. A trend towards better integration of climate change adaptation in cooperation programmes has been initiated in the framework of the Development Assistance Committee of the Organisation for Economic Cooperation and Development (DAC/OECD), in which Belgium is actively participating.

■ Technology transfer and capacity building

Technology transfer and capacity building are important aspects of bilateral and multilateral cooperation in the area of environment and climate change. Most activities in this field are conducted by multilateral and indirect capacity-building and technology-transfer actors. Although it is difficult to estimate accurately the share of programmes and projects related to climate change, Belgian financial contributions related to technology transfer and capacity building amounted to € 22.2 million for the period 2002-2003 (of which € 5.6 million targeted for adaptation). Most activities relate to agriculture, water, energy and the environment. Sustainable agriculture and land management, integrated water management, environmental education projects, small renewable energy systems and sustainable electrification are a few examples of programmes and projects related to climate change, which are supported by the Belgian authorities.

Most bilateral projects initiated by the federal agency in charge of development cooperation (DGDC) include training segments, either in the developing country itself, in Belgium or both. DGDC also supports international course programmes and international training programmes at Belgian universities. In April 2003, Belgium also organised a regional UNFCCC workshop on technology transfer (EGTT-meeting) in Ghent. The University of Ghent took this opportunity to organise five lectures on the different aspects of technology transfer under the UNFCCC and the Kyoto Protocol for a wide audience from the government and private sector.

■ Cooperation in scientific and technical research

Science, technology and innovation (STI) are policy areas that come under the authority of all the federated and federal entities of Belgium. The main responsibility for STI policy lies at the level of the regions and the communities, within their own areas of competence. As an exception to this rule, a number of competences involving scientific research are the responsibility of the federal government.

³ http://www.health.fgov.be/AGP/Canicule/Canicule/Plan%20chaleur/ozone_FR.pdf

⁴ Directive 2002/91/EC, which Member States must implement by January 2006

⁵ <http://www.energiesparen.be/energieprestatie/info-punt/download.php>

The trans-boundary nature and complexity of the climate system, including the dynamics, physics and chemistry of the troposphere and the atmosphere and their interaction, the role of the cryosphere and hydrosphere (including oceans), and the dynamics of ecosystems and bio-geochemical cycles, bring about the need for international cooperation on research and observation, scientific assessment and integration. Belgium plays a large part in this effort.

Belgian scientists participate actively in the following international research programmes (non-exhaustive list):

- European Community Sixth Framework Programme for Research and Technological Development.
- International Geosphere and Biosphere Programme (IGBP)
- Land Use and Land-Cover Change (LUCC) programme
- World Climate Research Programme (WCRP): in particular Climate Variability and Predictability (CLIVAR and EUROCLIVAR), Arctic Climate System Study (ACSYS), Climate and Cryosphere (CLiC) and Stratospheric Processes and their Role in Climate (SPARC)
- European Ice Sheet Modelling Initiative (EISMINT)
- European Project for Ice Coring in Antarctica (EPICA)
- Consortium for Ocean Drilling (ECOD)
- European Network of Earth System Modelling (ENES)

- International Space Programmes
- Network for the Detection of Stratospheric Change (NDSC)
- Energy Technology Systems Analysis Programme (ETSAP - IEA and OECD)
- Global Monitoring for Environment and Security (GMES)

Belgium contributes to international efforts in the field of scientific integration and assessment through the participation of Belgian experts in international expert panels and assessment and integration activities, such as the Intergovernmental Panel on Climate Change (IPCC), the World Meteorological Organisation (WMO), the Scientific Assessment Panel on Ozone Depletion, and the European Ozone Research Coordination Unit (EORCU).

Although Belgium has no particular policy yet with respect to the Global Climate Observing Systems (GCOS), it takes part in various climate-related monitoring activities, both nationally and as part of European programmes. These monitoring activities are not formally included in the GCOS, although a number of procedures are implemented to guarantee the continuity and long-term homogeneity of the data. Belgium is an observer in the Committee on Earth Observation Satellites (CEOS), an international programme for coordination and data and information management.

■ Assistance to developing countries in implementing the Convention

Through its financial contributions to multilateral institutions and programmes, the Directorate General for Development Cooperation (DGDC) supports a number of programmes which deal with climate change, biodiversity and actions to combat desertification (Rio Conventions). The contribution to the core budget of the UN Framework Convention on Climate Change and the Kyoto Protocol amounted to € 273 371 in 2003. In 2004, a total amount of € 212 234 was shared between the federal government (30% for DGDC) and the federated entities (70%).

It is also worth noting that, to a certain extent, other multilateral programmes not directly focused on climate change have benefits in terms of mitigation or adaptation. This is especially the case for certain actions of multilateral programmes under the auspices of the Food and Agriculture Organisation (e.g. urban and pre-urban agriculture, participatory management of land use), the UN Development Programme (UNDP) and the Consultative Group on International Agricultural Research (CGIAR).

Direct and indirect bilateral cooperation (or government cooperation), implemented by a variety of actors (recognised NGOs, Belgian universities, scientific institutions, etc.), constitutes another substantial dimension of Belgian assistance to developing countries. The main bilateral aid pro-

grammes related directly or indirectly to climate change issues are to be found in the areas of forestry, agriculture, water (supply and treatment of wastewater), energy, protection of the environment and integrated development. As a whole, in these sectors, € 26.3 million were allocated to climate change in 2003 and € 20.5 million in 2004. Of these amounts 37% concerned adaptation to climate change and 63% mitigation.

Other initiatives supported by the Belgian authorities assist the developing countries with implementing the Convention. A few are briefly described below:

- the Royal Belgian Institute for Natural Sciences (RBINS) plays a pioneering role in the development and operation of the Clearing House Mechanism in the least developed countries. The DGDC and the RBINS concluded a general agreement for the financing of the new four-year programme running until 2007 (the contribution for 2004 amounted to € 375 000);
- the Flemish and Walloon authorities are active in agriculture and rural development programmes in different parts of the developing world; these programmes cover areas such as energy, water and sanitation, sustainable land resource management, integrated water management, water engineering and environmental investments in developing countries.

REPORT ON DEMONSTRABLE PROGRESS UNDER THE KYOTO PROTOCOL

Report by Belgium required under UNFCCC CoP. Decision 25/CP.8

(Demonstrable progress under Article 3, paragraph 2, of the Kyoto Protocol)

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Edited by the National Climate Commission
- January 2006

Published and distributed by the Federal
Public Service Health, Food Chain Safety
and Environment

Place Victor Horta 40 Box 10,
B-1060 Brussels, Belgium

Legal Deposit: D/2006/2196/1

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and Dutch.

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