UNITED
NATIONS

UNFCCC Framework Convention on Climate Change

Distr.
GENERAL

FCCC/IDR.3/BEL
15 July 2003

ENGLISH ONLY

BELGIUM

Report on the in-depth review of the third national communication of Belgium

Review team:

Audace Ndayizeye (Burundi)
Paulus Agus Winarso (Indonesia)
John Fitz Gerald (Ireland)
Sergey Kononov (UNFCCC secretariat, coordinator)

GE 03-63348

I. INTRODUCTION AND NATIONAL CIRCUMSTANCES RELEVANT TO GREENHOUSE GAS EMISSIONS AND REMOVALS

A. Introduction

1. Belgium ratified the United Nations Framework Convention on Climate Change (UNFCCC) on 16 January 1996. It signed the Kyoto Protocol to the UNFCCC on 29 April 1998 and ratified it, with the other members of the European Community (EC), on 31 May 2002. The UNFCCC secretariat received the first national communication of Belgium (NC1) in January 1997 and the second one (NC2)[1] in August 1997. This **third national communication (NC3) was received on 29 April 2002.**[2]

2. The NC3 was prepared in about a year by a working group appointed by the Greenhouse Effect Coordination Group (GECG) under the Inter-ministerial Conference for the Environment (ICE). The working group included representatives of both federal and regional authorities.[3] The GECG approved the final version of the NC3 on 15 April 2002.

3. Non-governmental organizations (NGOs) did not take part in the preparation of the NC3. However, NGOs participate actively in the discussions of the Belgian climate policy through a number of consultation mechanisms, such as the Federal Council for Sustainable Development.

4. The in-depth review of the NC3 was carried out from November 2002 to January 2003 and included a visit by the review team to Brussels from 25 to 29 November 2002. The team consisted of Mr. A. Ndayizeye (Burundi), Mr. P.A. Winarso (Indonesia), Mr. J. Fitz Gerald (Ireland) and Mr. S. Kononov (UNFCCC secretariat, coordinator). During the visit, the team met Belgian officials representing the federal authorities and the three Belgian regions (the Flemish region, the Walloon region, the Brussels-capital region), Belgian experts involved in the preparation of the NC3, and representatives of business and environmental NGOs.

B. National circumstances

5. Belgium is located in the north-west of Europe. It borders France, Luxembourg, Germany, the Netherlands and, in the north-west, the North Sea. The climate is temperate; the average annual temperatures in 1997–2000 were 13.5˚C for the daily maximum and 6.3˚C for the daily minimum.

6. Forests cover about 20 per cent of the territory (32 per cent in the Walloon region, 11 per cent in the Flemish region and 15 per cent in the Brussels-capital region). Some 43 per cent of the land is used for agriculture. The forest and agricultural areas did not change in the 1990s.

7. Belgium is a constitutional monarchy and a federal state consisting of three language-based communities (Flemish, French and German) superimposed on three territory-based regions (Flemish, Walloon, and Brussels-capital). The federal state, the communities and the regions have their

---

[1] The NC2 provided an update of the NC1 for GHG inventory, policies and measures, and GHG projections.

[2] The submission deadline was 30 November 2001 (decision 11/CP.4).

[3] The working group included representatives of the following organizations: the Federal Public Service for Health, Food Chain Safety and Environment; the Ministry of the Flemish Community; the General Directorate for Natural Resources and Environment of the Walloon region; the Brussels Institute for Environmental Management; the Flemish Environmental Agency; Vito (Flemish Institute for Technological Research); the Federal Public Service Economy, Small and Medium-sized Enterprises, Self-employed and Energy; the Federal Planning Bureau; the Federal Office for Scientific, Technical and Cultural Affairs; the Federal Directorate General for International Cooperation; the Cabinet of the Secretary of State for Energy and Sustainable Development; the Federal Public Service Mobility and Transport; and the Federal Public Service Finance.

parliaments, administrations and budgets,[4] and they share policy responsibility in accordance with the constitution.

8. In the year 2000, the population of Belgium was 10.25 million (5.9 million in the Flemish region, 3.3 million in the Walloon region and about 1 million in Brussels). The gross domestic product (GDP) per capita was about US$ 31,000[5] in 2000. Services accounted for the largest share of GDP (71.5 per cent in 2000) followed by industry (27.0 per cent).[6] The share of agriculture was 1.5 per cent in 2000. The key industrial branches are the iron and steel industry, the chemical industry and food processing.

9. Belgium's GDP grew in the 1990s at about 2.1 per cent per year. The national GHG emissions also grew from 1990 to 2000, although at a slower rate than GDP (table 1).

Table 1. Main macro–economic indicators and GHG emissions for Belgium

	1990	2000	Change (%)
Population (millions)	9.97	10.25	2.8
Gross domestic product – GDP (billions US$ of 1995)	257.86	317.96	23.3
Total primary energy supply – TPES (Mtoe[a])	48.43	59.22	22.3
Electricity consumption (TWh)	58.00	77.56	33.7
GHG emissions[b] (Tg[c] CO_2 equivalent)	142.74	152.36	6.7
GHG emissions per capita (Mg CO_2 equivalent)	14.32	14.86	3.8
GHG emissions per GDP unit (kg CO_2 equivalent per US$ of 1995)	0.554	0.479	–13.5

Note: The data for population, GDP, TPES, and electricity are from "Energy balances of OECD countries, 1999-2000", OECD/IEA, Paris, 2002. The GHG emission data are from the NC3.

[a] Millions of tonnes of oil equivalent.

[b] Without accounting for land-use change and forestry (LUCF).

[c] One teragram (Tg) is equal to 1,000 gigagrams (Gg) or one million tonnes.

10. Figures 1 and 2 show that oil, gas, coal and nuclear energy are the key sources of energy and electricity. The share of gas in energy and electricity supply grew between 1990 and 2000 because of the improved competitiveness of gas-fired generation (facilitated by the recent requirement to install flue gas desulphurization at coal-fired plants) and environmental considerations (implemented through environmental permits issued by the regions).

11. The use of renewable energy sources, including hydro energy, is marginal, although some growth in electricity supply from combustible renewables and waste occurred in the 1990s. In the year 2000, imports of primary energy were about seven times larger than energy production in Belgium.[7] Belgium committed itself to phasing out nuclear power from 2014 (when the oldest nuclear unit will reach the end of its 40-year lifetime).

12. CO_2 emissions from fuel combustion in Belgium were 11.7 Mg CO_2 per capita and 0.38 kg CO_2 per US$ of GDP in 2000, which is close to the average for the members of the Organisation for Economic Co-operation and Development (OECD): 11.1 t CO_2/capita and 0.45 kg CO_2/US$.[8]

---

4 The Flemish community and the Flemish region have a common single parliament, administration and budget.

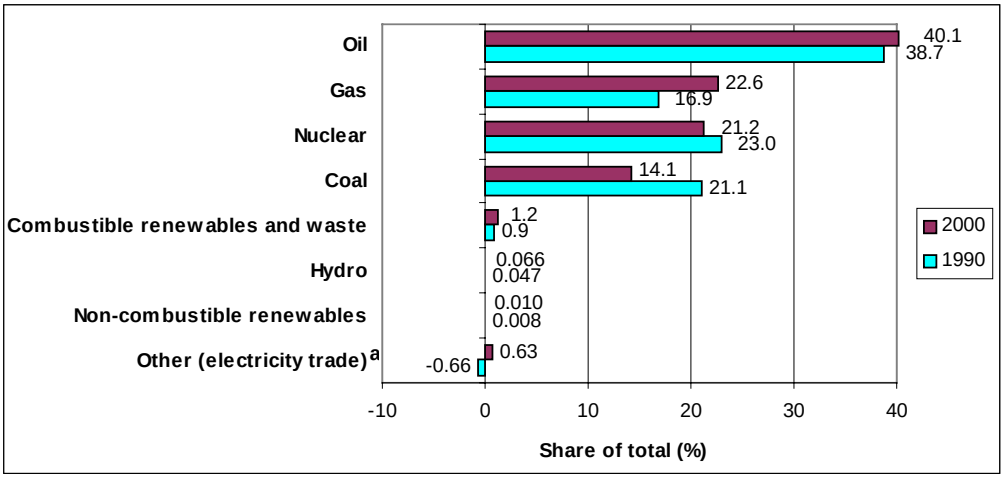
5 "Key World Energy Statistics from the IEA: 2002 edition", OECD/IEA, Paris, 2002.

6 World Bank country data at www.worldbank.org

7 "Energy balances of OECD countries, 1999–2000", OECD/IEA, Paris, 2002.

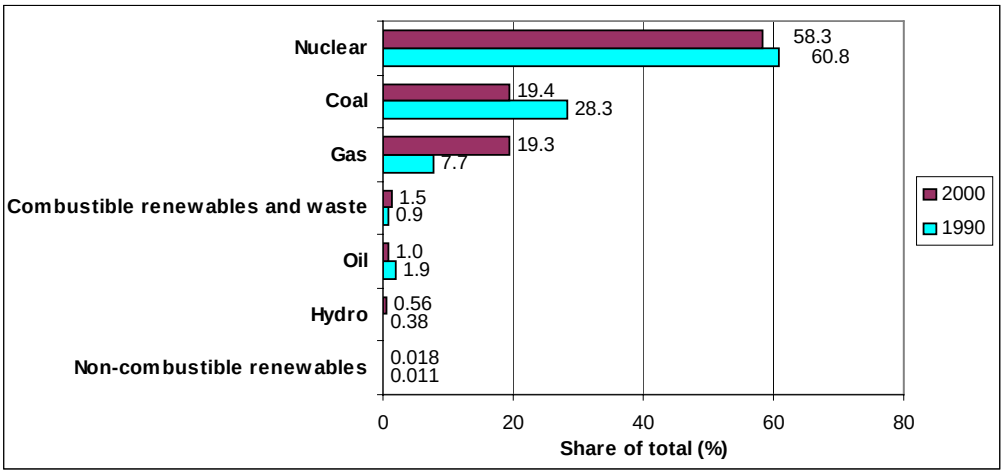
8 "Key World Energy Statistics from the IEA: 2002 edition", OECD/IEA, Paris, 2002.

Figure 1. Structure of primary energy supply in Belgium



Source: "Energy balances of OECD countries, 1999–2000", OECD/IEA, Paris, 2002.
Note: The sum of shares may not be exactly 100 per cent because of rounding.
[a] The negative number for electricity trade means, in accordance with the conventions of IEA statistics, that the country exports more electricity than it imports.

Figure 2. Structure of electricity supply in Belgium



Source: "Energy balances of OECD countries, 1999–2000", OECD/IEA, Paris, 2002.
Note: The sum of shares may not be exactly 100 per cent because of rounding.

C. Relevant general, energy and environmental policies

13. Belgium has been a member of the EC since 1958 and its national economic, energy and environmental policies are developed in coordination with EC decisions. In accordance with Belgian's constitution, policy decisions are prepared and implemented at the federal and regional levels within their established areas of responsibility. The federal state assumes Belgian's responsibility under international agreements and is the focal point for such agreements. Federal and/or regional experts represent Belgium in international organizations, such as the EC and the United Nations. The coordination of regional and federal policies is ensured either by the federal state or through cooperation accords prepared and implemented through high-level representatives of the three regions and the federal authority. Corresponding organizational structures and procedures have been created, such as the Greenhouse Effect Coordination Group.

14. **Economic policy** is defined and implemented by the regions but the federal state is responsible for a number of economic issues of common interest, such as the price and taxation policy, as well as for the still important activities dealing with the nuclear fuel cycle and related research and development (R&D) programmes.[9] With respect to **energy policy**, federal authorities ensure the security of energy supply and define guidelines for electricity production. They are responsible for large infrastructures (the electricity transmission grid, the gas transport grid and oil pipelines), whereas regions are in charge of the distribution of electricity, gas and oil products, as well as of demand management and promotion of renewable energy sources. Following EC decisions, Belgium is in the process of opening up its gas and electricity markets.

15. The regions are responsible for **environmental policy** in Belgium. The regions determine their environmental objectives, and develop and enforce corresponding policy measures and follow-up their implementation. The federal authorities are responsible for those matters that require, for technical or economic reasons, a uniform approach at the national level (for example, for the management of radioactive wastes or for the establishment of product standards).

16. The Kyoto Protocol commits the EC to an 8 per cent reduction in GHG emissions in the first commitment period from 2008 to 2012. Within the EC burden-sharing agreement, **Belgium committed itself to reducing its GHG emissions by 7.5 per cent compared to the 1990 level**.

II. GREENHOUSE GAS INVENTORY INFORMATION

17. The NC3 inventory covers the period from 1990 to 2000 and covers CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, NO_X, CO, NMVOC and SO_2. GHG emissions from biomass (for 1997–2000 only) and international bunkers are presented. The NC3 inventory is more extensive than the one in the NC2 (the NC2 reported CO_2, CH_4 and N_2O emissions for 1990–1995 and preliminary estimates for HFCs, PFCs and SF_6), is presented in accordance with the UNFCCC guidelines[10] and is consistent with Belgium's inventory submission to the UNFCCC in 2002.

A. Inventory preparation

18. Each of the three Belgian regions establishes its GHG inventory in the common reporting format (CRF). The regional inventories are then combined into a national GHG inventory by the Interregional Environment Unit (CELINE-IRCEL), which is responsible for annual submissions of the national GHG inventory to the UNFCCC secretariat and to the EC. For some sectors, the methodology to estimate emissions varies from one region to another due to different historical backgrounds for setting up the emission inventory and the varying availability of information in the regions. This leads to some inconsistency in the national inventory, such as missing sectoral background tables.

19. Belgium comprehensively revised the GHG inventory in 2001–2002, which resulted in a complete series of data for the period 1990–2000.[11] The resulting changes were incorporated in the NC3 and in the 2002 inventory submission. Table 2 shows that some emission estimates changed considerably in 2002 in comparison with earlier estimates.

20. Changes in CO_2 emissions occurred because of improvements in methodologies (such as revision of emissions factors, use of detailed regional energy balances, use of additional activity data). For industrial processes, emissions from the use of combustible wastes in the chemical industry in the

---

[9] Since 1 January 2002, road tax and car registration tax are a regional responsibility.

[10] Document FCCC/CP/1999/7.

[11] These changes took into account the recommendations of the centralized review of the GHG inventory of Belgium by a UNFCCC expert review team in 2001 (document FCCC/WEB/IRI(3)/2001/BEL).

Flemish region were added. Simultaneously, emission factors and activity data were revised, so that the total emissions from industrial processes decreased.

Table 2. Comparison of the 1990 emissions in the NC3 with the 2001 inventory data

	CO_2			CH_4			N_2O		
	Tg CO_2 equivalent		Change	Tg CO_2 equivalent		Change	Tg CO_2 equivalent		Change
	Inv2001	NC3	(%)	Inv2001	NC3	(%)	Inv2001	NC3	(%)
Energy	104.19	109.21	4.8	0.94	0.99	5.3	2.40	2.44	1.7
Industrial Processes	9.14	7.67	–16.1	0.07	0.05	–28.6	3.56	3.56	0.0
Agriculture	0.00	0.00	0.0	8.00	7.15	–10.6	3.38	6.81	101.5
LUCF	–2.06	–1.60	–22.3	0.20	0.11	–45.0	0.25	0.24	–4.0
Waste	0.67	1.08	61.2	3.65	3.26	–10.7	0.02	0.17	750.0
Total (without LUCF)	**114.00**	**117.96**	**3.5**	**12.66**	**11.45**	**–9.6**	**9.36**	**12.98**	**38.7**

Note: This table compares the GHG emission estimates presented in NC3 (which are the same as the estimates in the latest (2002) inventory submission) to the GHG emission estimates presented in the 2001 inventory submission.

21. The use of a new model for N_2O emissions from manure management in the Walloon region led to a substantial increase in the N_2O emissions in agriculture (table 2). However, recently, the Belgian experts came to the conclusion that the underlying assumptions in this model were not sufficiently country-specific. Consequently, it was decided to return to the use of the IPCC emission factor. Therefore, N_2O emissions are likely to become closer to their earlier estimates.

22. CO_2 and N_2O emissions from waste management increased in the NC3 because three sources, previously not accounted for, were added: emissions from waste incineration in Brussels, emissions from waste-water handling in the Walloon region, and all CO_2 emissions from waste management in the Flemish region. For LUCF, the decrease is due to a thorough revision of the calculation methodology. The review team noted that the LUCF estimates exclude the relatively small sinks[12] in the Flemish region (the calculation of these sinks is planned for 2003).

23. Belgian experts plan to further improve the quality of the national and regional inventories. For example, new methods for estimating non-energy CO_2 emissions and the emissions from the residential and commercial sectors are under development in the Flemish region; emissions from transport from 1990 to 1999 in the Walloon region will be recalculated to make them compatible with the data for 2000 and 2001; addition of the sinks in the Flemish region is being considered; and emission factors for CH_4 and N_2O are being fine-tuned in all regions. Use of the IPCC reference approach is under consideration.[13] The Belgian experts are aware of the importance of conducting recalculations consistently for all years, so that the emission trends will be credible.

24. An independent audit of the regional and national GHG inventories is in process (to be completed in 2003). The audit is expected to recommend improvements for GHG inventory preparation in Belgium. The review team commended Belgium authorities for this action that can lead to further harmonization of regional inventories and thus to a more consistent national inventory.[14]

---

[12] The Belgian experts indicated during the review visit that, according to preliminary estimates based on satellite data, the sink in the Flemish region might be about 0.3 Tg CO_2 equivalent.

[13] The IPCC reference approach has not been used in the calculation of CO_2 emissions from fuel combustion because activity data available at the national level are elaborated with different methodologies and do not allow direct comparison with the data used at the regional level for inventory preparation. This problem calls for an urgent solution. Use of the reference approach is being considered for future inventory submissions to the UNFCCC secretariat.

[14] The audit of the emission inventory procedures in the Flemish region was completed in January 2003. The recommendations of the audit have partially been taken up in the planning for 2003 of the working group on emissions of the Coordination Committee for International Environmental Policy (CCIEP). Some other recommendations, for example on the implementation of quality assurance procedures, are still under consideration.

25. There has been no uncertainty analysis for the national GHG inventory. Flemish experts estimated the uncertainty of CO_2 emissions from fuel combustion in their regional GHG inventories of 1999 and 2000 as 5–6 per cent. These estimates used the IPCC tier 1 approach.

B. Overall emission trends

26. **Total GHG emissions in Belgium increased by 6.9 per cent from 1990 to 2000** (see table 3 and figure 3). In the year 2000, 83.3 per cent of these emissions were CO_2, 7.2 per cent were CH_4 and 8.8 per cent were N_2O. By region, the Flemish region was responsible for about 60 per cent of total GHG emissions, the Walloon region 37 per cent and the Brussels-capital region 3 per cent.[15]

Table 3. GHG emissions, by gas, 1990–1999

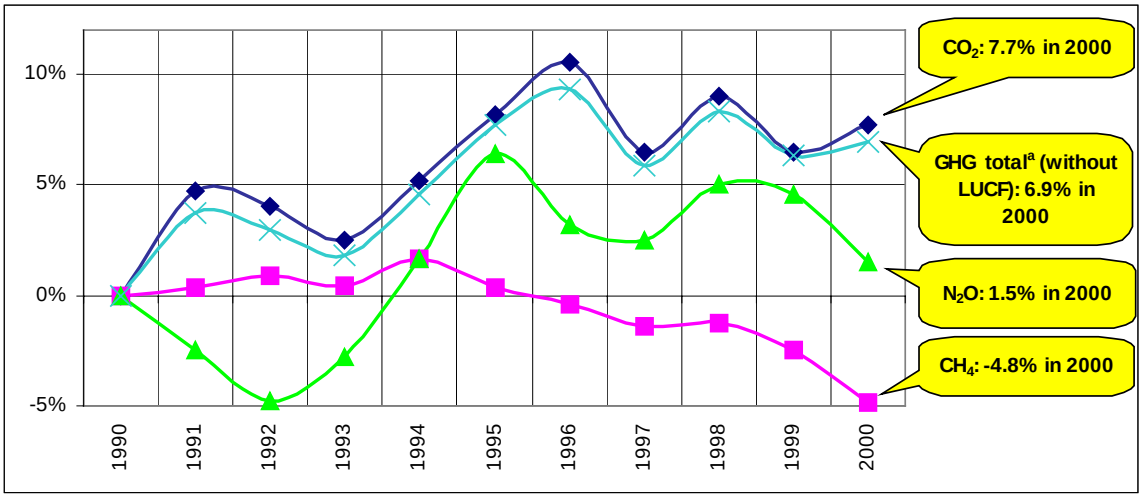
	Tg of CO_2 equivalent											Change 1990–2000
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**(%)**
CO_2	118.0	123.6	122.7	120.9	124.1	127.6	130.4	125.6	128.6	125.6	127.0	7.7
CH_4	11.56	11.60	11.66	11.61	11.75	11.59	11.51	11.40	11.41	11.27	11.00	–4.8
N_2O	13.22	12.89	12.59	12.85	13.44	14.07	13.64	13.55	13.88	13.82	13.42	1.5
HFCs	NA[a]	NA	NA	NA	NA	0.339	0.428	0.544	0.673	0.894	1.088	220.9[b]
SF_6	NA	NA	NA	NA	NA	0.096	0.098	0.102	0.106	0.111	0.101	5.2[b]
HFCs+PFCs+SF_6	NA	NA	NA	NA	NA	0.435	0.526	0.646	0.779	1.005	1.189	173.3[b]
GHG total	**142.7**	**148.1**	**147.0**	**145.3**	**149.3**	**153.7**	**156.0**	**151.2**	**154.7**	**151.7**	**152.6**	**6.9**

Source: For CO_2, CH_4, N_2O, the table uses NC3 data; for HFCs and SF_6, the latest ECONOTEC study (see footnote 16) is used. Because of the slight difference in HFC and SF_6 emissions between the NC3 and the ECONOTEC study, the GHG total differs a little for the total given in the NC3.

[a] NA means 'not available'.

[b] The change is calculated relative to 1995.

Figure 3. Relative changes in GHG emissions, 1990–2000



[a] The GHG total does not include HFCs, PFCs and SF_6 for 1990–1994.

27. CO_2 and N_2O emissions increased from 1990 to 2000 and CH_4 emissions decreased. HFC emissions have increased considerably, while SF_6 emissions have remained stable since 1995. PFC emissions are estimated to be negligible in Belgium. A recent study by ECONOTEC,[16] which revised the estimates for the HFC and SF_6 emissions from 1995 to 2001, confirmed their trends.

[15] The regional shares are calculated based on 1999 data given in the NC3; regional data for 2000 are not available.

[16] "Update of the emission inventory of ozone-depleting substances, HFCs, PFCs and SF_6 for 2000 and 2001", ECONOTEC Consultants, Brussels, 2002.

C. Key emission sources and sectoral trends

28. Table 4 shows that GHG emissions increased in most sectors, with the exception of energy production (where the replacement of coal by gas helped decrease CO_2 emissions), manufacturing industries and construction (for the same reason and also because of improved energy use efficiency) and agriculture (mostly because of decreasing production). The increase from transport and industrial processes was particularly high.

29. According to the analysis of key emission sources by Belgian experts,[17] five CO_2 sources accounted, in the year 2000, for more than 50 per cent of the total GHG emissions: road transport (15.2 per cent), public electricity and heat production (14.5 per cent), the residential sector (14.4 per cent), manufacturing industries and construction (9.5 per cent), and the iron and steel industry (6.7 per cent). Most of these key sources are also key contributors to the emission growth in 1990–2000.

Table 4. GHG emissions by sector and sub-sector, 1990–2000

	Tg CO_2 equivalent											Change 1990–2000
	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**(%)**
1. Energy	112.6	116.6	115.8	113.9	115.6	118.1	120.4	115.8	119.6	116.3	117.3	4.2
Energy industries	*28.9*	*30.4*	*30.4*	*29.6*	*28.7*	*30.1*	*29.6*	*28.3*	*30.3*	*27.2*	*27.6*	*–4.5*
Manufacturing industries and construction	*34.0*	*33.2*	*31.0*	*29.7*	*32.6*	*33.0*	*30.3*	*31.1*	*32.0*	*31.9*	*32.8*	*–3.5*
Transport	*20.0*	*20.7*	*22.2*	*22.1*	*22.1*	*22.3*	*22.8*	*23.6*	*24.0*	*24.6*	*24.8*	*24.0*
Other	*28.9*	*31.4*	*31.4*	*31.5*	*31.3*	*31.9*	*37.0*	*32.1*	*32.4*	*31.6*	*31.1*	*7.6*
Fugitive emissions	*0.772*	*0.823*	*0.833*	*0.881*	*0.894*	*0.706*	*0.766*	*0.759*	*0.849*	*0.916*	*0.906*	*17.4*
2. Industrial processes	11.3	12.8	12.6	12.9	14.9	16.8	16.6	16.4	16.3	16.2	16.3	44.2
3. Solvents	0.00	0.00	0.00	0.00	0.059	0.059	0.074	0.074	0.074	0.074	0.075	27.1[a]
4. Agriculture	13.96	13.80	13.75	13.91	13.84	13.96	13.86	13.80	13.84	13.93	13.73	–1.6
5. LUCF	–1.25	–1.25	–1.47	–1.53	–1.60	–1.57	–1.55	–1.53	–1.51	–1.49	–1.49	19.2
6. Waste	4.51	4.49	4.55	4.34	4.50	4.53	4.86	4.81	4.54	4.80	4.66	3.3
GHG (with LUCF)	**141.1**	**146.5**	**145.1**	**143.5**	**147.3**	**151.8**	**154.2**	**149.3**	**152.8**	**149.9**	**150.8**	**6.9**

Note: The emissions from industrial processes differ a little from the NC3 data because revised estimates for HFCs and SF_6 are used (from the ECONOTEC study referenced in footnote 16).

[a] The change is calculated relative to 1994 instead of 1990.

30. The emission trends are presented well in the NC3 but not all factors leading to these trends are clearly explained. The review team discussed the drivers for emission behaviour with Belgian experts during the review visit and noted the following trends: a substantial increase in the emissions from transport; an increase in the "other" emissions; an increase in fugitive emissions; a large increase in the emissions from industrial processes; and a change in the emissions from waste.

31. ***Substantial increase in the emissions from transport***. GHG emissions from transport increased by 24.5 per cent in 2000 relative to 1990, notwithstanding reduced fuel consumption per km driven due to technological progress in the car industry. Table 5 shows that the number of cars and passenger transport (in passenger-km per year) changed similarly to GDP. Until recently, no specific policy had been carried out to reduce passenger transport by car. Transport policies focus in the first place at improving the use and quality of non-road transport, with the aim of creating the conditions for road transport restructuring. The use and quality of alternatives is being improved to open the door for a modal transport shift (see the chapter on policies and measures). Freight transport by rail decreased in the 1990s, whereas freight transport by road increased (see table 6).

[17] Belgium's Greenhouse Gas Inventory (1990–2000): National Inventory Report submitted under the United Nations Framework Convention on Climate Change (April 2002).

32. Table 7 shows that for commuting from home to work public transport has retained its share in the Brussels-capital region. But for transportation from home to the place of study public transport lost a substantial part of its market share to private cars. This component includes, for example, parents driving their children to school or students driving to college.

33. Table 5 also shows that freight transport by road grew faster than GDP. Belgian experts suggested that increased international transport and trade globalization (leading to longer distances to suppliers) might be among the key reasons. However, no data to support these (or other) explanations were available at the time of the review.[18] The review team encouraged Belgian experts to continue studies in this area that could help develop a targeted GHG mitigation policy.

Table 5. Development of transport in Belgium from 1991 to 2000

Parameter	Unit	1991	1999	2000
GDP	Billion US$ of 1995[a]	210.57	245.23	255.11
	Change relative to 1991[b]	0	16.5	21.2
Total number of personal cars	Million	3.93	4.55	4.63
	Change relative to 1991	0	15.8	17.8
Share of diesel-fuelled personal cars	Percentage of the total	27.70	38.20	39.90
	Change relative to 1991	0	37.9	44.0
Cars per person	Number	0.39	0.445	0.451
	Change relative to 1991	0	13.2	14.8
Freight transport by road	Billion tonne-km	27.50	36.93	no data
	Change relative to 1991	0	34.3	no data
Passenger transport by road	Billion passenger-km	105.12	122.39	120.56
	Change relative to 1991	0	16.4	14.7
GHG emissions from road transport	Tg CO_2 equivalent	20.73	24.65	24.84
	Change relative to 1991	0	18.9	19.8

Note: This table is based on information provided by Belgian experts to the review team during its visit to Brussels.
[a] Calculated using the method of purchasing power parities (PPP), see: www.worldbank.org/data/icp/aboutpppdata.htm

Table 6. Trends in rail and road transport in Belgium

	1990	2000	Change (%)
Passenger transport by rail (billion passenger-km)	6.54	7.76	18.7
Freight transport by rail (billion tonne-km)	8.35	7.67	–8.1
Passenger transport by road (billion passenger-km)	101.00	120.56	19.4
Freight transport by road (billion tonne-km)	25.98	36.93[a]	42.1

Source: European Conference of Ministers of Transport, "Trends in the Transport Sector: 1970–2000", OECD, 2002.
[a] This number is for 1999. An estimate for 2000 is not available.

Table 7. Personal mobility by transport mode in Brussels

	Shares in total (%)			
	Professional mobility (from home to work)		Mobility associated with movements from home to place of study (school, high school, university)	
	1991	1999	1991	1999
Public transport (train, bus, tram, metro)	27.1	28.4	58.5	40.2
Private transport (mostly private cars)	72.9	71.6	41.5	59.8

Note: This information, provided by Belgian experts during the review visit, comes from the study "Enquête nationale sur la mobilité des ménages" conducted in 1998–1999. Absolute values in passenger-km/day are not available for 1991 and therefore not given here.

34. ***Increase in the "other" emissions***. The "other" category comprises mostly GHG emissions from the residential and commercial sectors. The trends in these emissions follow those of the annual

[18] During the review visit, Belgian experts demonstrated results of a study comparing the effects of activity, fuel efficiency, and modal structure. This study showed, similarly to the conclusions of the review team, that the increasing activity outweighed the effects of increasing fuel efficiency, and that the structural effect was negligible. However, this study covered the period from 1980 to 1996 only and was limited to the Walloon region.

average temperature. For example, 1996 is known to have been a cold year and the emissions were correspondingly high.

35. ***Increase in fugitive emissions***. The growth in fugitive GHG emissions (mostly CH_4 leaks from natural gas pipelines) reflects growing volumes of gas transported through the Belgian gas network, both for international transit and for internal use. However, the shown increase of 17.4 per cent may be to some extent misleading because of methodological differences. In the Flemish region, the calculation is based on the amount of the transported gas; in the Walloon region, the fugitive emissions are determined based on the type of material used in the gas distribution network and the amount of transported gas.

36. ***Large increase in the emissions from industrial processes***. Table 4 shows a large (44.2 per cent) increase in the GHG emissions from industrial processes. Table 8 identifies those industrial branches where the increase was most remarkable: the production of mineral products, the chemical industry and 'other' industries. The latter contains CO_2 emissions originating from the use of feedstocks (non-energy use) by the petrochemical industry in the Flemish region. The remarkable increase in CO_2 emissions in this sector from 1990 onwards is due to the increase of the number of naphtha-cracking installations (increased from two in 1990 to four in 2000). The start of nitric acid production in 1991 led to a growth in N_2O emissions from the chemical industry.

Table 8. Non-energy GHG emissions from selected Belgian industries in 1990 and 2000

		Tg CO_2 equivalent		Change
Industry	**Gas**	**1990**	**2000**	**(%)**
Mineral products	CO_2	4.569	5.298	15.9
Chemical industry	CO_2	0.778	1.563	100.9
Other	CO_2	0.654	2.746	319.9
Chemical industry	N_2O	3.559	4.130	16.0

Source: This table is based on the 2002 Belgian inventory submission to the UNFCCC secretariat.

37. ***Change in the emissions from waste***. The total GHG emissions from waste increased only slightly from 1990 to 2000 (3.3 per cent). However, the total conceals important developments in the structure of these emissions. CO_2 emissions increased by 57.3 per cent in this period, whereas CH_4 emissions decreased by 15.3 per cent. This indicates that waste incineration and flaring of the CH_4 recovered from landfills developed considerably in Belgium during the 1990s. At the same time, the total volume of waste increased.[19] The further development of recycling and efforts to minimize waste would help reduce these emissions.

III. POLICIES AND MEASURES

38. In general, the NC3 complied with the UNFCCC reporting requirements. It provided a clear itemization of the wide range of policies and measures introduced and proposed by the federal and the three regional governments. It also gave good guidance concerning the complicated decision-making process through which the policy on climate change is elaborated in Belgium.

39. The review team noted that the NC3 provides limited information on the GHG mitigation effect of most individual policies and measures, both the planned ones and those implemented in the past.[20] While recognizing the related methodological difficulties, the review team was of the opinion that such quantification, where feasible, could help in the formulation and implementation of an effective GHG

[19] For example, according to the data provided to the review team during the visit to Brussels, from 1995 to 1999 industrial wastes increased from 24.8 to 24.9 million tonnes per year and municipal waste from 5.0 to 5.6 million tonnes per year. From 1995 to 2000, the proportion of waste recycled increased from 37 to 52 per cent for paper and cardboard and from 67 to 87 per cent for glass.

[20] This lack of information was partially alleviated during the visit of the review team to Brussels.

mitigation policy. For measures implemented in the past quantification can help to identify the most efficient measures; for measures planned for the future, it can help in the monitoring of implementation.

A. Policy framework and objectives

40. In the "National programme for reducing CO_2 emissions", adopted in 1994, Belgium committed itself to a 5 per cent reduction in CO_2 emissions in comparison with the 1990 level by the year 2000. Later in the 1990s, CO_2 stabilization by the year 2000 was considered, consistent with the UNFCCC objective of returning the emissions of GHG gases to earlier levels by the end of the decade and with the CO_2 stabilization objective of the EC. These targets were not met. Belgium's target under the Kyoto Protocol is to reduce GHG emissions in the first commitment period of 2008–2012 by 7.5 per cent compared to the 1990 level.

41. The intermediate objective, agreed by the regional governments of the Flemish and Walloon regions, is to stabilize the regional GHG emissions in 2005 at their 1990 level. In 1999, the sum of the emissions of CO_2, CH_4 and N_2O was 9.4 per cent higher than in 1990 in the Flemish region; 0.2 per cent lower in the Walloon region; and 7.0 per cent higher in the Brussels-capital region. Given the limited time before 2005 and taking into account the projected emission trends, the review team felt that achieving stabilization of the regional GHG emissions by 2005 might be difficult.

42. Policy-making at the EC level plays an important role in action to combat climate change within Belgium. In December 2002 the European Council reached a political agreement on a common position on the adoption of a directive establishing a scheme for greenhouse gas emission allowance trading within the EC. When implemented, a trading regime may well supersede some domestic measures affecting the energy and the industrial sectors, such as voluntary agreements.

43. The introduction of an energy (or carbon) tax in Belgium would be facilitated by a common EC position. The federal government has so far delayed the introduction of such a tax in expectation of a relevant EC action. According to the NC3, the Belgian Government decided on 20 September 2001 to study the introduction of taxation on energy in Belgium (it was not clear to the review team whether only an energy tax was being considered or whether a carbon tax was also being included as an option). The tax should not affect household incomes, employment or the competitiveness of Belgian companies. The regional governments indicate that, without an energy (or carbon) tax, they may not be able to achieve the 2005 intermediate GHG stabilization target.

B. National climate policy

44. The three Belgian regions have pursued active climate policies. The Flemish 1997–2001 Environmental Policy Plan (MiNa Plan 2) included measures to reduce emissions of GHGs. In 2001, the Flemish Government prepared a Climate Policy Plan for the Flemish region, which was approved on 28 February 2003. The plan focuses on measures to achieve regional GHG stabilization by 2005 (the first progress report is under preparation). Measures to reduce GHG emissions from transport are also included in the Flemish Mobility plan. The Walloon region is implementing the Walloon Region Action Plan for Climate Change adopted in 2001. The plan contains guidelines and measures to reduce regional GHG emissions by 7.5 per cent by 2010. The Brussels-capital region is preparing a specific action programme on climate change. Measures to reduce GHG emissions are included in the current regional plans such as the Regional Development Plan, the Transport Plan and the Air Plan.

45. At the federal level, policies and measures to deal with the problem of climate change are included in the Federal Plan for Sustainable Development 2000–2004, adopted in 2000. The plan is not binding; for the suggested GHG mitigation measures to work, established procedures need to be implemented at the regional or at the federal level.

46. The result of this decentralized decision-making is that different policy initiatives have been undertaken in the three regions. The two largest regions have agreed on a common intermediate objective of stabilizing emissions by 2005, but their regional policies have not been fully coordinated and they are not designed consistently with the Belgian national target under the Kyoto Protocol.

47. The importance of coordinating the national policy response to climate change has long been recognized by the Belgian authorities, both regional and federal, with the development of consultative mechanisms involving all interested parties. One of the recent results of this approach is a new **National Climate Plan** (NCP), approved on 6 March 2002 by the Inter-ministerial Conference for the Environment (ICE). The cooperation agreement for the implementation of the NCP and for the establishment of reports under the UNFCCC and the Kyoto Protocol was already approved by the federal parliament (on 3 April 2003) and by the Brussels parliament. Completion of the approval procedures in the Flemish and Walloon regions is expected for autumn 2003.

48. The NCP integrates the relevant regional plans and initiatives described above. It also includes a provision for additional funding of federal policies to mitigate GHG emissions through the creation of a "Kyoto Fund" to be financed by a small levy on electricity transmission (€25 million per year).[21]

49. The cooperation agreement that set up the NCP provides for the creation of a **National Climate Commission** (NCC) in 2003, comprising relevant decision makers from the federal and regional governments. It will have a small permanent secretariat and will bear responsibility for the monitoring, assessment and adjustment of the NCP in the coming years. The NCC will also work on the development of a common methodology for the national GHG projections and on the preparation of the use of the international flexibility mechanisms under the Kyoto Protocol. The permanent secretariat of the NCC will report to outside institutions, such as the EC and the UNFCCC. Finally, the NCC will have the essential task of establishing a proposal for a repartition of the national reduction target (7.5 per cent) between the federal government and the three regions of Belgium (an internal "burden sharing").

50. The **burden-sharing agreement** will constitute an agreement of four parties (the federal government and the three regional governments) on the amount of GHG emission reductions to be achieved by the regions in order to meet the national Belgian target under the Kyoto Protocol. It is expected that the agreement will be in place by end of 2005. At present, it is not clear whether the agreement will be based entirely on regional reduction objectives, or whether sectoral targets will also play a role. The review team believed that timely conclusion of the agreement is important for meeting the Belgian Kyoto Protocol target.

51. The sectoral analysis of policies and measures below is structured as follows: the energy sector[22] (61 per cent of the total emissions in 2000), transport (16 per cent), industry (11 per cent), agriculture (9 per cent), forestry (removals through LUCF offset about 1 per cent of the total emissions in 2000), and waste management (3 per cent of the emissions).

C. Energy

52. Most of the GHG mitigation measures in energy production, distribution and use fall under one of the following categories: support (through regulatory and fiscal measures) of electricity production from renewable energy sources (RES) and combined heat and power (CHP) generation; promotion of energy conservation and efficient use of energy; and voluntary agreements with large energy consumers.

---

[21] The creation of the "Kyoto fund" was adopted by the parliament in December 2002; this fund has been operational since January 2003.

[22] In accordance with the UNFCCC guidelines, this includes energy production and transformation as well as energy use in residential, commercial and public buildings; transport is excluded.

53. The majority of these measures are implemented by regional authorities. The federal government is involved mostly in fiscal measures and, to some extent, in the development of the structure of electricity generation through a non-binding "Indicative Programme for the Electricity Sector" adopted in 2002. This programme replaced the former "National Equipment Programme for Electricity Production and Transmission" of 1996 that played the role of a national plan for the development of electricity generation. The fact that the new programme is indicative and non-binding reflects the liberalization of the electricity market in Belgium (a federal law for the transposition of the EC directive 96/92/CE on common rules for the internal market in electricity was adopted in 1999).

54. ***Support of electricity production from RES and CHP plants***. Authorities in the Flemish and the Walloon regions are introducing "green certificates" which will require electricity suppliers to purchase a minimum amount of renewable energy. The Flemish scheme requires the purchase of 2 per cent of electricity from RES by the end of 2004, rising to 6 per cent by 2010 (relative to the total electricity supplied in Flanders, including both transmission and distribution). In the Walloon region, on the condition that the energy plan is approved, the requirements will be 8 per cent of electricity from RES and 12 per cent from CHPs by 2010. Fines for non-compliance are foreseen in both regions. The Brussels-capital region is also considering the introduction of a system of "green certificates". Technical details of all these schemes have still to be worked out, including a decision on whether the eligible electrical energy has to be produced within the region. The regional schemes may need to be reconciled with the federal scheme for "green certificates" introduced by the federal government through a royal decree on 7 December 2001.[23]

55. Measures have been adopted to promote the deployment of renewable energy technologies and to encourage investment in RES and CHP plants. This includes the provision of priority access to the grid, extended eligibility for the free selection of electricity suppliers and various subsidies.

56. ***Promotion of energy conservation and efficient use of energy***. There are numerous subsidies at the regional level to facilitate investments in energy efficiency improvements. Following the relevant EC directives, energy efficiency labels have been introduced for many products such as refrigerators, washing machines and electric light bulbs. All three regions support energy audits by providing grants and subsidies to conduct an audit or by organizing a preliminary audit free of charge. A new scheme of tax incentives to encourage investment in energy efficiency in the household sector was adopted at the federal level with effect from financial year 2004 (affecting the incomes of 2003). This may be particularly important for the Brussels-capital region where a high proportion of GHG emissions come from residential and commercial buildings.

57. The review team noted that electricity consumption rose surprisingly rapidly in Belgium over the 1990s (table 9). This pattern of increase is out of line with that in some neighbouring countries, especially if one takes into account the relatively small use of electric heating in Belgium.[24] Part of the explanation lies in structural changes in manufacturing (switch to electric furnaces in the iron and steel industry) but this does not explain the rapid increase in electricity demand elsewhere in the economy.

---

[23] The Flemish certificate system has already been reconciled with the federal scheme. The federal government may only issue certificates for off-shore wind plants. These certificates can contribute to the green electricity objectives. The technical details of the green certificate system also have already been worked out in Flanders. It has been decided that electricity suppliers can only fulfil their objective by handing over green certificates that apply to electricity that is produced in Flanders.

[24] For example, in the Flemish region, the share of electric heating is about 6 per cent for houses with a centralized heating system and about 23 per cent for houses with decentralized heating.

58. Additional information provided to the review team during the visit to Brussels indicated that **the average size of a dwelling and the age of the buildings** in Belgium may explain, at least partially, the increase in electricity consumption and the difficulties in controlling energy use in buildings. For example, most new Belgian dwellings (with the exception of social housing[25]) are individual houses. There are substantially fewer apartments in Belgium than there are in France or the Netherlands. The average Belgian dwelling is comparable in size with those in neighbouring countries (floor area about 86 square metres, compared with 85 in France and 88 in Germany), but new Belgian dwellings are on average substantially larger than new buildings in those other countries (134 square metres, compared with 97 in France and 91 in Germany). Dwellings constructed in Belgium after 1970 make up about 17 per cent of the whole building stock, which is considerably fewer than in France (26 per cent) or Germany (35 per cent).[26]

Table 9. Increase in electricity consumption in 2000 relative to the 1990 level (%)

	Belgium	France	Germany
Electricity consumption in industry	30.6	17.9	6.0
Electricity consumption in transport	15.9	31.5	16.4
Electricity consumption by commercial and public services	56.8	31.2	34.3
Electricity consumption by households	28.9	32.8	–5.9
Total consumption of electricity	**33.7**	**27.6**	**7.7**

Source: The data are taken from IEA energy statistics in "Energy balances of OECD countries, 1999–2000", OECD/IEA, Paris, 2002.

59. ***Voluntary agreements with large energy consumers***. In all three regions, voluntary agreements to improve energy use efficiency with large energy consumers, usually industrial companies, are under consideration. In the Flemish region, the voluntary agreements with energy-intensive companies are benchmarking agreements. The companies commit themselves to being among the 10 per cent most energy-efficient companies in the world by 2012. If it is not possible to define the world's top 10 companies, the companies can also commit themselves to achieve energy-efficiency with the best available technologies (BAT). The exact practical meaning of the term "best available technologies" remains to be defined.[27]

60. In the Walloon region, several energy-intensive industries (including the chemical, paper, cement, lime and non-ferrous industries) already signed a letter of intent in 2000 and 2001. In total, these industries account for about 90 per cent of energy consumption in the region. The letters of intent should be followed up by a full agreement (expected for 2003) to reduce energy consumption by 2010.

61. The Brussels-capital region introduced a voluntary company label, "eco-dynamic company". To be awarded the label, a company needs to sign an obligation to respect certain principles of environmental management, including the progressive reduction of energy consumption.

62. The review team noted that a prompt start of the agreements, a well-based and clear definition of the targets and a transparent follow-up procedure are important for voluntary agreements to be effective. The team understood that progress in the elaboration and implementation of the agreements could allow Belgium to quantify its impact on GHG emissions and to project its contribution to the achievement of the regional and national GHG reduction targets.

---

[25] The apartment houses built by the state and provided to low income families.

[26] These numbers were provided by Belgian experts during the review visit with a reference to an EC study of 1998 SENVIVV, "Studie van de Energieaspecten van Nieuwbouwwoningen in Vlaanderen: Isolatie, Ventilatie, Verwarming 1995-1997", Vlaams Impulsprogramma - Energietechnologie, Project 930.256/WTCB; some information comes also from WOUTERS P., PhD thesis at BBRI - Belgian Buildings Research Institute.

[27] For many years, the Flemish Institute for Technological Research has investigated BATs in different sectors. The list of BAT is also used in the grant scheme for energy-saving investments (which is part of the economic expansion programme in Flanders).

63. Fiscal incentives have been available to encourage increases in energy efficiency in industry. For example, 13.5 per cent of the investment cost for improving energy efficiency can be deducted from taxable income. In discussions, the Belgian authorities indicated that this incentive had not resulted in a major increase in such investments.

D. Transport

64. As shown in table 4, GHG emissions[28] from transport have been increasing in Belgium. The review team found that there was some uncertainty about the factors driving the growth in transport and the resulting emissions of CO_2; although qualitative reasons are known, at least partially, the impact of various factors on transport growth has not been quantified. In particular, the rapid growth in road freight traffic was not easy to explain. This highlights the problem that the Belgian authorities face in reducing emissions in the sector.

65. Personal mobility in Belgium is among the highest among developed countries. In 1996, the average number of vehicle-km per person in Belgium was about 9.3,[29] compared with 8.9 for Canada, 8.0 for France or 7.1 for the OECD countries on average. One possible reason is that dwellings are rather scattered in Belgium, so urban planning may have particular importance for the emissions from transport. The current practice of promoting the use of company cars by employees may be another factor.

66. An increase in GHG emissions from transport is a problem for other EC countries, too. Therefore, developments at the EC level to achieve increased efficiency in motor vehicles could prove especially important in the long term. One example is the agreement with the European Automobile Manufacturers Association (ACEA), signed in 1998, to reduce CO_2 emissions from new cars from the 1995 level of about 186 g/km to 140 g/km by 2008.[30] The impact of the ACEA agreement on GHG emissions from transport in Belgium is not discussed in the NC3, although some regional analyses are available.[31]

67. The three Belgian regions have put in place policies to develop and promote the use of public transport, especially for passengers. In the Flemish region, a Mobility Plan was drafted in 2001 and should be put forward for implementation in 2003. Climate-relevant actions of this mobility plan are also included in the Flemish Climate Policy Plan. The Mobility Plan defines the goal of stabilizing the regional CO_2 emissions from transport at the 1990 level by 2010. In the Walloon region, measures to limit GHG emissions from transport are part of the Walloon Action Plan for Climate Change, with emphasis on structural measures to promote the use of non-road transport. In the Brussels-capital region, the IRIS I plan (approved in 1998) set the objective of stabilizing the number of car journeys in the morning rush hour at the 1991 level by 2005. The IRIS II plan is now in preparation as part of the Regional Development Plan. IRIS II will set the objective of reducing the number of kilometres driven in the region by 20 per cent (compared to 1999) by 2010. The Walloon and Brussels-capital regions set up "mobility observatories" to collect and analyse information relating to passenger and freight transport.

---

[28] CO_2 is the predominant GHG from transport.

[29] "Environmental performance reviews – Belgium", OECD, 1998. This publication contains the 1996 data referred to in this paragraph. More recent data were not found.

[30] "CO_2 Emissions from Cars: the EU Implementing the Kyoto Protocol", document 14 CR-17-98-540-EN-C, Office for Official Publications of the European Communities, L-2985 Luxembourg (1998).

[31] Experts from the Flemish region estimated that the ACEA agreement could lead to a decrease of 10 per cent in the regional CO_2 emissions from transport by 2010 compared to 1990. Importantly, this estimate shows that the agreement would lead to an average value of 164 g CO_2 per km by 2010 and not to 140 g CO_2 per km, because of the existence of many cars in the car fleet that do not fall under the agreement (such as 4x4 vehicles, sports cars and mini-trucks).

68. Promotion of non-road transport includes development of the bus, tram and metro networks, coordination of timetables between the bus and rail public transport, improvements in public transport operation and preparation of local transport plans. As fiscal measures, various schemes of tax exemption and tax deduction for transport expenses relating to the use of public transport have been introduced. The use of bicycles is also promoted. For freight transport, measures to support the development of relevant infrastructures and to promote the use of railways and waterways by transport companies are being implemented.

69. Measures relating to GHG emissions from transport are also being implemented at the level of federal government. The modal shift is looked upon as a primary aim. In 2001, the federal government committed itself to increasing the proportion of rail traffic (for both passenger and freight transport) by 15 per cent by 2010 compared to the 2000 level. A plan to invest €17 billion in railways was approved in 2001. Under the cooperation agreement of 11 October 2001 between the federal government and the regions, a long-term plan 2001–2012 on railway investments has been approved with the following objectives: renewal, modernization and an increase in infrastructural capacity; the improvement of passenger welcoming in trains and stations; and remodelling of the "consultative committee of users" of railway. The government promotes non-motorized methods of transport and has undertaken numerous measures to make them safe. A bill concerning the collection of data about the commuter traffic of employees has been recently approved by the federal parliament. The review team noted the importance of coordination between the federal government and the regions in developing public transport policy. For example, extensive consultations, currently in process, are necessary to launch the development of a regional express network (REN) around Brussels, which could have a sizable impact on GHG emissions. This REN aims at reducing short distance trips for which cars are normally used.

70. At the federal level, a grant for retrofitting a petrol-driven car with LPG equipment was introduced in 2001. The fiscal deduction of commuter traffic costs has been introduced for those using public transport, carpooling or bicycles. Employers may deduct 120 per cent of expenses made for organizing a form of collective transport for their employees. In 2002, the regions introduced reductions in the car registration tax for cars compliant with the "Euro 4" standard and for LPG-driven cars.

E. Industry

71. Measures to reduce GHG emissions from industrial processes are undertaken in the Flemish and Walloon regions within the framework of the implementation of the EC directive on Integrated Pollution Prevention and Control (IPPC). Industries will need to show adherence to "best available practices" in order to obtain their environmental permits.

72. Within the framework of voluntary agreements, the use of catalysts to reduce N_2O emissions from chemical industry could be considered in the Flemish and Walloon regions. The environmental policy plans of the Flemish region (MiNa 2 and MiNa 3) contain regulations on HFC, PFC and SF_6 emissions.

F. Agriculture

73. The Flemish and Walloon regions implement measures to encourage environmentally friendly agricultural practices. Many such measures are integrated into regional rural development plans and are implemented in line with the Common Agricultural Policy of the EC.

74. In the Flemish region, GHG emissions from agriculture decreased by 8.5 per cent in 1990–2001. Within the Flemish Climate Policy Plan, a Climate Action Plan for agriculture will be prepared to further decrease the emissions. Together with the implemented measures, which are integrated into the Flemish

rural development plan, this action plan is expected to reduce GHG emissions in the region by 14 per cent (compared to 1990) by 2010.

G. Forestry

75. The area covered by forest in Belgium is relatively small (about 20 per cent of the territory). The Flemish and Walloon regions implement measures, including financial support, to preserve the existing forests and to promote reforestation. The Walloon region set up a "Wood Energy Plan" in 2001 to study, within a number of small-scale projects, opportunities for using wood as a fuel in the region.

H. Waste management

76. Waste management policy is a responsibility of the regions.[32] The existing charges per tonne of waste, varying among the regions, provide an incentive to reduce waste amounts. In the Flemish region, landfilling with organic waste was banned in 2000. CH_4 recovery from landfill sites was introduced and developed in the 1990s. As part of the strengthening of the relevant environmental regulation, landfill operators must conduct a study of economic and technical feasibility of landfill gas recovery by 1 January 2004; if the recovery is found to be feasible, it should be implemented by 30 June 2005. The Flemish government approved the corresponding regulation in principle on 8 November 2002 and is expected to approve it definitely in June 2003. The emission reduction potential is estimated as 105 kt CO_2-equivalent by 2005 and 62 kt CO_2-equivalent by 2010.

77. In 1998, the Walloon region decided to ban landfilling with organic waste from 1 January 2005. Measures to manage the waste and to recover the old landfill sites are being prepared. CH_4 recovery from landfill sites was introduced and developed in the 1990s.

78. The Brussels-capital region is implementing the "Waste Prevention and Management Plan" to reduce the amount of waste by 10 per cent by 2002 (relative to 1995). Under this plan, the number of waste incineration installations was reduced and stricter standards were imposed on operating installations. Other measures include the development of the container network for waste recycling, studies and the introduction of improved waste treatment procedures, and information campaigns.

I. Overall policy evaluation

79. There has been important policy innovation by the regional and the federal authorities in recent years. However, evaluation of the success or failure of these measures has been limited. Some evaluation has been carried out in the Walloon region, but it concentrated on whether the policies had been implemented, rather than on whether they had achieved their targets. In the Flemish region quantified targets have been prepared for the range of policy initiatives proposed or already in place. This is a useful exercise as it anticipates the relative importance of the different measures and provides a benchmark against which their success can be assessed in any future evaluation. It also helps to assess whether policy measures can achieve the required emission reduction.

80. The earlier targets for GHG emission reductions were not met. The Task Force on Sustainable Development of the Federal Planning Bureau published its first Federal Report on Sustainable Development in 1999. It contained a section that assessed progress in the implementation of the national programme for the reduction of CO_2 emissions of 1994. On the failure to reduce GHG emissions the report concluded that the main reasons were lack of an ambitious EC strategy (an EC-wide CO_2/energy tax was expected to provide more than half of the emission reductions necessary to meet the 5 per cent

[32] At the federal level, introduction of an "eco-tax" system to encourage the use of re-usable packaging is being considered.

reduction target[33]), and slow implementation of the adopted measures. The slow implementation is explained by insufficient budgetary and human resources, lack of annual assessments and adjustment of the programme, difficult coordination between federal and regional policies, lack of monitoring mechanisms (mainly because no quantification had been made of the emission reductions for which each government is responsible), and a lack of power in the environmental ministries over important policy instruments. The Federal Council for Sustainable Development, in its advice on the implementation of the Kyoto Protocol (1998), came to similar conclusions.[34]

81. In summary, the review team was impressed by the reinforced political commitment to reduce GHG emissions with the adoption of a new National Climate Plan, the set-up and operation of coordination mechanisms, the development of the burden-sharing agreement and other recent advances in the Belgian climate policy. At the same time, the team felt that several factors might mitigate against the timely achievement of GHG emission reductions (for the first commitment period of the Kyoto Protocol): lack of sufficient time to coordinate among the regions, including the completion of the burden-sharing agreement; uncertainty about the time, type, extent and effect of the relevant EC actions; and lack of sufficient time to implement complementary solutions (such as the international flexibility mechanisms).

IV. PROJECTIONS AND THE TOTAL EFFECT OF POLICIES AND MEASURES

82. The presentation of projections in the NC3 follows the UNFCCC reporting guidelines. Two scenarios are presented: "with measures" and "with additional measures". The base year for modelling was 1990. **Emissions of CO_2, CH_4, N_2O, were projected until 2020 based on modelling; expert estimates for HFCs, PFCs and SF_6 were provided for the period until 2010**. Each gas was projected individually; the results are presented by gas and by sector. A projection of the emissions from international bunker fuels is provided. A projection of the emissions from biomass is not provided. The 1990 data used in the projections are not fully consistent with the Belgian national GHG inventory because of the recent inventory recalculations and the temperature adjustment used in the modelling. However, these inconsistencies are not likely to affect the emissions trends very much.

A. Methodology

83. **The projections for Belgium were prepared using two sets of models: the HERMES–EPM models and the MARKAL–GEM-E3 models**. HERMES and GEM-E3 are macro-economic models. EPM and MARKAL are energy models differing in the modelling approach: EPM is a simulation model with a very detailed representation of technologies for energy supply and use; MARKAL is a generic optimization model with a powerful optimization algorithm and an extensive technology database.

84. The HERMES–EPM set was used to prepare medium-term projections (until 2010) for CO_2, CH_4 and N_2O emissions from all sectors. The MARKAL–GEM-E3 set was used for long-term projections (until 2020) of energy-related emissions of CO_2, CH_4 and N_2O. Both sets of models provided results for the "with measures" and "with additional measures" scenarios.

---

[33] F. Bossier, T. Bréchet, N. Gouzée, S. Mertens, S. Willems, " Politiques et mesures destinées à modifier les tendances des émissions anthropiques de gaz à effet de serre en Belgique ". Planning Paper No.76, Brussels, Federal Planning Bureau, 1996.

[34] The second Environmental Policy Plan of the Flemish region also set out some objectives, which were not met: a 10 per cent reduction in CH_4 emissions by 2002 and the stabilization of N_2O emissions in 2002, compared to the 1990 level.

B. Scenario definitions and key assumptions

85. The "with measures" scenario incorporates some GHG mitigation measures from the "National programme for reducing CO_2 emissions" of 1994 and some new measures implemented since 1994. The "with additional measures" scenario includes additional mitigation measures that are in line with the 2002 National Climate Plan (NCP), including a carbon tax.

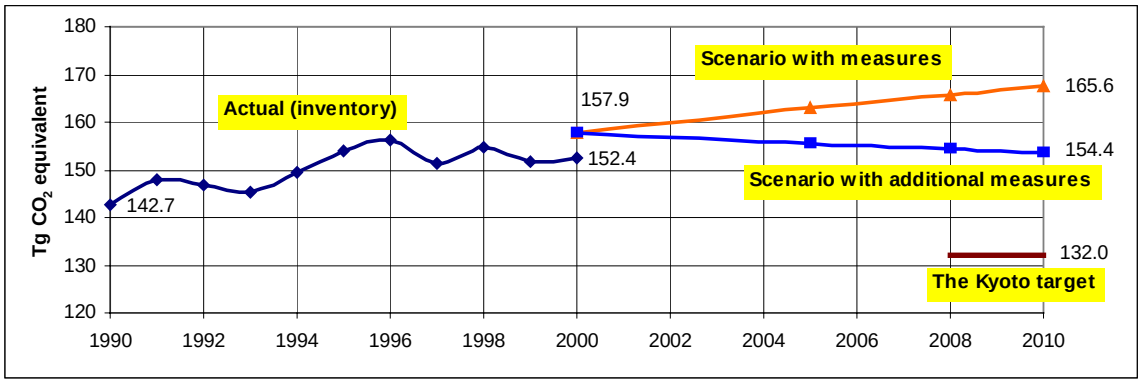
86. The measures assumed in the projections do not correspond exactly to the measures in the NCP because the projections were prepared before the formulation of the NCP. Moreover, the sets of additional measures differ between the medium-term and long-term projections. Importantly, the carbon tax was modelled differently. For medium-term projections, a carbon tax of €1.3 (in euros of 1990) per tonne CO_2 was introduced in 2002, gradually increasing to €11.5 by 2010. For long-term projections, the timing and level of the tax are chosen by the model based on the requirement to meet the Kyoto Protocol target of reducing the GHG emissions by 7.5 per cent relative to the 1990 level by 2010. This resulted in a carbon tax of €4.7 (in euros of 1990) per tonne CO_2 in 2005 increasing to €20.3 by 2010 and to €67.8 by 2020.

87. The macro-economic and technological assumptions are not the same in the medium-term and long-term projections, but the differences are not critical (data for both sets of models are based on EC and OECD projection studies) and they are well explained in the NC3. The prices for oil and gas are assumed to increase gradually between 2000 and 2020; coal prices remain stable. GDP is assumed to grow at an annual rate of about 2–3 per cent per year.

C. Projected emission trends

88. The medium-term "with measures" projection shows the total GHG emissions rising by 2010 to about 16 per cent above the 1990 level (see figure 4 and table 10). With additional measures, including a carbon tax, the emissions in 2010 would still be 6.3 per cent higher than in 1990. The long-term projections prepared with MARKAL indicate that an increase in a carbon tax to €20.3 per tonne CO_2 by 2010 (instead of the €11.5 by 2010 assumed in the medium-term projections) might bring the emissions closer to the Kyoto target.

Figure 4. Actual GHG emissions and medium-term GHG projections from the NC3



89. The implementation of additional measures has an impact on energy supply and demand. For example, the share of natural gas in electricity generation increases to about 40 per cent by 2010 (currently 19.3 per cent, see figure 2); the share of coal decreases by 2010 to about 4 per cent (from 19.4 per cent in 2000) in the scenario "with measures" and to 0.3 per cent in the scenario "with additional measures". The use of renewable energy sources increases, in particular in the scenario with additional measures, but by 2010 these sources still contribute only a little to energy and electricity supply (less

than 6 per cent in electricity supply for the total of all renewables in the scenario "with additional measures"). Final energy demand increases by 12 per cent from 2000 to 2010 in the scenario "with measures" and by 3 per cent in the scenario "with additional measures", which reflects the impact of additional measures on energy demand.[35]

90. The medium-term projections and the long-term ones can be compared only for energy-related GHG emissions. Such comparison was made in the NC3 and showed that although the results for 2010 differ somewhat quantitatively, their qualitative meaning is similar: without additional measures, decreasing or even stabilizing the GHG emissions at the 1990 level does not appear feasible.

91. The Belgian experts provided an assessment of the impact of the recent economic slowdown on the projected CO_2 emissions. If the medium-term projections are revised downwards as a result of the current world economic slowdown, this could lead to a reduction in the projected emissions for 2010 of about 2 Tg CO_2 equivalent.

Table 10. Scenario results, by gas, for the medium-term projections

	Tg CO_2 equivalent				Change since 1990 (%)	
Gas	1990	2000 "with measures"	2010 "with measures"	2010 "with additional measures"	2010 "with measures"	2010 "with additional measures"
CO_2	118.3	131.1	140.0	126.2	18.3	6.7
CH_4	14.1	12.3	10.5	10.5	–25.5	–25.5
N_2O	12.1	13.2	14.3	14.3	18.2	18.2
HFC+PFC+SF_6	0.0	1.3	2.6	2.6		
GHG total	144.5	157.9	167.4	153.6	15.8	6.3
LUCF	–2.1	–2.3	–2.0	–2.0	–4.8	–4.8
GHG total with LUCF	142.4	155.6	165.4	151.6	16.2	6.5

92. In summary, the projections indicate that Belgium will have difficulty in meeting its target obligations under the Kyoto Protocol. The international flexibility mechanisms may be required to supplement the domestic GHG mitigation measures.

D. Effects of policies and measures

93. Table 11 shows that the largest part of the reductions from the additional measures is likely to be achieved in the manufacturing and construction industries, followed by the energy sector. As these results are obtained with an economic optimization model, they seem to indicate that sizable "cheap" emission reductions are possible in these sectors.

94. Another important observation from table 11 is that in the "with measures" scenario, CO_2 emissions from the energy sector are projected to double between 2010 and 2020. The reason is that, according to MARKAL modelling, the nuclear units retiring after 2014 are replaced with coal-fired plants, which by that time become more economic than gas-fired plants (because of the increasing gas prices). To keep the emissions decreasing, a large increase in the carbon tax was found to be necessary: from €20.3 per tonne CO_2 in 2010 to €67.8 by 2020. Should such a level of tax not be achievable, alternative measures should be found to avoid an increase in emissions in the "post-Kyoto" period.

95. The Belgian experts also analysed the relative importance of non-fiscal and fiscal measures, the carbon tax being the key component of the fiscal measures. According to the NC3, fiscal measures would account for about one third of the total GHG emission reductions by 2010.[36]

---

[35] The information in this paragraph was provided to the review team during the country visit; the information relates to the medium-term projections calculated with the EPM model.

[36] This estimate was made within medium-term modelling with HERMES–EPM.

Table 11. GHG emissions and the effect of additional policies and measures

	GHG emissions[a] (Tg CO_2 equivalent)					The effect of additional measures[b]	
	"With measures"			"With additional measures"		Tg CO_2 equivalent	Share of total (%)
	1990	2010	2020	2010	2020		
Energy sector	29.7	22.8	45.5	16.9	19.5	5.9	29.1
Manufacturing and construction	29.8	34.0	35.8	22.8	19.0	11.2	55.2
Residential and commercial sectors	29.8	35.0	36.3	33.0	26.3	2.0	9.9
Transport	21.6	30.2	34.9	29.4	33.2	0.8	3.9
Total CO_2 emissions	110.9	122.0	152.5	102.1	98.0	19.9	98.0
Total CH_4 and N_2O emissions	3.6	4.2	4.7	3.8	3.9	0.4	2.0
Total GHG emissions	**114.5**	**126.2**	**157.2**	**105.9**	**101.9**	**20.3**	**100.0**

[a] These are energy-related emissions from MARKAL results for the long-term projections; this explains the difference in the GHG total between this table and table 10.

[b] The mitigation effect is the difference in annual GHG emissions between the scenario "with measures" and the scenario "with additional measures", estimated for the year 2010.

96. Using macro-economic models, Belgian experts estimated the macro-economic impacts of the additional GHG mitigation measures.[37] This analysis suggested that a CO_2 tax could have a positive impact on both GDP and employment. For example, it was estimated (with HERMES) that the introduction of a tax of €11.5 (in 1990 prices) per tonne of CO_2 could result in an increase in GDP of 0.1 per cent and in employment of 0.2 per cent in 2012 in comparison with a no-tax scenario, provided that the tax revenues are recycled to reduce social security payments. At the same time, the impact on specific industries varies: energy-intensive industries may suffer from the tax while labour-intensive industries may gain.[38,39] The review team was impressed by the comprehensiveness of macro-economic modelling and noted that such analyses could be included in future national communications.

E. Overall evaluation of the projections

97. **The review team recognized the high quality of the NC3 projections and noted that they were better than the NC2 projections**. The modelling methodology has advanced since the NC2 and it was presented better. The projections are built on reasonable and consistent assumptions developed in extensive consultations between the modelling teams themselves, and also with policy makers at various levels. Use of two different sets of "state-of-the-art" models facilitated a robust analysis. Although the different models naturally produced different results, the differences are limited and explicable. Macro-economic impacts of additional mitigation measures, including a CO_2 tax, were estimated.

98. **The review team identified some areas where further improvement appeared possible:** selection of GHG mitigation measures for modelling; modelling of regional differences; modelling of GHG emissions from transport; links between the GHG inventory and the projections; modelling of the international flexibility mechanisms; modelling of additional measures for non-CO_2 emissions; modelling of the impact of the liberalization of energy markets; comparison with earlier projections (from the NC2).

99. ***Selection of GHG mitigation measures for modelling***. The policies and measures incorporated in the NC3 projections differ from those presented in the NC3 chapter on policies and measures. This happened because the policies and measures chapter of the NC3 reflects the very latest policy status, including the NCP, whereas the projections were prepared earlier. Understanding this situation, the review team still suggested that future projection analyses reflect more closely the actual, latest sets of

[37] These estimates are not in the NC3 but were provided to the review team during its visit to Brussels.

[38] F. Bossier, I. Bracke, I. Callens, H. de Beer de Laer, F. Vanhorebeek, W. Van Ierland, "Évaluation de l'impact des mesures fiscales et non-fiscales sur les émissions de CO_2", Working paper 9-01, Bureau fédéral du plan – ECONOTEC, Bruxelles, 2001.

[39] S. Proost, D. Van Regemorter, "How to achieve the Kyoto target in Belgium – modelling methodology and some results", Working paper 2000-09, Center for Economic Research of the Catholic University of Leuven, 2000.

GHG mitigation policies and measures. This could help to assess the expected policy impact more accurately and give a better opportunity for using the projection results for the subsequent monitoring of policy implementation.

100. The review team also noted that more attention could be given to the analysis of the cost-efficiency of GHG mitigation measures, which could help to determine where GHG reductions could be achieved at the lowest cost. The team had the impression that the Belgian experts had examined this problem within the projection studies but such information was not included in the NC3.

101. ***Modelling of regional differences***. The NC3 projections are prepared for Belgium as a whole. Because of the federal structure of Belgium and the regional character of environmental decision-making, it will be important in the future to translate, consistently, national GHG emissions projections into regional projections. The models used for national GHG projections should have an internal (within the models) sub-division by region in order to incorporate accurately the regional policies and their impact on the emissions. This would allow the inevitable (and important) regional differences in the type and scope of GHG mitigation measures to be better taken into account. It would also help the modelling exercise to estimate the costs of emission reductions in the different regions, taking into account their particular situation, such as the industrial structure and the profile of GHG emissions.

102. ***Modelling of GHG emissions from transport***. The review team felt that the transparency of the presentation of the modelled GHG emissions from transport could be improved. The GHG projections for transport, provided in the NC3, indicate further increases in these emissions. Seeing the behaviour of key emission drivers in transport, such as the projected intensity of freight and passenger transport (in tonne-km and passenger-km) or the projected modal structure of transport, would help the reader understand the projections better. The NC3 projections do not take into account the EC–ACEA agreement on improving the fuel efficiency of motor vehicles. This should be included in the future.[40]

103. ***Links between the GHG inventory and the projections***. The review team had the impression that links between the GHG inventory and GHG projections could be strengthened. First, the base year (1990) emissions in the models could be made consistent with the latest, considerably revised inventory. Second, the analysis of past emission behaviour could be used to a larger extent as input for projection preparation. For example, freight transport volumes increased rapidly in Belgium in the 1990s, but the forces driving this increase are not yet fully understood. Therefore, in developing future projections, it would be desirable to consider in detail the specific factors that drove the transport sector in the past and to link them to the projections.

104. ***Modelling of the international flexibility mechanisms***. The Belgian authorities indicated that, in order to meet its Kyoto Protocol target, Belgium might have to complement domestic policy action with the international flexibility mechanisms. Future modelling could examine the possible role of such mechanisms. The information on the cost of reducing emissions through purely domestic policy action could serve as a guide to the appropriate future allocation of resources to flexible mechanisms.

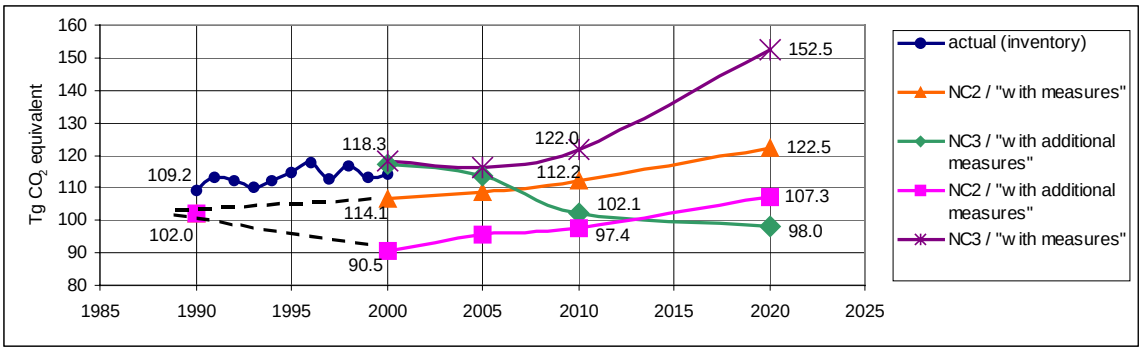
[40] These findings relate to the national projections as presented in the NC3. They may not be fully applicable to some regional studies. The assumptions on driving factors in the Flemish Mobility Plan, for example, are based on an analysis of the past, from which values for the kilometres travelled are derived and used as input for the calculation of GHG emissions in 2010. The projections in the Flemish region take into account the EC-ACEA agreement on improving the fuel efficiency of motor vehicles.

105. ***Modelling of additional measures for non-CO_2 emissions***. The NC3 mentions additional measures to mitigate CH_4 and N_2O emissions but their modelling was limited[41] and could be extended.

106. ***Modelling of the impact of the liberalization of energy markets***. Belgian experts indicated that the impact of liberalization in the electricity and gas sector in Belgium would be studied within a project involving the use of a PRIMES model. Results of such studies, when available, could usefully contribute to future projections.

107. ***Comparison with earlier projections (from NC2).*** The NC3 did not compare the projections in the NC2 with those in the NC3 but, during the review visit, the Belgian authorities demonstrated a comprehensive analysis of the differences between these projections (figure 5). Understandably, the NC3 projections differ from those in the NC2 but the differences are explainable. For example, the NC2 estimated the difference between the "with measures" and "with additional measures" emissions in 2000 at about 24 Tg CO_2 equivalent – assuming that the additional measures would be put to implementation in 1990. The NC3 estimates the difference between the "with measures" and "with additional measures" emissions in 2010 as about 20 Tg CO_2 – assuming that the additional measures would be implemented starting in 2002.[42] Thus, both communications estimate that about 10 years would be required to decrease Belgium's national GHG emissions by about 20 Tg CO_2 equivalent.

Figure 5. Comparison of energy-related GHG projections in the NC2 and the NC3



Note: The long-term projections from the NC2 and the NC3 are used in this comparison.

V. VULNERABILITY ASSESSMENT, CLIMATE CHANGE IMPACTS AND ADAPTATION MEASURES

108. The NC3 reporting on the issues of vulnerability and adaptation follows the UNFCCC guidelines. This chapter provides considerably more information than the NC1;[43] a large part of this information comes from a study prepared by the ECOLAS consulting company in 1999 at the order of the Federal Office for Scientific, Technical and Cultural Affairs.

109. The reference scenario for Belgium used in the NC3 is based on IPCC studies (the Second Assessment Report of 1995 in particular), and on the work of the UK Climate Change Group. The scenario assumes an increase in CO_2 concentration in the atmosphere to 700 parts per million (ppm) by 2100 (from about 360 ppm at present). The average annual temperature would increase by 2.0°C by

---

[41] In the medium-term projections, additional measures on CH_4 and N_2O were not modelled. In the long-term projections, only energy-related additional measures on CH_4 and N_2O were modelled. Additional measures for HFCs, PFCs and SF_6 are not considered in the NC3.

[42] The reason for the difference between the NC2 and the NC3 estimates relates, apparently, to the measures implemented in the 1990s.

[43] The NC2 did not have additional information on vulnerability and adaptation in comparison with the NC1.

2100.[44] The total precipitation may change slightly and its variability would increase; storms would become more frequent.

110. **The climate change impacts** of most relevance for Belgium are those on freshwater resources, agriculture and horticulture, forestry and coastal areas. Climate change can lead to a decrease in the replenishment of freshwater water reservoirs (underground and surface), to lower water levels in summer and autumn, and to the deterioration of water quality due to sea salt intrusion and alterations in soil properties. For coastal areas, sea level rise may lead to salt intrusion in surface waters, increased flooding and coastal pollution. The consequences of climate change for agriculture, horticulture and forestry may be both positive and negative. Higher CO_2 content, increased temperatures and longer growing seasons may lead to increased productivity, although different crop species may be needed. Lower water availability and the migration of pests would have a negative effect.

111. Belgium does not have a national programme for **adaptation to climate change** – the impacts are considered too uncertain and the capacity of Belgium to adapt to climate change is perceived as relatively high (because of the nature of the environment and the structure of the economy). Economic impacts of climate change have not yet been studied in Belgium for the same reasons (except for some estimates of the costs of the 1995 floods). However, Flemish authorities are developing measures for protection against the rising sea level and the increasing number of storms at the North Sea coast. This is part of integrated coastal zone management. A draft cooperation agreement between the Flemish administration and the federal government on the designation of coastal zones vulnerable to flooding was prepared in 2002.

VI. FINANCIAL RESOURCES AND TRANSFER OF TECHNOLOGY

112. The NC3 reporting on financial resources and transfer of technology only partially complies with the reporting guidelines, in that none of the tables indicated in the guidelines (tables 3, 4, 5, 6) is provided because of the lack of detailed information.[45] A definition of the "new and additional resources" (paragraph 51 of the guidelines) is also missing.

113. The **Official Development Assistance** (ODA) of Belgium for 2000 was about 0.4 per cent of GDP. The Directorate General for Development Cooperation of the Ministry of Foreign Affairs is responsible for allocating 68 per cent of the ODA. The present federal government made a commitment to increase the ODA to 0.7 per cent of GDP by 2010.

114. Belgium concentrates its bilateral development aid on five areas: agriculture and food security, health, education, infrastructure and the strengthening of society (including conflict prevention). Since 2000, the description of a cooperation project should indicate whether the project is related to climate change, but it is not possible to determine the relevance to climate change for earlier projects.[46] The Belgian experts assume that the share of climate-related aid would not be large because Belgian assistance is based on national needs defined by national counterparts. So far, no project with climate change as the primary objective has been requested from Belgium.

---

[44] Belgian experts noted that in light of the findings of the IPCC Third Assessment Report this assumption appears conservative. An increase of 3–3.5°C would be considered now as a reference scenario.

[45] The review team noted that some information was available, for example in "Rapport des activités 2001" of the Direction Générale de la Coopération Internationale.

[46] According to the report "Aid targeting the Rio Conventions 1998–2000", DCD/DAC/STAT(2002)7 of the OECD's Development Assistance Committee, Belgium's climate-related funding was about US$ 12.4 million in total in 1998–2000 (about 0.8 per cent of the total bilateral ODA). The Belgian experts indicated that these are rough estimates.

115. Belgium has regularly contributed to the **Global Environment Facility** (GEF); the contribution of Belgium to the third replenishment of the GEF amounted to €46 million.[47] This is 33 per cent more than the Belgian contribution to the second GEF replenishment.

116. A special budget line for **technology transfer** used to exist within the ODA, but it was abandoned recently, following the decision to focus cooperation on the above-mentioned areas. But capacity-building and technology transfer are part of cooperation programmes.

117. The Flemish, Walloon and Brussels-capital regions started to consider the possibility of using the **international flexibility mechanisms** under the Kyoto Protocol – Emission Trading (ET), Joint Implementation (JI) and the clean development mechanism (CDM). For example, the Walloon region has been studying, with the Quebec province of Canada, a possible CDM project in Senegal. The review team noted that such mechanisms require extensive preparation and might take a considerable amount of time to put in place, especially within the federal context of Belgium.

VII. RESEARCH AND SYSTEMATIC OBSERVATION

118. The NC3 contains a comprehensive description of climate-related research and observation in Belgium. Belgian communities are responsible for fundamental research and for applied research in high schools and universities; regions are responsible for technological and policy-related research; and the federal state supports scientific activities of national and international interest. There is no formal coordination of climate-related research among the communities, the regions and the federal state, but there is scientific coordination through information exchange and participation in projects. Notably, there is a "steering committee" for the scientific support plan for a sustainable development policy that covers climate research. Potential users of research results are part of user committees at the project level.

119. At the federal level, a considerable part of the support for **climate research** is provided through the Federal Office for Scientific, Technical and Cultural Affairs (OSTC). In 1996–2000, OSTC implemented a large programme entitled "The First Scientific Support Plan for a Sustainable Development" (SPSD I). The programme included 24 projects relating to climate change and sustainable development with a total budget of €16 million. The projects focused on climate-related uncertainties and on support to the Belgian climate change policy. The second phase of the programme (SPSD II) with a total budget of €57.8 million started in 2000 and will continue through 2005. Two large topics of SPSD II are relevant to climate change: one is sustainable production and consumption patterns, and the other one is global change, ecosystems and biodiversity. About 23 climate-related projects will receive support under SPSD II but the allocation of funds has not been completed yet.

120. Furthermore, as the implementation of an active Demand Side Management (DSM) policy is considered crucial in the context of the Kyoto Protocol, and since the federal authorities may support such a policy in co-operation with the regions, the OSTC has awarded an order to an international consortium, specialized in energy efficiency issues, for a study aiming at elements for a DSM programme. The study, which has identified a possibility to achieve a very substantial part of the Kyoto target through DSM-oriented instruments, is close to completion and will soon be publicly available on the Internet.[48]

121. At the regional level, emphasis is placed on **technological and policy-oriented research**. In 1999, for example, the Walloon region allocated about €8.7 million to support research in energy conservation and renewable energy sources and the Flemish region allocated €14 million to

---

[47] Composed of €10.5 million per year for four years, plus a voluntary contribution of €4 million.

[48] At www.mineco.fgov.be/homepull_fr.htm or www.energie.mineco.fgov.be

energy-related research. The Brussels-capital region supports the preparation and development of energy balances, studies of air pollution and research in transport technologies.

122. **Systematic observation of climate** in Belgium is conducted mostly by the Royal Meteorological Institute. Belgian experts participate in atmospheric, oceanic and terrestrial observation as well as in space-based observing programs. Belgian scientists also participate in the work of international expert panels such as the IPCC, the Scientific Assessment Panel on Ozone Depletion and the European Ozone Research Coordination Unit. For many research topics, Belgium favours participation in international projects instead of developing full-scale national projects.

123. Belgium has not yet determined its approach to participation in the **Global Climate Observing System (GCOS)** because providing representatives to the large number of associations under GCOS is difficult for a small country. But Belgium actively supports the EC initiative to develop a system of Global Monitoring for Environment and Security (GMES) and participates in the initial phase (2001–2003) of GMES deployment.

VIII. EDUCATION, TRAINING AND PUBLIC AWARENESS

124. The NC3 reports issues of education, training, and public awareness in compliance with the reporting guidelines and more comprehensively than did the NC1.[49] It is well understood in Belgium that an effective climate change policy is not possible without public understanding and support. The need to promote public awareness on climate change is reflected in regional and federal policies.

125. The distribution of responsibilities within the federal structure of Belgium is important for promoting public awareness on climate change. Education is the responsibility of communities; environmental policy in general and the related training (for example, in efficient use of energy) are the responsibility of the regions; climate change as an issue is dealt with by federal authorities, too, because Belgium has related national obligations.

126. At the federal level, the Belgian Federal Council for Sustainable Development (FCSD) acts as an important forum for public discussion of issues relating to sustainable development, including climate change. The FCSD includes federal officials, regional authorities, and representatives of industries and NGOs. On request, the FCSD also provides written advice to the federal government reflecting the view of the FCSD and the level of multi-stakeholder consensus (or its absence) on the considered issue. The federal government asked 19 times for such advice in the year 2000.

127. The FCSD provided well-prepared advice on the Belgian climate change policy: on the implementation of the Kyoto Protocol (1998), on climate-related taxation (1999), on the flexibility mechanisms (1999 and 2002), on the proposed European system of emission trading (2000), on the cooperation agreement on reducing GHG emissions among the federal government and the regions (2001), on voluntary agreements with industries (2001), on obstacles for the implementation of "no-regret" measures to reduce GHG emissions (2003), and on some other matters.

128. At the regional level, there are also councils and other mechanisms (of various types) that provide multi-stakeholder consultations. Active discussions on the new environmental plans, such as the MiNa 3 plan in the Flemish region and the Air Plan in the Walloon region, are being conducted. These plans contain climate-related actions and climate change is part of the discussions. The Flemish region also organizes or participates actively in workshops on the EC directive on emission trading and the use of the international mechanisms under the Kyoto Protocol.

---

[49] The NC2 did not update the NC1 information on this subject.

129. The review team noted that raising public awareness on the efficient use of energy seemed to be well advanced in Belgium. Climate change as a separate topic receives less attention. The team remarked that wider distribution of IPCC studies and available publications of Belgian scientists on the implications of climate change for Belgium could help promote awareness of climate change.

130. Belgian NGOs are concerned about the slow implementation of domestic measures for GHG reductions in Belgium, and they work actively on climate policy, including raising awareness of climate change. The NGOs were not involved in the preparation and discussion of the NC3, although most of the information reported in the NC3 was available to them through other sources. In the opinion of the review team, the participation of NGOs in the discussion of a national communication could help increase its impact on climate-related policies and on public awareness of climate change.

131. Initiatives are taken in various languages (Dutch, French and German) to incorporate environmental education, including the subject of climate change, into school syllabuses and teaching material for the young generation. Several universities offer courses on climate change with a focus on links between climate change and human activities. Recently, several types of training for building professionals, trainers, consumer associations and municipal eco-advisors at both federal and regional levels were introduced, with emphasis on methods to improve energy use efficiency.

IX. CONCLUSIONS

132. **The Belgian NC3 is, in general, in compliance with the UNFCCC reporting guidelines**. The NC3 is better prepared than the NC2. The most notable improvements are: an extended and more consistent GHG inventory; a new set of GHG mitigation measures reflecting the recent advances in the Belgian climate policy; a thorough revision of the projections; new assessments for vulnerability and adaptation; and a well-prepared summary on the promotion of public awareness of climate change.

133. **The review team identified some areas for further improvement**: identification of key drivers for emissions growth; evaluation of GHG reductions from individual mitigation measures; use of regional disaggregation within the national GHG projections; change of the reporting on funding and technology transfer to bring it into full compliance with the UNFCCC guidelines; and some others.

134. **The total GHG emissions in Belgium (without LUCF) increased by 6.9 per cent from 1990 to 2000**. The increase was high in transport (24.0 per cent) and industrial processes (44.2 per cent).

135. Notwithstanding the failure to meet the target of a 5 per cent reduction in the national CO_2 emissions by 2000 (defined in 1994 in the first Belgian programme to reduce CO_2 emissions), there has been considerable development of the climate policy by the regional and the federal authorities in recent years, which was reflected in a new National Climate Plan that integrates the relevant regional plans and initiatives. At the same time, regional and federal climate policies have not yet been designed in a manner consistent with the Belgian national target under the Kyoto Protocol. The federal and regional authorities are working on a "burden-sharing agreement" and aim to have it in place by the end of 2005. The agreement should reflect a consensus relating to the distribution of the national GHG reduction target under the Kyoto Protocol among the Belgian regions and/or the economic sectors. The review team commended the Belgian authorities for their efforts and noted the importance of a timely conclusion of the agreement as well as the importance of policy monitoring and evaluation.

136. The NC3 projections show that **with the policies currently in place Belgium's GHG emissions in 2010 would exceed the 1990 level by about 16 per cent.** Within the EC burden-sharing agreement for the Kyoto Protocol, Belgium is to reduce its GHG emissions in the period 2008–2012 by 7.5 per cent compared to 1990. According to modelling, the timely introduction of additional measures, including a

comprehensive CO_2 tax increasing from €4.7/t CO_2 in 2002 to about €20/t CO_2 by 2010, could bring the Belgian GHG emissions considerably closer to the Kyoto Protocol target.

137. Belgian experts used macro-economic modelling to analyse the impacts of CO_2 taxation on the national economy. This analysis showed that under a certain tax recycling scheme the economy might benefit from the introduction of a CO_2 tax, because the recycling of tax revenues could decrease the high labour taxation in Belgium and thus give a positive stimulus to the economy.

138. Belgian authorities indicated that **Belgium might need to use the international flexibility mechanisms in addition to domestic action to meet its Kyoto Protocol target**. Federal and regional authorities started a discussion of the organizational arrangements for using the mechanisms.

139. The climate change impacts of most relevance to Belgium are those on freshwater resources, agriculture and horticulture, forestry and coastal areas. Belgium does not have a national programme for adaptation to climate change; the impacts are considered too uncertain and the capacity of Belgium to adapt to climate change is perceived as relatively high.

140. Currently, the Official Development Assistance (ODA) of Belgium amounts to about 0.4 per cent of GDP. The government is committed to increasing ODA to 0.7 per cent by 2010. The ODA statistics did not allow the share of climate-related aid in the total ODA to be identified in the NC3. Therefore, the reporting in the NC3 is in only partial compliance with the UNFCCC guidelines.

- - - - -